HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-8816 | Fax 03 314-9181 | Email info@hurunui.govt.nz
Web hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil
Skype hdc_customer_services | twitter.com/hurunuidc

WM Hislop
61 Watties Road
RD 2
AMBERLEY
7482

7 October 2021

Dear Warren and Angelique,

Water Application Number WS21059-WS21063 – 122 Racecourse Road, Amberley

The Council has approved your application to connect 5 new units to the Ashley Rural Water Supply. This connection will be supplied in accordance with the Hurunui District Council Three Waters Bylaw.

Your responsibilities for connection completion for Lots accessed off of Innes Road – Stage 2 (see map enclosed)

- Installation of DN63mm 12.5 bar pipe from the 100mm main at the junction of Racecourse Road to the Westernmost tank on the new sub division (Tank 182761P). This would include a road crossing.
- A 63mm road crossing in a 100mm duct is required. A pressure reducing valve and gate valve will need to be located prior to the road crossing.
- Minimum DN25mm 12.5bar pipe, installed to a cover depth of at least 500mm, from your proposed tank location to where our restrictor box will be located on the road boundary.
- The point of supply to existing tank 1862 should be relocated to a restrictor on Racecourse Road and the existing connection disconnected and abandoned.
- Tanks sufficiently sized to store at least 3 days' supply onsite. This equates to at least a 5400 litre tank for 1 unit of Ashley rural water.
- **Tanks installed with an overflow and managed air gap**.
- All pipe and fittings must be laid to the standards set out in Hurunui District Council's Development Engineering Standards 2017.
- Payment of remaining balance after all required pipe installation.

Your responsibilities for connection completion for Lots accessed off of Racecourse Road – Stage 3 (see map attached)

- Installation of DN63mm 12.5 bar pipe from the 100mm main on the south side of Racecourse Road to connect to the existing tank 1862 and the proposed tanks 182764P and 182765P. This would include a road crossing.
- A 63mm road crossing in a 100mm duct is required. A gate valve will need to be located prior to the road crossing.
- Proposed Tank 182637P (on Lot 3 DP 520186) can be connected to the existing sub main in Racecourse Road.
- Minimum DN25mm 12.5bar pipe, installed to a cover depth of at least 500mm, from your proposed tank location to where our restrictor box will be located on the road boundary. A new lateral for the existing tank 1862 also needs to be included.

- Tanks sufficiently sized to store at least 3 days' supply onsite. This equates to at least a 5400 litre tank for 1 unit of Ashley rural water.
- **Tanks installed with an overflow and managed air gap**.
- All pipe and fittings must be laid to the standards set out in Hurunui District Council's Development Engineering Standards 2017.
- Payment of remaining balance after all required pipe installation.

Prior to any pipe purchase would you please contact Rick Frye, Council's Utilities Officer, to arrange a site meeting to discuss pipe route and any problems that may arise with your proposal. You can contact him on his cell phone number 027 528 6969.

Councils responsibilities for connection completion

- Installation of restrictor and connection of service lateral to restrictor.
- Connection to water main.
- Please note that this connection will not be completed unless the overflow is installed with the correct managed air gap.
- Please note that this work will not proceed until you have paid the full fee.

If you could arrange to pay the remaining balance of $6,340.00 per new connection required, after you have installed all the necessary pipes and have the tank on site with the overflow installed. On receipt of the balance owing, I will forward your application on to Rick to carry out the connection. **Please anticipate a connection timeframe of 20 days from the date of payment or notification.**

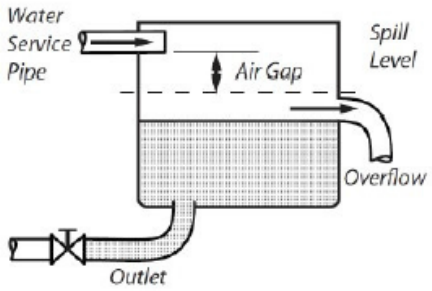
If you have any questions, please feel free to contact me.

Yours sincerely

Cynthia Otto
Customer Services Advisor

Phone 03 314-8816
Email cynthia.otto@hurunui.govt.nz

Managed air gap



- Used for High, Medium & Low Hazard Risks.
- For private tanks on restricted water supply networks. The pipework should be protected to prevent vermin and birds contaminating the water.
- The air gap is to be a minimum of 50mm below the level of the ballcock with an overflow pipe to prevent the reduction of the gap.
- To be installed, maintained and monitored by the property owner.
- The managed air gap is put in when you install your tank, so there is no additional cost.

HURUNUI District Council

Address: PO Box 13, Amberley
Telephone: (03) 314 8816
Facsimile: (03) 314 9181

B & P Donnelly
176 Kivers Road
RD 7
Christchurch 7677

Customer No BC210485
Date 28/09/21

GST Reg No 53-915-477

Tax Invoice 52976

BC210485 - Deposit Invoice - 153 Innes Road	1,500.00 *
(* Incl GST $195.65)	
Sub Total	**$1,500.00**
Total incl GST	**$1,500.00**

Council's bank account 03-0802-0946666-00

B & P Donnelly

Customer No BC210485
Date 28/09/21
Invoice No 52976
Total Due $1,500.00

GoGet Processing Summary Report

Consent No: 210485

Site Address: 153 Innes Road

Description: 4-bedroom dwelling with attached garage and woodburner

Checklist/Elements	Status	Notes	Processed By
Vetting	Pass		Adele Patchett
Exemption	N/A		AMP
Certificate of Acceptance (Building)	N/A		AMP
Building consent/PIM	Pass		AMP
Client Checklist *	Pass		AMP
Earthquake Fast Track Queue	N/A		AMP
PIM only check	N/A		AMP
ED buildings - ODP Waiver	N/A		AMP
Deposit/Fee	Pass		AMP
HDC Project Payment (Lominga)	N/A		AMP
Application Form - Building Consent*	Pass		AMP
Building Code Assessment	Pass	Missing RFI returned - Building code assessment completed	AMP
Compliance schedule information	Pass	CS not required (Residential)	AMP
Planning Check / PIM Declaration form *	Pass		AMP
Certificate of Title *	Pass	Missing RFI returned - current R of T provided	AMP
Agent Nomination form *	N/A	Owner applying	AMP
Any relevant Resource Consents *	Pass	RC210485	AMP
Design Memorandum (Form 2A)	Pass		AMP
Heritage Building Status - Internal Only alterations	N/A	New Build	AMP
DRAWINGS/SPECS:	Pass		AMP
Site plan *	Pass		AMP
Floor plan *	Pass		AMP
Elevations *	Pass		AMP
Drainage plan*	Pass		AMP
Bracing Plan & Schedule/Calculations	Pass		AMP
Cross sections	Pass		AMP
Construction details	Pass		AMP
Risk Score (Weathertightness Matrix)	Pass	Assessed as 8 by designer	AMP
Building Category	Pass	R1 - RESIDENTIAL 1:	AMP
Lighting Plan	Pass	Sheet 23	AMP
Written specifications	Pass		AMP
Roof Truss Design & PS1	Pass		AMP
Producer Statements	N/A		AMP
Liquefaction Assessment received?	N/A		AMP
Amendment to Building consent	N/A		AMP
Solid & Liquid Fuel Burner	N/A		AMP
Marquee Checklist	N/A		AMP
1 Storey Dwelling	Pass		Brenna Ogier
General	Pass		BXO
Property File Information Considered	Pass	Considered. No issues noted.	BXO
New building work	Pass	Building work has not been started - Confirmed	BXO
Building Complexity	Pass	R2 - Detached dwelling (SH) designed to a common standard (NZS 3604, NZS 4229) less than or equal to	BXO

Checklist/Elements	Status	Notes	Processed By
		2 storeys and risk matrix score less than or equal to 12	
PIM Information Considered	Pass	FROST CONTROL FANS: Resource consent is required for breach of rule 3.4.3.22(a); Any new dwelling located on a separate lot under different ownership within 1km of any frost control fan must be designed and constructed so noise level inside any bedroom of the dwelling will not exceed 30 dB LAeq with all fans operating at normal duty. Compliance must be demonstrated by a design certificate from an appropriately qualified and experienced acoustic engineer based on outlined noise requirements. The dwelling is located within 1km of a frost control fan. An acoustic report has been provided, although is based on drawings dated Jan 2019 by Trident Homes. Thus, a new report must be provided or the report provided needs to be amended to note that it is based on drawings dated 3rd Sept 2021 by A1 Homes. The outlined recommendations in the report must be incorporated in the plans. NO BUILDING WORKS TO PROCEED UNTIL ADDRESSED. FIREFIGHTING WATER: Resource consent is required for breach of rule 3.4.3.23(a); At the time a residential dwelling is erected on any building site that is not provided with sufficient firefighting water supply via the Council's reticulated water supply a firefighting water supply that complies with the New Zealand Fire Service Firefighting Water Supplies Code of Practice: SNZ PAS 4509:2008 (Code of Practice) is to be provided. No firefighting water supply is shown on the plans. Please note on the plans a firefighting water supply that complies with the New Zealand Fire Service Firefighting Water Supplies Code of Practice. Refer to the firefighting checklist provided with the issue of the PIM. NO BUILDING WORK TO PROCEED UNTIL ADDRESSED. --- Response - BXO 21 Nov 2021 4:39pm --- No longer an issue in Magiq - resolved	BXO

Request for Further Information:

Request:	FROST CONTROL FANS: Resource consent is required for breach of rule 3.4.3.22(a); Any new dwelling located on a separate lot under different ownership within 1km of any frost control fan must be designed and constructed so noise level inside any bedroom of the dwelling will not exceed 30 dB LAeq with all fans operating at normal duty. Compliance must be demonstrated by a design certificate from an appropriately qualified and experienced acoustic engineer based on outlined noise requirements. The dwelling is located within 1km of a frost control fan. An acoustic report has been provided, although is based on drawings dated Jan 2019 by Trident Homes. Thus, a new report must be provided or the report provided needs to be amended to note that it is based on drawings dated 3rd Sept 2021 by A1 Homes. The outlined recommendations in the report must be incorporated in the plans. NO BUILDING WORKS TO PROCEED UNTIL ADDRESSED. FIREFIGHTING WATER: Resource consent is required for breach of rule 3.4.3.23(a); At the time a residential dwelling is erected on any building site that is not provided with sufficient firefighting water supply via the Council's reticulated water supply a firefighting water supply that complies with the New Zealand Fire Service Firefighting Water Supplies Code of Practice: SNZ PAS 4509:2008 (Code of Practice) is to be provided. No firefighting water supply is shown on the plans. Please note on the plans a firefighting water supply that complies with the New Zealand Fire Service Firefighting Water Supplies Code of Practice. Refer to the firefighting checklist provided with the issue of the PIM. NO BUILDING WORK TO PROCEED UNTIL ADDRESSED.	BXO
Response:	*No longer an issue in Magiq - resolved*	BXO

Service Plan Review	Pass	Services locations & type correct as per plans provided	BXO
Earthquake zone	Pass	3	BXO
Altitude	Pass	0-100m	BXO
Snow zone & load	Pass	N4 <100m - Up to 1kPa	BXO

Checklist/Elements	Status	Notes	Processed By
Wind zone	Pass	A	BXO
Exposure zone	Pass	B	BXO
Ground	Pass	3 (VL) - Suitable - Good Ground as defined in NZS3604	BXO
Wind speed	Pass	Wind Zone: A Ground Roughness: Open Site Exposure: Exposed Topographic Class: T1 High in accordance with NZS3604	BXO
Importance level	Pass	2	BXO
Building use - Schedule 2 Building Regulation 2005	Pass	SH	BXO
Procedure for inspections included	N/A	no engineers inspections required	BXO
Building Act 2004 Sections	Pass		BXO
Sec 28 - Cases Involving Bans	Pass	N/A none identified in documents	BXO
Sec 67 - Waivers or Modifications	Pass	None requested/ required	BXO
Sec 71-74 - Building on Land Subject to Natural Hazards	Pass	Site of proposed building clear of natural hazard areas mapped on YourMaps	BXO
Sec 75 - Building on 2 or More Allotments	Pass	Proposed building work sited clear of legal boundaries and easements - checked scheme plans from RC210163	BXO
Sec 102 - When compliance schedule must be issued	N/A	Not required	BXO
Sec 112 - Alterations to Existing Buildings	Pass	New building - no requirements	BXO
Sec 133AT - Alterations to buildings subject to EPB notice	Pass	N/A - Sec 113AT only applies to Earthquake Prone Buildings	BXO
Sec 113 - Specified Intended Life	Pass	Indefinite but not less than 50 years	BXO
Sec 114 - Change of use	Pass	New building - no requirement	BXO
Sec 116A - Subdivision	Pass	N/A - no subdivision required as part of this application	BXO
NZ Building Code Handbook	Pass		BXO
A1 Classified Use	Pass	Housing - Detached dwelling	BXO
B1 Structure	Pass		BXO
Foundations	Pass	Please show pod layout on plans, include any thickening''s to be shown in accordance with the latest Firth RibRaftfi Technical Manual, January 2020 (please provide copy) Please take into account the polished concrete in your design. --- Response - BXO 1 Dec 2021 4:25pm --- Confirmed happy for me to download - done	BXO
Request for Further Information:			
Request:	Please show pod layout on plans, include any thickening's to be shown in accordance with the latest Firth RibRaftfi Technical Manual, January 2020 (please provide copy) Please also take into account the polished concrete in your design. Pod design provided Technical manual not provided - Building Officer to add to Techdata at agents request Polished concrete taken into account - slab thickness now 100mm - ok with Firth Raft design RFI 2: Firth RibRaftfi Technical Manual, January 2020 - not provided - are you happy for me to download and add to tech data?		BXO
Response:	*Confirmed happy for me to download - done*		BXO
Floor Slab and mesh	Pass	Rib-raft system - see dwgs for manufacturer's data	BXO
DPM	Pass	250 micron 1 ply polyethylene sheet refer sheet 1	BXO
Steel concrete cover	Pass	Adequate support, min 30mm to concrete top	BXO

Checklist/Elements	Status	Notes	Processed By
		surface - Firth Manual	
Supplementary bars	Pass	Supplementary bars to shower recess is to be shown on plans --- Response - BXO 1 Dec 2021 4:30pm --- Confirmed yes add to plans	BXO
Request for Further Information:			
Request: Supplementary bars to shower recess is to be shown on plans RFI 2: Supplementary bars to shower recess corners not shown on plans - cross bars - ok for me to add to plans?			BXO
Response: Confirmed yes add to plans			BXO
Shrinkage control	Pass	Saw-cuts - positions comply (Fig 7.19)	BXO
Slab thickenings (see truss design data)	Pass	Complies with Firth technical manual	BXO
Piles (incl. bracing)	N/A	N/A; none proposed/required	BXO
Bearers	N/A	N/A; none proposed/required	BXO
Floor joists	N/A	N/A; none proposed/required	BXO
Load-bearing walls	Pass	All loads transferred to exterior walls/footings Ext.footings/slab thickenings in place where required	BXO
Stud centres (ground level)	Pass	SG8 90 x 45mm @ 600mm crs	BXO
Long studs	Pass	Please indicate long stud specifications on plans (truss design indicates all gable ends are included in wall framing) - 90x45 at 600ctrs does not cover this height. --- Response - BXO 21 Nov 2021 4:49pm --- No long studs, revised truss design provided with truss to ends	BXO
Request for Further Information:			
Request: Please indicate long stud specifications on plans (truss design indicates all gable ends are included in wall framing) - 90x45 at 600ctrs does not cover this height.			BXO
Response: No long studs, revised truss design provided with truss to ends			BXO
Lintels	Pass	By truss manufacturer - see drawings and PS1	BXO
Bracing (ground level)	Pass	GIB "Ezybrace" system CHH Woodproducts Ecoply brace system	BXO
Brace calculations	Pass	Brace calculations need correcting, plan area not entered in the input section giving incorrect minimum bracing units required. With correct leaves areas requiring attention --- Response - BXO 21 Nov 2021 4:53pm --- Revised calculations provided - now complies	BXO
Request for Further Information:			
Request: Bracing calculations need correcting, plan area not entered in the input section giving incorrect minimum bracing units required. With correct leaves areas requiring attention			BXO
Response: Revised calculations provided - now complies			BXO
Bracing distribution	Pass	Sufficiently even bracing distribution - complies	BXO
Ceiling Diaphragms	N/A		BXO
Support beams	N/A		BXO
Trusses	Pass	Proprietary timber trusses - refer manufacturer's details and PS1	BXO
Trusses - Truss point loads	Pass	Refer truss manuf. details and PS1 for specific design	BXO
Trusses - Truss fixings	Pass	Proprietary manufacturer's fixings - see dwgs and PS1	BXO
Timber rafters	N/A	No rafters in design	BXO
Rafter fixings	N/A	No rafters in design	BXO
Purlins/tile battens	Pass	SG8 70 x 45mm on flat @ 900mm crs less than or	BXO

Checklist/Elements	Status	Notes	Processed By
		equal to 900mm span	
Purlin/batten fixings	Pass	1/10g self-drilling screw, min 80mm long	BXO
Roof bracing	Pass	Lumberlok "Multi-brace" cross bracing (complies with Sec. 10.4) Refer sheet 16	BXO
Gable braces	Pass	refer above	BXO
Ceiling battens/restraints	Pass	Proprietary metal ceiling batten system to manuf. requirements - Rondo - refer page 90 specifications - doesn''t state centres on plans 10mm on walls 13mm on ceilings 70x35 H1.2 timber also specified Please confirm --- Response - BXO 21 Nov 2021 4:54pm --- Confirmed 70x35 timber at 600ctrs ok	BXO
Request for Further Information:			
Request: Ceiling battens: Rondo referred to on page 90 specifications - centres not specified, plans specify 70x35 H1.2 timber please confirm and remove conflicting information.			BXO
Response: Confirmed 70x35 timber at 600ctrs ok			BXO
Entry columns/beams	N/A	N/A; none proposed/required	BXO
Verandah Posts	N/A	N/A; none proposed/required	BXO
Footing sizes (uplift)	N/A	N/A; none proposed/required	BXO
Verandah beams	N/A	N/A; none proposed/required	BXO
Timber rafters	N/A	N/A; none proposed/required	BXO
Deck piles	N/A	N/A; none proposed/required	BXO
Deck Bearers	N/A	N/A; none proposed/required	BXO
Deck joists	N/A	N/A; none proposed/required	BXO
Decking	N/A	N/A; none proposed/required	BXO
Retaining walls	N/A	N/A; none proposed/required	BXO
Siting/surcharge	N/A	N/A; none proposed/required	BXO
Stair construction	N/A	N/A; none proposed/required	BXO
Footings and construction	N/A	N/A; none proposed/required	BXO
Solid fuel heater compliance	Pass	Means of compliance - NZS2918:2001	BXO
Non Clean-Air-approved burner model	N/A		BXO
Clean-air approved burner model	Pass	Woodsman Tarras MKIII free-standing (dry)	BXO
Clean air approved number	Pass	Clean air approved number 143492	BXO
Hearth/Slab	Pass	Ceramic tile surface	BXO
Chimney/flue	Pass	"Heat Saver" 150mm dia. S/S flue kit	BXO
Fire/Flue Durability applications	Pass	Grade 304 S/S flue system - 15 years	BXO
B2 Durability	Pass		BXO
Fixings	Pass	Quality materials from reputable manufacturers	BXO
Durability evaluation	Pass	Quality materials from reputable manufacturers	BXO
Durability; materials suitable for application	Pass	Durability of all materials specified suitable for proposed applications - OK	BXO
Timber treatments - In ground	N/A		BXO
Timber treatments - Sub-floor	N/A		BXO
Timber treatments - Floor	N/A		BXO
Timber treatments - Ext. trims	Pass	H3.1	BXO
Timber treatments - Cavities	Pass	H3.1	BXO
Timber treatments - Plywood	N/A		BXO
Timber treatments - Interior wall framing	Pass	H1.2	BXO
Timber treatments - Exterior wall framing	Pass	H1.2	BXO

Checklist/Elements	Status	Notes	Processed By
Timber treatments - Roof framing	Pass	H1.2	BXO
Timber treatments - Exterior deck piling	N/A		BXO
Timber treatments - Exterior deck framing	N/A		BXO
C1 - C6 Protection from Fire	Pass		BXO
Solid Fuel heater (heat transfer)	Pass	Manufacturer's test approved clearances provided	BXO
Woodburner make and model	Pass	Woodsmna Tarras MKIII	BXO
Risk group assessed	Pass	SH	BXO
Fire protection system	Pass	Type 1 - Domestic smoke alarms only	BXO
Escape path lengths	Pass	Match protection system Yes - confirmed using Trapeze	BXO
Distance to boundary (1m min)	Pass	Distance to boundary greater than 1m - ok	BXO
Life/Property rating system	Pass	Distance to boundary greater than 1m - rating correct	BXO
D1 Access Routes	Pass		BXO
Slip resistance to external access	Pass	Broomed/wood floated conc. compliant with Table 2 - refer sheet 11	BXO
Stair	N/A		BXO
Tread and risers	N/A		BXO
Handrails	N/A		BXO
D2 Mechanical Access	N/A	No work detailed in this proposal requiring consideration under this code clause	BXO
E1 Surface Water	Pass		BXO
Acceptable Solution Suitable	N/A	Catchment area puts this outside the scope of AS1	BXO
Protection from flooding	Pass	Adequate contours to direct surface water away - OK	BXO
Minimum FFLs	Pass	Outside the scope of AS1 how ever checked Canterbury maps viewer and site is relatively flat with the general land sloping in one direction (adequate levels to direct water away) Plans +225 which is in accordance with NZS3604	BXO
Gutters	Pass	Quad/box ext gutters - comply with E1 Fig. 15	BXO
Down pipes	Pass	Standard downpipes - comply with E1, Table 5	BXO
Discharge pipe size	Pass	100mm diameter	BXO
Pipe gradients: mains	Pass	1:120 minimum	BXO
Soak pit/other	Pass	Stormwater to 25,000L dual purpose tank (for irrigation use only) - overflow to adequately sized and detailed soak pit E1 VM1	BXO
Driveway drainage	N/A	No specific requirements	BXO
Retaining wall drainage	N/A	No retaining wall to consider	BXO
E2 External Moisture	Pass		BXO
Floors	Pass	Cladding clearances to ground.	BXO
Weathertightness risk factors	Pass	See Risk Matrix calcs - all complies	BXO
Building Wrap type / Sill tape	Pass	Building wrap and flexible flashing tape system not specified - please specify and provide manufactures specifications. --- Response - BXO 21 Nov 2021 4:55pm --- Confirmed as Texton wall wrap with Superstick tape system - manufactures specifcaitons and BRANZ certs provided - both approved products on HDC list	BXO

Request for Further Information:

Request:	Building wrap and flexible flashing tape system not specified - please specify and provide manufactures specifications.	BXO
Response:	*Confirmed as Texton wall wrap with Superstick tape system - manufactures specifcaitons and BRANZ certs provided - both approved products on HDC list*	BXO

Cladding systems	Pass	James Hardie Axon panel on cavity	BXO

Checklist/Elements	Status	Notes	Processed By
Brick tie spacings - SED	N/A		BXO
Cladding on frame - bare GL	N/A		BXO
Clad on frame - paved GL	N/A		BXO
Cav. veneer clad - bare GL	Pass	Greater than or equal to 150 and <225mm	BXO
Cav. Veneer clad - paved GL	Pass	Greater than or equal to 100 and <150mm	BXO
Flashings	Pass	Standard flashings - Comply with E2 Table 7	BXO
Roofing systems	Pass	Longrun coated metal - trapezoidal	BXO
Roof pitch	Pass	Greater than or equal to 0°less than or equal to 25°	BXO
Roofing underlay type	Pass	Thermakraft 215 bituminous self supporting - refer sheet 1	BXO
E3 Internal Moisture	Pass		BXO
Surface finishes	Pass	Refer drawings and spec Paint finish, aqualine to wet areas, impervious linings where required. Polished concrete proposed to bathrooms, laundry area and kitchen - please indicate on plans and provide manufactures specifications for the proposed sealant to these areas. --- Response - BXO 21 Nov 2021 4:56pm --- Sealer will be used on the concrete manufactures specifications provided - ok	BXO
Request for Further Information:			
Request: Polished concrete proposed to bathrooms, laundry area and kitchen - please indicate on plans and provide manufactures specifications for the proposed sealant to these areas.			BXO
Response: Sealer will be used on the concrete manufactures specifications provided - ok			BXO
Fungal growth prevention	Pass	Appropriate surfaces/finishes installed/applied	BXO
Wet area shower	Pass	Tiled floor over membrane/wet wall panels over frame Ardez WPM 001 - manufactures specifications provided - on HDC approved product list Tiled showers with safety glass screen and door? Are they recessed into the slab? (construction detail required including supplementary reinforcing in accordance with Firth Manual. Slope to drain minimum gradient in accordance with Ardex installation details). --- Response - BXO 21 Nov 2021 4:57pm --- Glass screens and doors confirmed (10mm safety) Constrcution detail provided of recess in ribraft	BXO
Request for Further Information:			
Request: Tiled showers with safety glass screen and door shown on plans (confirm if this is correct as conflicting details provided) Are they recessed into the slab? (construction detail required including supplementary reinforcing in accordance with Firth Manual. Slope to drain minimum gradient in accordance with Ardex installation details).			BXO
Response: Glass screens and doors confirmed (10mm safety) *Constrcution detail provided of recess in ribraft*			BXO
F1 Hazardous Agents	Pass		BXO
F1 Hazardous Agents	Pass	Ecan LLUR report indicates preliminary report not summarised yet. Preliminary site investigation report was done and provided to ECAN in 2018 The proposed site is indicated as being potentially contaminated. Please show how you intend to comply with F2	BXO

Checklist/Elements	Status	Notes	Processed By
		Hazardous agents on site. --- Response - BXO 1 Dec 2021 4:22pm --- Copy of report provided - confirmed no hazardous agents	
Request for Further Information:			
Request: The proposed site is indicated as being potentially contaminated. Please show how you intend to comply with F1 Hazardous agents on site. RFI 2: F1 Hazardous agents on site: Full detailed site investigation completed 01/08/2021 performed by Sephira Environmental Ltd. - report has been completed but not yet summarised - clients chasing lawyer for copy - require copy of the report please.			BXO
Response: Copy of report provided - confirmed no hazardous agents			BXO
F2 Hazardous Building Materials	Pass		BXO
Hazardous building materials	Pass	Glazing only to consider; issues addressed OK - refer sheet 13	BXO
F3 Hazardous Substances	N/A	No work detailed in this proposal requiring consideration under this code clause	BXO
F4 Safety from Falling	Pass		BXO
Opening windows	Pass	FFL - GL <1m - protection not required	BXO
Barriers	N/A		BXO
F5 Construction Hazards	Pass		BXO
F5 Construction Hazards	Pass	Protection provided - refer sheet 2 Temp fencing in accordance with AS1	BXO
F6 Visibility in Escape Routes	N/A	N/A - Does not apply to Detached Dwellings, household units within Multi-unit Dwellings, Outbuildings, or Ancillary buildings.	BXO
F7 Warning Systems	Pass		BXO
Locations	Pass	3m max from all bedroom doors - OK - refer sheet 23	BXO
F9 Means of restricting access to residential pools	N/A	No work detailed in this proposal requiring consideration under this code clause	BXO
G1 Personal Hygiene	Pass		BXO
No. of sanitary fixtures	Pass	Main bathroom: 1x bath 1x shower 1x vanity 1x wc Ensuite: 1x shower 1x vanity 1x wc Adequate facilities for 4 bedroom dwelling	BXO
Basin in WC space	Pass	Yes	BXO
G2 Laundering	Pass		BXO
Laundering facilities	Pass	Wash tub; washing machine connection provided, refer sheet 10	BXO
G3 Food Prep and Prevention of Contamination	Pass		BXO
Appliances and Facilities	Pass	See Drawings - OK Sheet 10 Prep sink: Yes Cooktop: Yes Storage: Yes Refrigerator: Yes	BXO
G4 Ventilation	Pass		BXO

Checklist/Elements	Status	Notes	Processed By
Ventilation	Pass	Refer sheet 10,13,23 Natural - opening windows and doors Natural openings + extract to Bathrooms and Kitchen	BXO
Ventilation rate	Pass	Natural - min. 5% of floor area opening windows	BXO
G6 Airborne and Impact Sound	N/A	N/A- No building elements between common occupancies.	BXO
G7 Natural Light	Pass		BXO
Vertical windows in external walls	Pass	Greater than or equal to 10% of floor area for window area to all habitable spaces - Kids room measures at 17.05sqm how ever scaling with trapeze and calculating the habitable space of the area comes to 16.855 which results in the 10% being achieved	BXO
Outside environment awareness	Pass	Sufficient natural light levels and outside env. awareness	BXO
G8 Artificial Light	Pass		BXO
Illuminance	Pass	Illuminance at floor level will meet 20 lux minimum - refer sheet 23	BXO
G9 Electricity	Pass		BXO
Electrical installation	Pass	Refer dwgs for all electrical fitting locations and details - refer sheet 23	BXO
G10 Piped Services	N/A	No work detailed in this proposal requiring consideration under this code clause	BXO
G11 Gas as an Energy Source	Pass		BXO
Safe pressure maintenance suitability	Pass	Gas Hob - splash back requirements noted on sheet 10 in accordacne with ASNZS5601 Gas Hot water - Infinity installation instructions provided for EF26 A Seriers continuous flow - reputable brand and product with in service history. Adequate system for 4 bedroom dwelling	BXO
Auto cut-off system (vent. space)	Pass	Auto cut-off in place as required for appliance in ventilated space - OK	BXO
Isolation valves	Pass	All systems suitably fitted with isolation valves necessary - OK	BXO
G12 Water Supply	Pass		BXO
Water supply - source	Pass	Connected to Local Authority supply	BXO
Water supply - quantity	Pass	Adequate council supply - OK	BXO
Water supply - quality	Pass	Adequate council supply quality - OK	BXO
Safe tray installed	N/A	N/A - No cylinder	BXO
HW Tempering	Pass	Output max 55°C - page 124 specifications	BXO
Seismic restraints/ tank supports	Pass	Adequate seismic restraints note on sheet 10	BXO
Drain/relief vent material	N/A	N/A - No cylinder	BXO
Solar heating system	N/A	N/A - no solar	BXO
Solar support/fixing	N/A	N/A - no solar	BXO
G13 Foul Water	Pass		BXO
Effluent disposal system (EDS)	Pass	CRC131130 - checked on ECAN website and is active	BXO
ECAN rule 5.8	N/A	Proposal does not comply with Regional Council LWRP - Resource consent required	BXO
Bedroom numbers	Pass	Four bedrooms; system complies - OK	BXO
EDS tank size	Pass	ABS2000	BXO
EDS daily flow	Pass	1400L/day	BXO
Gully traps	Pass	See drainage plan for locations	BXO
Support and thermal movement	Pass	Adequate support and thermal movement allowed for - OK	BXO

Checklist/Elements	Status	Notes	Processed By
Discharge pipe size	Pass	100mm diameter	BXO
Drain ventilation	Pass	80mm TV/MV at head of drain, AAV where required	BXO
Pipe/joint materials	Pass	PVC	BXO
Pipe gradients: mains	Pass	1:100 minimum	BXO
Pipe gradients: fittings	Pass	40mm@1:40 100mm@1:60	BXO
Sanitary plumbing	Pass	Refer fitting layout on designer's drawings	BXO
Bedding and backfill	Pass	Bedded in adequate fill, to Fig. 7 - OK Refer sheet 6	BXO
Drains under buildings	N/A	No drains under buildings	BXO
Inspection chamber (see PIM notes)	N/A	Not required	BXO
H1 Energy Efficiency	Pass		BXO
Means of Compliance	Pass	Calculation method Ref building 456 Proposed building 377	BXO
Thermal Envelope	Pass	Insulation R values: Floor: 1.3 - concrete slab (actually a Ribraft at R1.2 which still complies Wall: R2.4 - Pink Batts Ceiling: R3.6 - Pink Batts Pink Batts approved HDC product list Installation instructions provided	BXO
Hot water system	Pass	HWC and pipework suitably insulated Refer specifications	BXO
Changes made during processing	Pass		BXO
Changes to External Envelope	Pass	None made during processing	BXO
Changes to Plans and Specifications	Pass	Changes tracked in processing folder and RFI correspondance	BXO
Minor Variations during processing	Pass	None made during processing	BXO
Phone to resolve	Pass		BXO
Name of person contacted to attempt to resolve RFI	Pass	Bryan	BXO
ECan Rule 5.8 Assessment	Pass		Brenna Ogier
Proposal assessed against ECan LWRP rule 5.8	Pass		BXO
The volume of wastewater is 2000l a day or less	Pass	CRC131130 approved 11/12/2012 land contaminated since then with tyre fires --- Response - BXO 1 Dec 2021 4:29pm --- I Beth Roche put the PS1 together and did a desktop assessment to ensure the final location of the drip irrigation line was complying with the regulations and the consent conditions set out as per Environment Canterbury''s conditions CRC131130. It was reviewed by Joe Drury our general manager prior to leaving the Austin''s office I have had extensive in house training by Graeme Beale with 20+ years'' experience within the industry at another waste water company and Lew Austin 50+ years'' experience in the waste water industry from Austin Bluewater. I have been working within the waste water industry for 6+ years within that time I have successfully completed IPENZ Onsite Waste Water Management Course facilitated by John Cocks and Wastewater 101 course from Water NZ. I am satisfied on reasonable grounds that this meets the requirements of a suitably qualified person	BXO

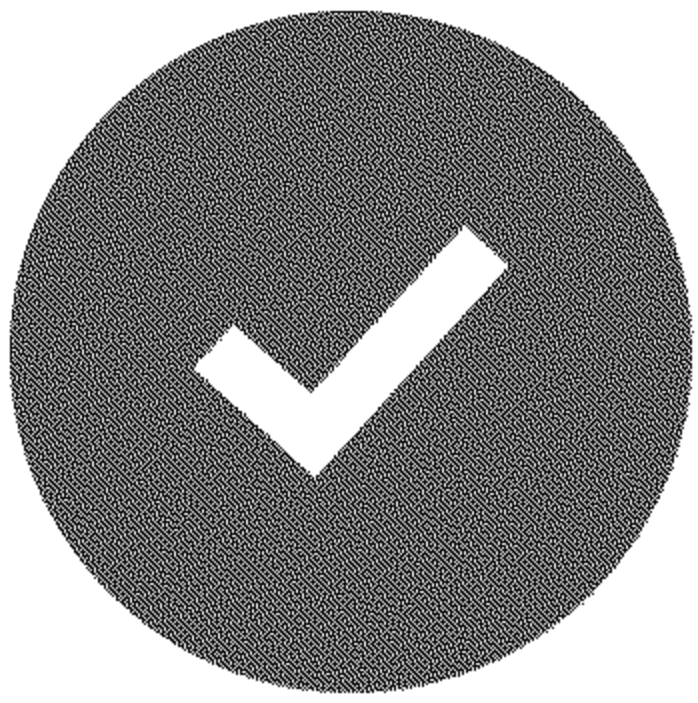
Checklist/Elements	Status	Notes	Processed By
Request for Further Information:			
Request: Please provide a copy of septic design including assessment against Rule 5.8 (Canterbury Land and Water plan) PS1 provided with copy of CRC131130 - checked on ECAN website and is active RFI 2: PS1 author Joe Drury - not on HDC list of approved designers please provide evidence supporting that Joe is suitably qualified in accordance with ECAN guidelines.			BXO
Response: I Beth Roche put the PS1 together and did a desktop assessment to ensure the final location of the drip irrigation line was complying with the regulations and the consent conditions set out as per Environment Canterbury's conditions CRC131130. It was reviewed by Joe Drury our general manager prior to leaving the Austin's office. *I have had extensive in house training by Graeme Beale with 20+ years' experience within the industry at another waste water company and Lew Austin 50+ years' experience in the waste water industry from Austin Bluewater. I have been working within the waste water industry for 6+ years within that time I have successfully completed IPENZ Onsite Waste Water Management Course facilitated by John Cocks and Wastewater 101 course from Water NZ.* *I am satisfied on reasonable grounds that this meets the requirements of a suitably qualified person*			BXO
The discharge is onto a site that is equal to or greater than 4ha in area	N/A		BXO
The discharge is located within an area where residential density is less than 1.5 dwelings per hectare & the total popuation is less than 1000 persons	N/A		BXO
There is no sewerage network available	N/A		BXO
The land is not contaminated or potentially contaminated	N/A		BXO
The discharge does not contain any hazardous substances	N/A		BXO
The discharge is not within 20m of any surface water body or coastal marine area	N/A		BXO
The discharge is not onto land where it may enter any surface water body	N/A		BXO
The discharge is not within 50m of a bore used for water abstraction	N/A		BXO
The site is not listed as an archaeological site	N/A		BXO
The discharge is not onto land where there is less than 1m separation between the discharge and ground water	N/A		BXO
The discharge is not within a Community or Group drinking water protection zone	N/A		BXO
The treatment and disposal system has been designed and will be installed to comply with AS/NZS 1547:2012	N/A		BXO
The system will be operated and maintained in accordance with the systems design specifications and/or AS/NZS 1547:2012	N/A		BXO
The discharge does not result in any wastewater being visible on the ground surface	N/A		BXO
Producer Statement Assessment 1	Pass	Septic Design	Brenna Ogier
Producer statement category	Pass		BXO
Category	Pass	Design (PS1) - Intended for use by the person responsible for the design in circumstances where the Building Consent Authority will rely on the producer statement to issue a building consent.	BXO

Checklist/Elements	Status	Notes	Processed By
Producer statement content	Pass		BXO
Heading	Pass	Headed with Producer Statement	BXO
Address details	Pass	The Producer Statement is addressed for the attention of Hurunui District Council	BXO
Author details	Pass	Bethe Roache - refer sep RFI confirmed suitably qualified	BXO
Written statement	Pass	That clearly identifies the building consent work covered by the Producer Statement - septic design	BXO
Date	Pass	Date the PS1 was produced 12.10.21	BXO
Professional indemnity insurance	N/A		BXO
Decisions and outcome	Pass		BXO
Acceptance	Pass	I have accepted this Producer Statement because the documentation is COMPLETE	BXO
Producer Statement Assessment 2	Pass	Truss design	Brenna Ogier
Producer statement category	Pass		BXO
Category	Pass	Design (PS1) - Intended for use by the person responsible for the design in circumstances where the Building Consent Authority will rely on the producer statement to issue a building consent.	BXO
Producer statement content	Pass		BXO
Heading	Pass	Headed with Producer Statement	BXO
Address details	Pass	Generic MiTek Truss Design Producer Statement - OK	BXO
Author details	Pass	Mitek truss design input is correct	BXO
Written statement	Pass	That clearly identifies the building consent work covered by the Producer Statement	BXO
Date	Pass	Date the PS1 was produced 22.10.21	BXO
Professional indemnity insurance	Pass	The sum of Professional Indemnity Insurance held is identified 500k	BXO
Decisions and outcome	Pass		BXO
Acceptance	Pass	I have accepted this Producer Statement because the documentation is COMPLETE	BXO

I am satisfied on reasonable grounds that the provisions of the Building Code will be met if the building work in relation to the attached application is properly completed in accordance with the attached plans and specifications.

Signed: _____ Date: 6 December 2021 7:21 pm
Kerry Walsh

Payment successful



Amount:	$1,500.00
From:	Streamline intro 12-3118-0024255-00
To:	HDC 03-0802-0946666-00
Description:	Their statement Donnelly building con Your statement Donnelly building con
Date:	Tuesday, 28 Sep 2021

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-8816 | Fax 03 314-9181 | Email info@hurunui.govt.nz
Web hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil
Skype hdc_customer_services | twitter.com/hurunuidc

11 October 2021

B & P Donnelly
176 Kivers Road
RD 7
Christchurch 7677

Dear Bryan

Request for Information – Building Consent No 210485
Proposal: 4-bedroom dwelling with attached garage and woodburner
Site Address: 153 Innes Road

The above application has been checked. However, the proposal must comply with the requirements of the New Zealand Building Code before Consent can be granted.

Therefore for a building consent to be granted we require the following further information:

1. RM Compliance items from PIM report for your information:

   FROST CONTROL FANS: Resource consent is required for breach of rule 3.4.3.22(a); Any new dwelling located on a separate lot under different ownership within 1km of any frost control fan must be designed and constructed so noise level inside any bedroom of the dwelling will not exceed 30 dB LAeq with all fans operating at normal duty. Compliance must be demonstrated by a design certificate from an appropriately qualified and experienced acoustic engineer based on outlined noise requirements. The dwelling is located within 1km of a frost control fan. An acoustic report has been provided, although is based on drawings dated Jan 2019 by Trident Homes. Thus, a new report must be provided or the report provided needs to be amended to note that it is based on drawings dated 3rd Sept 2021 by A1 Homes. The outlined recommendations in the report must be incorporated in the plans. NO BUILDING WORKS TO PROCEED UNTIL ADDRESSED.

   FIREFIGHTING WATER: Resource consent is required for breach of rule 3.4.3.23(a); At the time a residential dwelling is erected on any building site that is not provided with sufficient firefighting water supply via the Council`s reticulated water supply a firefighting water supply that complies with the New Zealand Fire Service Firefighting Water Supplies Code of Practice: SNZ PAS 4509:2008 (Code of Practice) is to be provided. No firefighting water supply is shown on the plans. Please note on the plans a firefighting water supply that complies with the New Zealand Fire Service Firefighting Water Supplies Code of Practice. Refer to the firefighting checklist provided with the issue of the PIM. NO BUILDING WORK TO PROCEED UNTIL ADDRESSED.

2. Please show pod layout on plans, include any thickening's to be shown in accordance with the latest Firth RibRaft® Technical Manual, January 2020 (please provide copy) Please also take into account the polished concrete in your design and supplementary reinforcing bars to shower recess if applicable.

3. Supplementary bars to shower recess is to be shown on plans please.

4. Please indicate long stud specifications on plans (truss design indicates all gable ends are included in wall framing) - 90x45 at 600ctrs does not cover this height.

5. Bracing calculations need correcting, plan area not entered in the input section giving incorrect minimum bracing units required. With correct input entered it leaves areas requiring attention

6. Ceiling battens:

   Rondo referred to on page 90 specifications - centres not specified, plans specify 70x35 H1.2 timber please confirm and remove conflicting information.

7. Building wrap and flexible flashing tape system not specified - please specify and provide manufactures specifications.

8. Polished concrete proposed to bathrooms, laundry area and kitchen - please indicate on plans and provide manufactures specifications for the proposed sealant to these areas.

9. Tiled showers with safety glass screen and door shown on plans (confirm if this is correct as conflicting details provided)

   Are they recessed into the slab? (Construction detail required including supplementary reinforcing in accordance with Firth Manual. Slope to drain minimum gradient in accordance with Ardex installation details).

10. The proposed site is indicated as being potentially contaminated. Please show how you intend to comply with F2 Hazardous agents on site.

11. Please provide a copy of septic design including assessment against Rule 5.8 (Canterbury Land and Water plan)

Your application will be placed on hold until this information is provided. When the above requirements have been addressed appropriately, Council officers will again consider approval of your application.

Please note that all information must be supplied within 28 days of this letter or the application will be refused.

If you have any queries, please contact me.

Yours faithfully

Brenna Ogier
Building Officer

HURUNUI DISTRICT COUNCIL
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Skype hdc_customer_services | twitter.com/hurunuidc

24 November 2021

B & P Donnelly
176 Kivers Road
RD 7
Christchurch 7677

Dear Sir/Madam

Request for Information – Building Consent No 210485
Proposal: 4-bedroom dwelling with attached garage and woodburner
Site Address: 153 Innes Road

The above application has been checked. However, the proposal must comply with the requirements of the New Zealand Building Code before Consent can be granted.

Therefore for a building consent to be granted we require the following further information:

BUILDING

1. Firth RibRaft® Technical Manual, January 2020 - not provided - **are you happy for me to download and add to tech data?**

2. Supplementary bars to shower recess corners not shown on plans - cross bars - **ok for me to add to plans?**

3. F1 Hazardous agents on site: Full detailed site investigation completed 01/08/2021 performed by Sephira Environmental Ltd. - report has been completed but not yet summarised - clients chasing lawyer for copy - require copy of the report please.

4. Wastewater Design: PS1 author Joe Drury - not on HDC list of approved designers please provide evidence supporting that Joe is suitably qualified in accordance with ECAN guidelines.

Your application will be placed on hold until this information is provided. When the above requirements have been addressed appropriately, Council officers will again consider approval of your application.

Please note that all information must be supplied within 28 days of this letter or the application will be refused.

If you have any queries, please contact me.

Yours faithfully

Brenna Ogier
Building Officer

Building Consent / PIM Check Sheet
(T-02-PS-01)

Ref : T-02-PS-01
Version: 13
Issued: 6 July 2017

Check Sheet – Documents required before Application can be formally received	Applicant	Council
Deposit supplied *(See current "Fees & Charges" list for required amount)* *HDC A/C # for direct online payment :* **03-0802-0946666-00**		
Building Consent Application - Form 2 *(signed and correctly / fully completed)*		
Planning check/PIM declaration form *(required for all new building work)*		
Certificate of Title *(relevant to property & no more than 6 months old)*		
Agent Nomination form *(required if applicant is not the property owner)*		
Any relevant Resource Consents *(copy of decision letter / info)*		
Design Memorandum – Form 2A *(if project involves Restricted Building Work)*		
Project details / drawings required (to scale) :		
Site plan *(showing boundaries, site coverage, distances)*		
Floor plan		
Elevations		
Cross sections *(through main construction areas requiring detail)*		
Construction details *(including weather tightness details)*		
Drainage Plan		
Bracing Plan & Schedule / Calculations		
Weathertightness Risk Matrix		
Written specifications		
Roof truss design and Producer Statement		
Other Producer Statements *(appropriate to site & drawings produced, by suitably qualified person)*		
Liquefaction Assessment *(required for Zones 1 & 2 - see report on HDC website)*		
Compliance Schedule information *(draft compliance schedule, for commercial applications)*		
Approved consent documentation will be available to download from our website. Printed copies will only be sent upon request and will incur printing and postage charges.		

For Building Consent Authority Use Only:

This application is *as all relevant information* *been supplied*

Signed :

Name :

Date :

Notes :

KEY: √ = Receive X = Missing or inaccurate NA = Not Applicable

HURUNUI DISTRICT COUNCIL
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Form 5

Building Consent 210485

Section 51, Building Act 2004

The building

Street address of building: 153 Innes Road

Legal description of land where building is located: Lot 4 DP 520186

Building Name:

Location of building within site/block number:

Level/unit number:

The owner

Name of owner: B & P Donnelly

Contact person: Bryan Donnelly

Mailing address: 176 Kivers Road, RD 7, Christchurch 7677

Street address/registered office:

Phone number:	Daytime:	Mobile: 0273751899
Landline:	Fax number:	
Email: bryanvizbuilt@gmail.com	Website:	

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

As above

Building work

The following building work is authorised by this building consent:

Project: 4-bedroom dwelling with attached garage and woodburner

Current, lawfully established, use: Detached 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

Section 90 – Inspections by building consent authorities

This building consent is issued subjected to the condition that agents authorised by the BCA for the purposes of this section are entitled, at all times during normal working hours or while building work is being done, to inspect –

a) Land on which building work is being or is proposed to be carried out; and
b) Building work that has been or it being carried out on or off the building site; and
c) Any building

This building consent is issued subject to the following conditions:

1. A minimum of 24 hrs notice must be given to the Building Officer prior to any inspections.
2. Construction, fixings and materials are to be in accordance with the approved consent documents authorised under the Building Act 2004,any variance may require an application for an amendment
3. It is recommended that a copy of the approved plans and specifications are kept on site at all times for building contractors
4. Under section 52 of the Building Act 2004 a building consent will lapse in 12 months from date of issue if the building works concerned have not been commenced
5. All Plumbing and Drainage work is to be carried out by suitably qualified tradesman in accordance with the requirements of the Plumbers, Gasfitters and Drainlayers Act.

Compliance schedule

A compliance schedule is not required for the building.

Attachments

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

- Project information memorandum 210485
- Required Items Letter ***(refer to this for inspection and CCC documentation requirements)***

Signature:

Position: Building Support Officer

On behalf of: Hurunui District Council

Date: 7/12/21

HURUNUI DISTRICT COUNCIL
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Skype hdc_customer_services | twitter.com/hurunuidc

B & P Donnelly
176 Kivers Road
RD 7
Christchurch 7677

25 October 2023

Dear Sir/Madam,

CODE COMPLIANCE CERTIFICATE REMINDER

Building Consent No: 210485
Proposal: 4-bedroom dwelling with attached garage and woodburner
Site Address: 153 Innes Road

Section 93 of the Building Act requires us to either issue or refuse a Code Compliance Certificate within 20 days of the second anniversary of issuing the Building Consent. The above-mentioned Building Consent was issued on 7 December 2021.

To date Council has not issued a Code Compliance Certificate for the above project. As owner, under Section 92 of the Building Act 2004, you need to inform us when the building work is completed so that we can determine whether a Code Compliance Certificate can be issued.

If all work in respect of the building consent has been completed, please complete an application online using the Simpli Portal – register and apply here: https://simpli.govt.nz/login/.

Alternatively, if work is not yet completed, please advise us accordingly along with a request for an extension to the two-year time frame for when the project is expected to be finalised. You can apply for an extension using the Simpli Portal – register and apply here: https://simpli.govt.nz/login/

If the building work is not completed at the end of 24 months, or an extension applied for, your Code Compliance Certificate may be refused. This does not mean that you cannot apply for your Code Compliance Certificate at a later date.

If you have any questions or need further information, please email building@hurunui.govt.nz or phone 03 314 8816.

Regards,

Brooke Parker
Building Support Officer

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley 7441 | 66 Carters Road | Amberley 7410
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Web: hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil

B & P Donnelly
176 Kivers Road
RD 7
Christchurch 7677

30 January 2025

Dear Sir /Madam,

REFUSAL OF CODE COMPLIANCE CERTIFICATE

Building Consent No: 210485
Proposal: 4-bedroom dwelling with attached garage and wood burner
Site Address: 153 Innes Road

As a follow up to our email dated 13/12/2024, we have not received an application for a Code Compliance Certificate for the above-mentioned Building Consent. Section 93 of the Building Act requires us to either issue or refuse a Code Compliance Certificate within 20 days of the second anniversary of granting the Building Consent.

There is currently outstanding documentation as per the original required items letter, therefore because we do not have enough information to issue the Code Compliance Certificate, we must at this time refuse it in order to comply with our statutory obligation. A Code Compliance application can still be made at any time. Please note that this may incur a re-application fee as per our Fees and Charges.

Should you wish to contest Council's decision, then an application can be made to the Ministry of Business Innovation & Employment for a determination. Information on determinations is available on the following website www.building.govt.nz/resolving-problems/resolution-options/determinations/ or by telephone to 0800 242 243.

If you have any questions or need further information, please email building@hurunui.govt.nz or phone 03 314 8816.

Regards,

Brooke Parker
Building Support Officer

HURUNUI DISTRICT COUNCIL
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Skype hdc_customer_services | twitter.com/hurunuidc

FORM 6
CODE COMPLIANCE CERTIFICATE APPLICATION

Section 92, Building Act 2004

APPLICATION

Building Consent No : **210485** Consent issued by Hurunui District Council

THE OWNER	AGENT – APPLICANT N/A ☒ *(leave section blank)*
Owner's Name : B & P Donnelly	Agent's Name :
Contact Person : (if owner is not an individual)	Contact Person :
Mailing Address : 153 Innes Road, Glasnevin Canterbury Postcode : 7482	Mailing or Billing Address : Postcode :
Street Address or Registered Office : 153 Innes Road, Glasnevin Canterbury Postcode : 7482	Street Address or Registered Office : Postcode :
Mobile Phone : 027 375 1899	Mobile Phone :
Phone :	Phone :
After Hours Phone :	After Hours Phone :
Landline number :	Landline number :
Daytime phone :	Daytime phone :
Fax number :	Fax number :
E-mail Address : bryanvizbuilt@gmail.com	E-mail Address :
Website :	Website :

Note – The Agent (if appointed) will be the first point of contact for communications with the Council / Building Consent Authority regarding this application / building work and will receive all correspondence including all invoices

The Code Compliance certificate should be sent to : ☑ Owner ☐ Agent

All building work carried out under the above Building Consent was completed on - Date : 20/12/2024

The following evidence of ownership is attached to this application : ☑ Certificate of Title
☐ Sale and Purchase Agreement (only if new purchase)

SIGNATURE

I request that the Hurunui District Council Building Consent Authority issue a Code Compliance Certificate for this work (under section 95 of the Building Act 2004)

Signature of owner / or agent on behalf of and with the authority of the owner : Bryan Donnelly
Digitally signed by Bryan Donnelly
Date: 2025.03.17 21:54:50 +13'00'

☑ Owner ☐ Agent Date : 22/12/2024

Note : If acting "for and on behalf", please read the following declaration before signing :

"I hereby declare that I am authorised to act as Agent of the Owner"

THE PERSONNEL WHO CARRIED OUT WORK OTHER THAN RESTRICTED BUILDING WORK	
Name of Builder : Matthew Latham	Phone Number : 02102226227
Postal Address : 164 MacKenzie Avenue Opawa Chch	Registration Number : BP129107
E-mail Address : mattlatham@redmattconstruction.co.nz	
Name of Craftsman Plumber : Joshua Cottle	Phone Number : 0212618678
Postal Address : 133 Blackett St, Rangiora 7400	Registration Number : 26118
E-mail Address : Josh@cottleplumbing.co.nz	
Name of Craftsman Gasfitter : Corran Vincent	Phone Number : 021565688
Postal Address : 3 Martyn St,Rangiora	Registration Number : 09401
E-Mail Address : Corranvincent@outlook.com	
Name of Registered Drain-layer : Josh Sutherland	Phone Number : 0220372190
Postal Address : 77 Dalbeg Rd, Amberley	Registration Number : 20798
E-mail Address : Josh@northcanterburydrainage.com	
Name of Electrician : Graham Bavis	Phone Number : 021381800
Postal Address :	Registration Number : E256145
E-mail Address : Graham@eastcoastconnections.co.nz	
Name of soild / liquid fuel burner installer : Jonathan Toulson	Phone Number : 021498442
Postal Address : 4 Puriri St, Pegasus 7612	Registration Number : 15592
E-mail Address : JT@aquaflame.co.nz	
Name of other Contractor / Tradesperson : Gimbert Vicentle (Tanking)	Phone Number : 0224214201
Postal Address : 54 Stanley St, Avonhead 8042	Registration Number : 14951
E-mail Address :	
Add any additional persons on another (separate) sheet.	

ATTACHMENTS

The following supporting documents are attached to this application :

- ☑ Certificates / other documents from the personnel who carried out the work
- ☑ Certificates that relate to the energy work
- ☑ Evidence that Specified Systems are capable of performing to the performance standards set out in the building consent
- ☑ Memoranda from Licensed Building Practitioner(s) stating what Restricted Building Work they carried out or supervised

Notes by applicant: (Other notes or comments which you as the applicant may wish to add)

RESTRICTED BUILDING WORK

Did the Building Consent work include any restricted building work ☑ Yes ☐ No

If yes, provide the following details of all licensed building practitioners who were involved in the carrying out or supervising the restricted building work

Licensing Class	Name and address	Licensed building practitioner number (or registration number treated as being licensed under section 291 of the building Act 2004)	Description of particular work carried out or supervised
Foundations	Blair Mcilroy 63 Stott dr, Darfield 7571	BP130583	
Carpentry	Matthew Latham 164 MacKenzie Avenue Opawa Chch	BP129107	Frames/Roof/Bracing,Roof cladding,Wall cladding
Exterior Plasterer			
Brick-layer			
Block-layer			
Roofer	Matthew Latham 164 MacKenzie Avenue Opawa Chch	BP129107	Roof Wrap Install Long run roofing Roof Flashings

SPECIFIED SYSTEMS

Are there specified systems associate with this project? ☐ Yes (as listed below) ☑ No

The following specified systems are contained on the compliance schedule for the building and, in the opinion of the personnel who installed them, are capable of performing to the performance standards set out in the building consent.

SS1 Automatic systems for fire suppression
SS2 Emergency warning systems
SS3/1 Automatic doors
SS3/2 Access controlled doors
SS3/3 Interfaced fire or smoke doors and / or w indows
SS4 Emergency lighting systems
SS5 Escape route pressurisation systems
SS6 Riser Mains
SS7 Automatic back flow preventers
SS8/1 Passenger carrying lifts
SS8/2 Service lifts
SS8/3 Escalator and moving walks
SS9 Mechanical ventilation or air conditioning systems
SS10 Building maintenance units
SS11 Laboratory fume cupboards
SS12/1 Audio loops
SS12/2 FM radio and infrared beam transmission systems
SS13/1 Mechanical smoke control
SS13/2 Natural smoke control
SS13/3 Smoke curtains
SS14/1 Emergency power systems
SS14/2 Sign44s for SS1-13
SS15/1 Spoken information intended to facilitate evacuation
SS15/2 Final exits
SS15/3 Fire separations
SS15/4Signs for facilitating evacuation
SS15/5 Smoke separations
SS16 Cable cars

Additional Information to Note

1. A final inspection must have been completed prior to this application being sought.
2. The Code Compliance Certificate will be based on the approved building consent documents, so any variations to the original approved plans are required to be documented and approved prior to the work being carried out.
3. A Code Compliance Certificate will not be issued until all of the information required on this form that is relevant to the job is provided to the Council. This includes all names, certificates from personnel who carried out the work, registration numbers, producer statements, or any other required documents

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.miteknz.co.nz

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

ISSUED BY: **MiTek New Zealand Limited**

TO: **PlaceMakers - 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 **211408** 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.

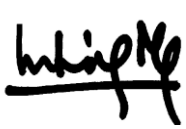
On behalf of MiTek New Zealand Limited, and subject to:

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: Thursday, 3 March 2022**



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

Job: 211408 Client: PlaceMakers Christchurch - Hub Site: A1 Homes Christchurch
Phone: 153 Innes Road
Description: Amberley
Building Consent No.: BC210485 Phone:

MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MiTek accredited fabricator **PlaceMakers - 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

Timber Group:	CFT 111ss Pine	Pitch:	8.000 deg	Nominal Overhang:	600 mm
Roof		**Ceiling**		**Wind**	
Material:	Galv Iron .5mm	Material:	Gib Board 13mm	Area:	High (44.0 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:	600 mm centres	**Snow**	
Live Load:	Qur = 0.250 kPa Qc = 1.100 kN	Live Load:	Qc = 1.400 kN	Location:	Christchurch (N4) at 100 m
				Open Ground Load:	0.900 kPa
				Basic Roof Load:	0.630 kPa

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, ~~Txx~~ = failed design, Ø = non certified, Unmarked trusses = designed successfully, LB = lateral bracing required
GB = gable brace required

Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
*FR1	1	9550	8.000	900	T04	1	8260	8.000	900	PTG01	1D	11490	0.000	900
*FR2	1	7180	8.000	900	T05	1	6350	6.000	900					
*FR3	1	6950	6.000	900	T02A	1	5980	8.000	900					
*FR4	1	7180	6.000	900	T04A	5	8260	8.000	900					
*FR5	1	2970	8.000	900	T04B	1	8260	8.000	900					
*OR1	47	1305	0.000	900	T04C	4	8260	8.000	900					
T01	6	8350	8.000	900	T04D	1	8260	8.000	900					
T02	4	5980	8.000	900	T05A	7	6350	6.000	900					
T03	2	5980	6.000	900	T05B	4	6350	6.000	900					

Total quantity : 90

The computer design input has been carried out by:

Signed: .....

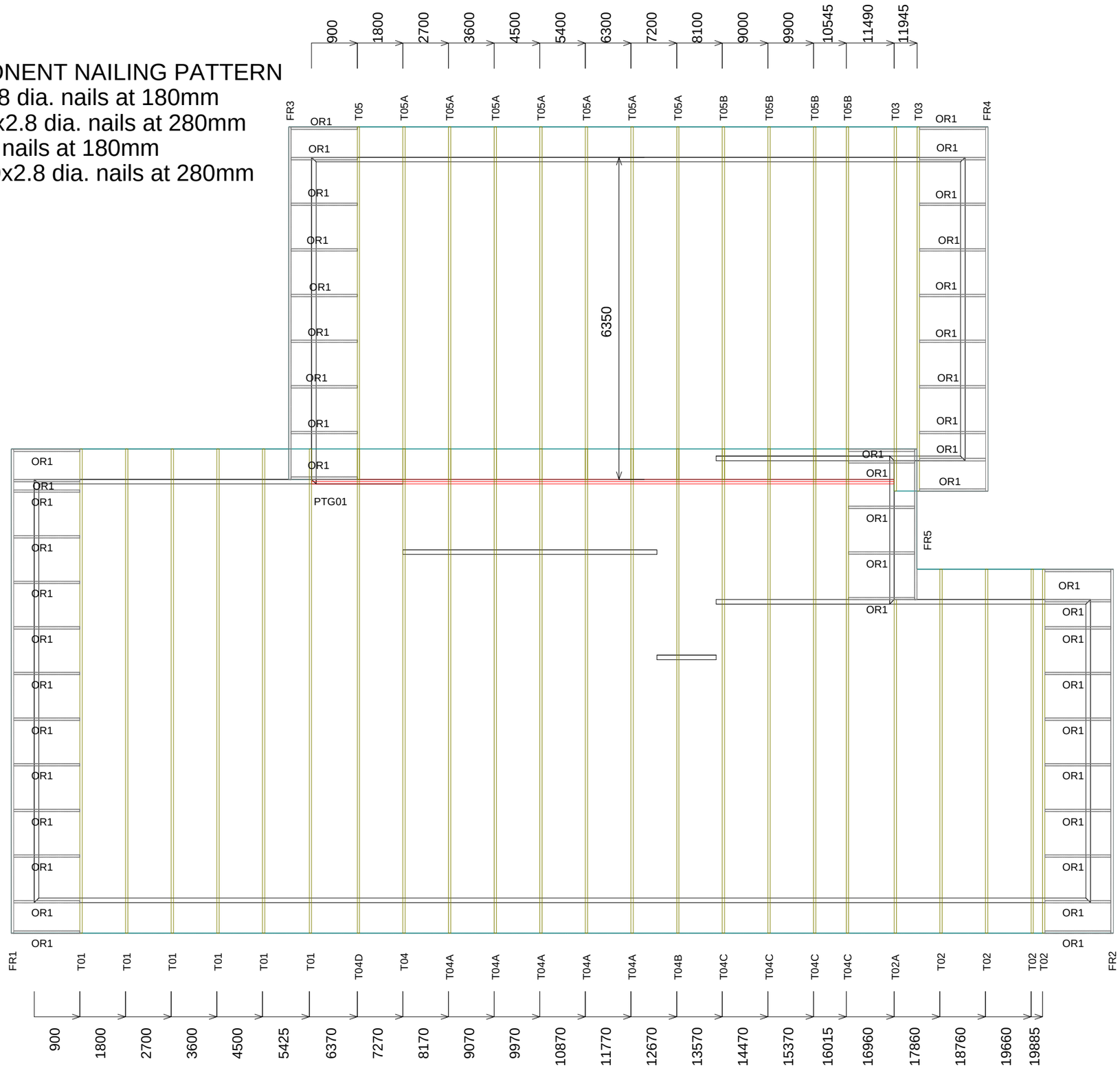
Date: ...Thursday, 3 March 2022....

Name of Detailer: Beth Versey

Qualifications and Title:

On behalf of: **PlaceMakers - Frame & Truss**

DOUBLE TRUSS COMPONENT NAILING PATTERN
Top Chord: 1 row of 90x2.8 dia. nails at 180mm
Bottom Chord:1 row of 90x2.8 dia. nails at 280mm
Webs:1 row of 90x2.8 dia. nails at 180mm
W13, W3, W5: 1 row of 90x2.8 dia. nails at 280mm



Ground Floor

Consent Number : BC210485

Truss Dimension Layout

PlaceMakers Know how. Can do.
FRAME & TRUSS
cft.detailing@placemakers.co.nz

PM Frame & Truss
1 Koru Place
Harewood
Christchurch
Ph : 03-359-9560
Cell : 027-7045894

A1 Homes Christchurch
153 Innes Road
Amberley

Drawn :	Beth Versey	CFT Reff :	211408
Date :	3 Mar,2022	Branch Reff :	21-211408

PlaceMakers Know how. Can do. | FRAME & TRUSS

AsBuilt Layout [Trusses]

Roof Pitch	8.000
Roof Material	Galv Iron .5mm
TC Restraints	900
Overhang	600
Wind Zone	High
Roof Snow	0.630
BC Restraints	600
Ceiling Material	Gib Board 13mm

Trusses And Rafters At 900 Centres
Unless Stated Otherwise

Fixings

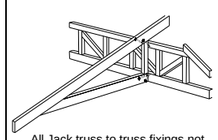
- O = CT200 (LH & RH) Pair
- G = 9kN TTP
- K = 16kN TTP
- X = 47x90 JH
- Z = 47x120 JH
- P = 47x190 JH
- E = 95x165 JH
- M = Multigrip [Pair]
- V = CPC40 [Single]
- 8 = CPC80 [Single]
- 4 = Multigrip [Single]
- SBS = SBS
- SPH = Split Hanger
- NP = Nail On Plate

Wiredogs Fixing Per, Drawing\Note Below

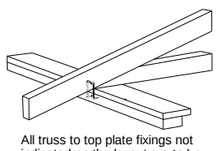
Please contact PlaceMakers Frame & Truss Manufacturing if any on Site Remedial work is required.There will be no Compensation for work done without PlaceMakers Frame & Truss Manufacturing written authority.

Job No.	211408
Job Name	A1 Homes Christchurch
Address	153 Innes Road Amberley
Consent #	BC210485

Drawn	Beth Versey
Date	3 Mar,2022
Main Ph	03-359-9560
Cell Ph	027-7045894
Email	cft.detailing@placemakers.co.nz

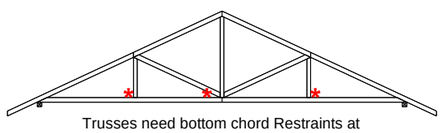


All Jack truss to truss fixings not indicated on the layout are to be fixed with a pair of 90mm nails.

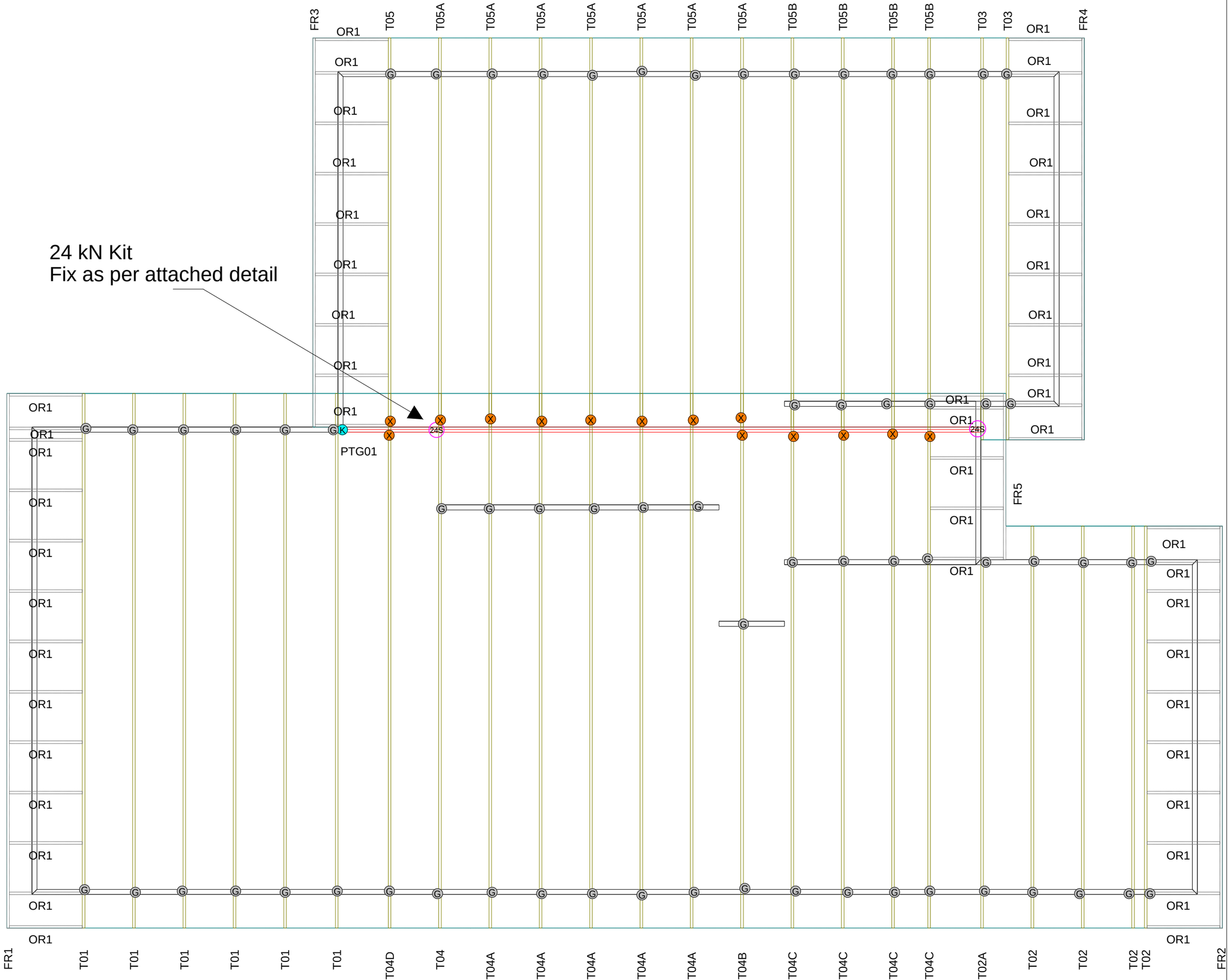


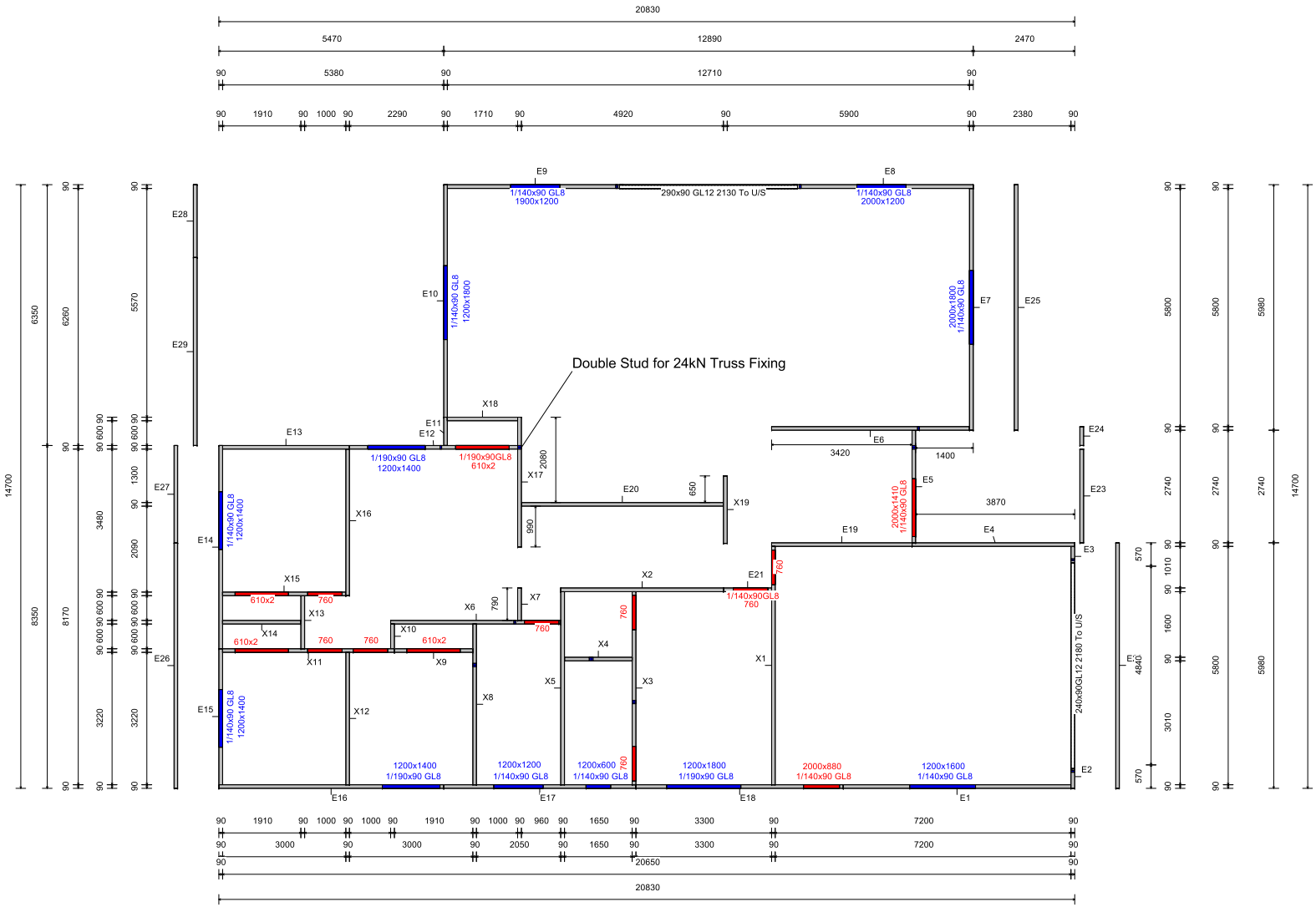
All truss to top plate fixings not indicated on the layout are to be fixed with 2/100 x 3.75 skewed nail + 2 wire dogs.

Note: Where Internal Load-Bearing Walls are shown on layout Fixings required to all Trusses.



Trusses need bottom chord Restraints at
* 1800 Centres
if Rondo Metal Battern Clip System used [Not Directly Fixed]





These plans are provided solely to enable the builder to erect the prenail 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.
PLEASE CONTACT PLACEMAKERS FRAME & TRUSS IF ANY ON SITE REMEDIAL WORK IS REQUIRED.
THERE WILL BE NO COMPENSATION FOR WORK DONE WITHOUT PLACEMAKERS FRAME & TRUSS WRITTEN AUTHORITY.

ALL WALLS WITH DOUBLE TOP PLATE DO NOT HAVE CEILING PLATE

Plates are skewed nailed to studs as per NZS 3604:2011.
All lintels not shown on plans have been sized from: Mitek Ganglam Lintels, Beams, Joists & Rafters, Mitek Flitch Beams, CHH Design IT, Hyne Design or Prowood software
PlaceMakers Frame & Truss provide this information as their recommendations only.
The recommended fixing systems in this wall framing layout may need additional fixings to comply with the building code NZS3604:2011.
All building contractors or their subcontractors are responsible for ensuring in particular areas "that appropriate additional fixings are fitted on site, where required, to ensure compliance" with the building code.
All building contractors or their subcontractors are responsible for checking frames are correct before the manufacture or installation of complementary building products

Ground Floor

Consent Number : BC210485

PlaceMakers Know how. Can do.
FRAME & TRUSS
cft.detailing@placemakers.co.nz

PM Frame & Truss
1 Koru Place
Harewood
Christchurch
Ph : 03-359-9560
Cell :027-7045894

A1 Homes CHCH
153 Innes Road
Amberley

Frame Dimension Layout

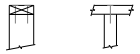
Drawn :	Daniel Mayer	CFT Reff :	D211408
Date :	3 Mar,2022	Branch Reff :	21-211408

Stud to Top Plate

For Alternative Fixing see the "MiTek On Site Guide 01/2018"

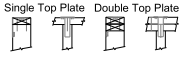
FIXING TYPE A
0.7kN

2/90mm x 3.15 Ø nails
driven vertically into Stud.



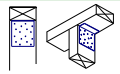
FIXING TYPE B
4.7kN

Single Top Plate Double Top Plate



OR

FIXING TYPE B 4.7kN
Option for Internal Walls

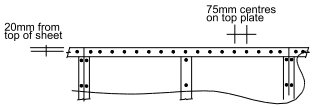


2/90mm x 3.15 Ø nails
driven vertically into Stud
plus LUMBERLOK Stud Strap

2/90mm x 3.15 Ø nails
driven vertically into Stud
plus 6kN Stud Anchor (CPC80)

Rigid Air Barriers

If CHH - Ecoply Barrier or James Hardies - HomeRAB 4.5mm
or RAB Board 6.0mm or IBS - OS'Brace Rap OSB Board 6.0mm
is used on External Walls, the nailing pattern below eliminates
Some of the need for any other Stud to Top Plate fixing on those Walls.
Please refer to the Product Specs as some Areas Still Require Fixings.
Lintel Fixings and Load Bearing Internal Wall Fixings will still be Required.



See Ecoply Rigid Air Barrier Installation Manual
James Hardies Rigid Air Barrier Installation Manual
IBS - OS'Brace Rap Installation Manual
for nail selection and nailing pattern on rest of sheet.

Lintel Fixing

- Fixings Provided are an
Alternative to Table 8.14 & Figure 8.12 NZS 3604:2011.

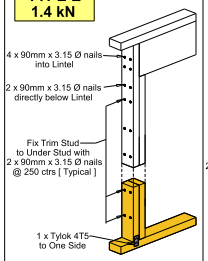
- Alternative Fixing see the "MiTek On Site Guide 01/2018"

- Stud Numbers shown are Indicative only
Refer Table 8.5 NZS 3604:2011.

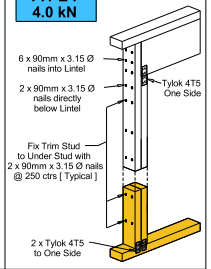
- Fix Top Jacks to Top Plates as per Stud to Top Plate Fixing
- If Lumberlok Stud Straps do not reach the Lintel,
See LUMBERLOK Jack Stud to Top Plate and Lintel Fixing 08/2017.

- Where Rigid Air Barrier is used, See Product Specs
continue Top Plate nailing pattern on Top Jacks and Lintels.

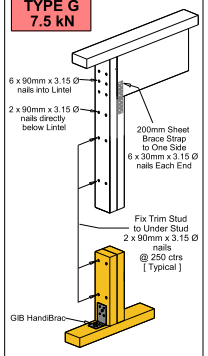
TYPE E
1.4 kN



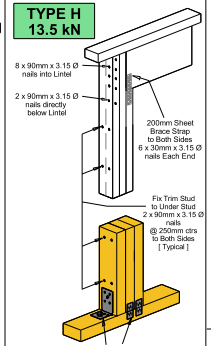
TYPE F
4.0 kN

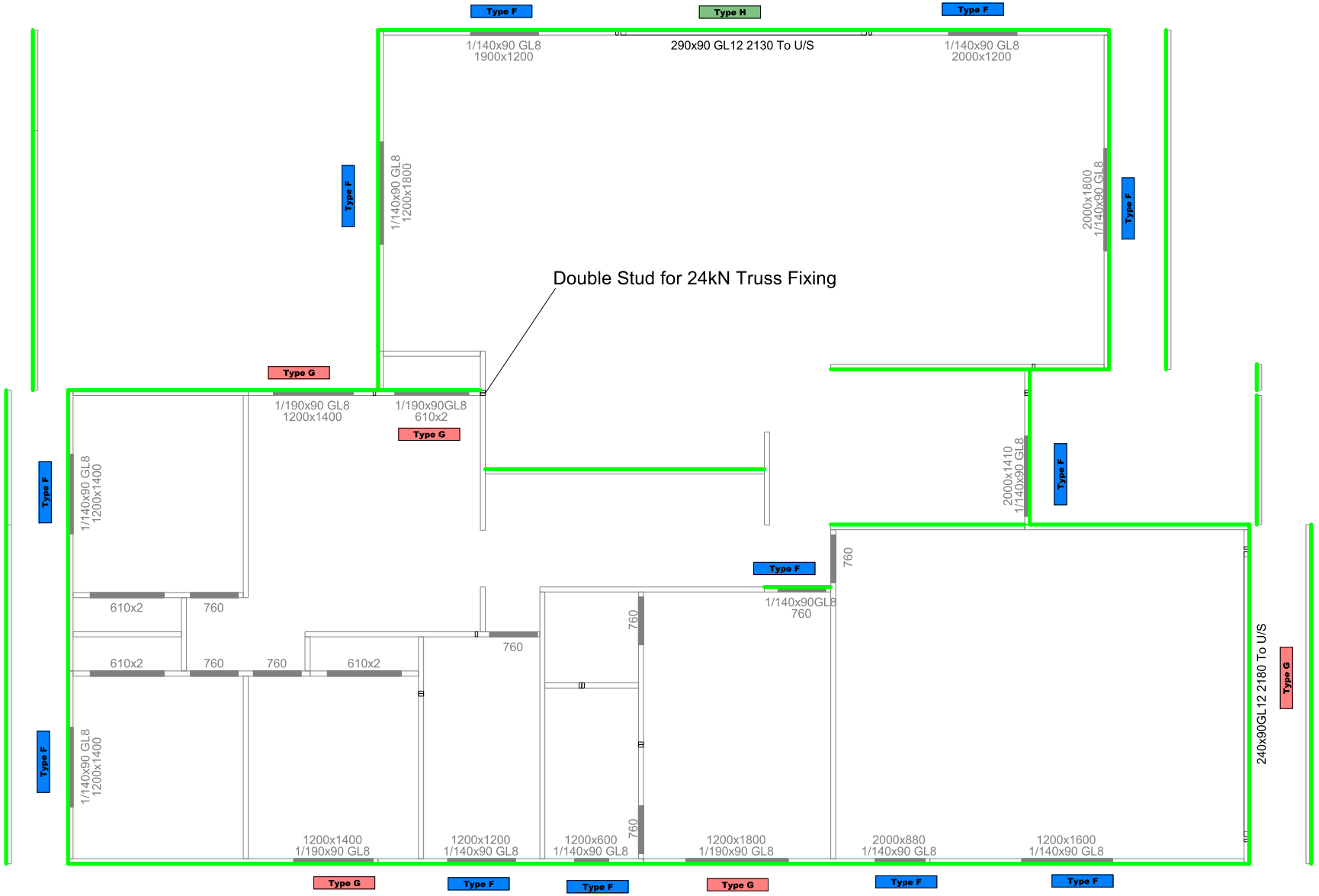


TYPE G
7.5 kN



TYPE H
13.5 kN





Ground Floor

Consent Number : BC210485

Frame Fixing Layout

Drawn :	Daniel Mayer	CFT Reff :	D211408
Date :	3 Mar,2022	Branch Reff :	21-211408

PlaceMakers Know how. Can do.
FRAME & TRUSS
cft.detailing@placemakers.co.nz

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1 Koru Place
Harewood
Christchurch
Ph : 03-359-9560
Cell : 027-7045894

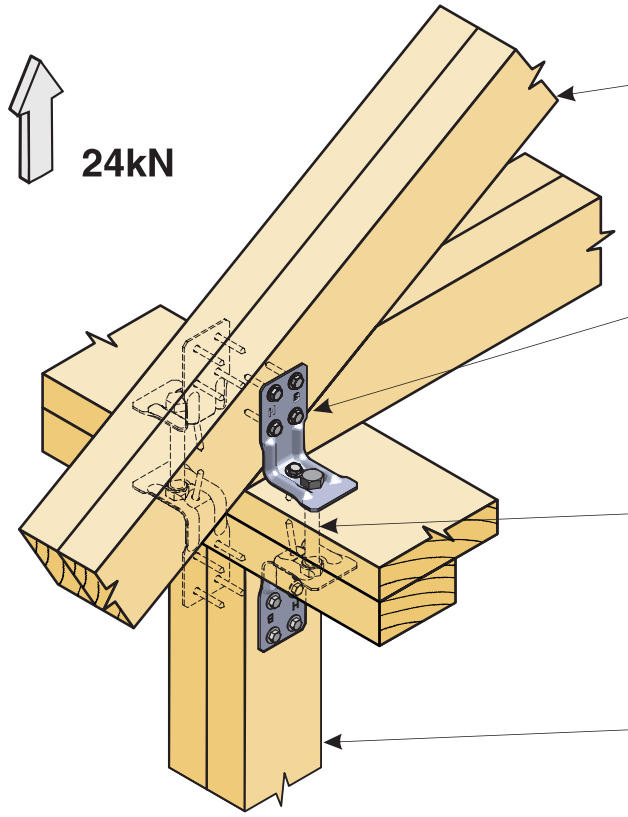
A1 Homes CHCH
153 Innes Road
Amberley

MiTek®

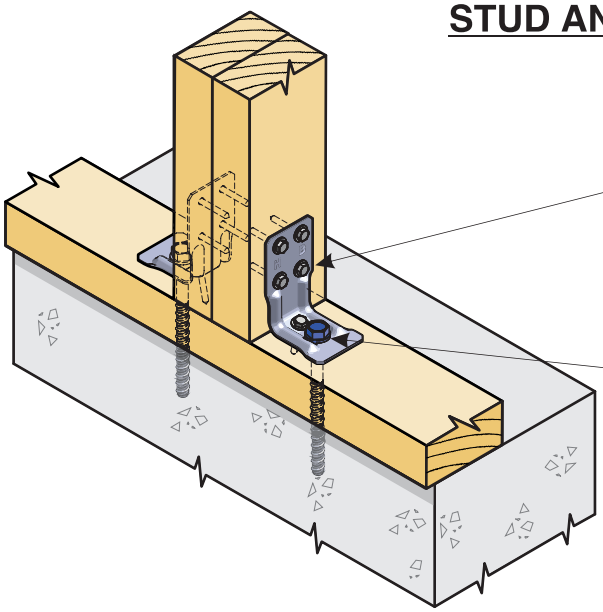
May 2018

TECHNICAL BULLETIN No. 4

SED Truss Uplift Fixing - 24kN Characteristic



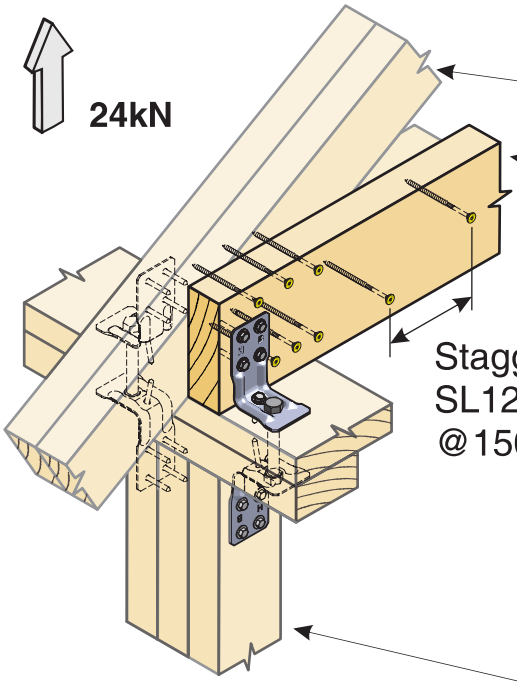
STUD AND BOTTOM PLATE FIXING



Rev. D: 16 May 2018

MiTek®

DOUBLE TRUSS TO TRIPLE STUDS - EXTERNAL WALL CONNECTION

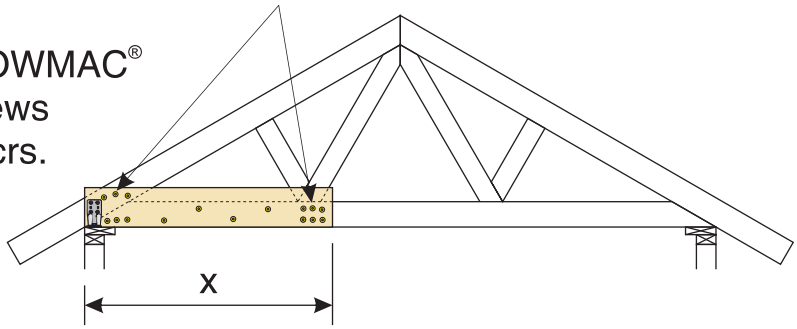


Double truss

Timber scab minimum 140mm x 45mm SG8

Fix 6 x BOWMAC® SL125 Screws as shown

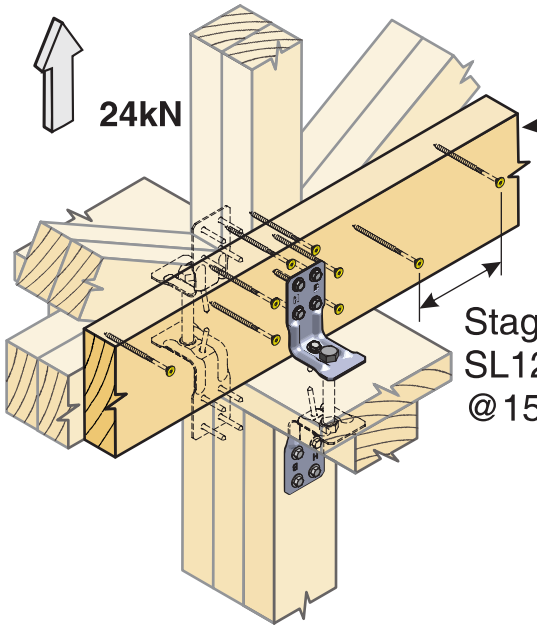
Stagger BOWMAC® SL125 screws @150mm crs.



x - minimum of 600mm or 1 panel length

Triple studs

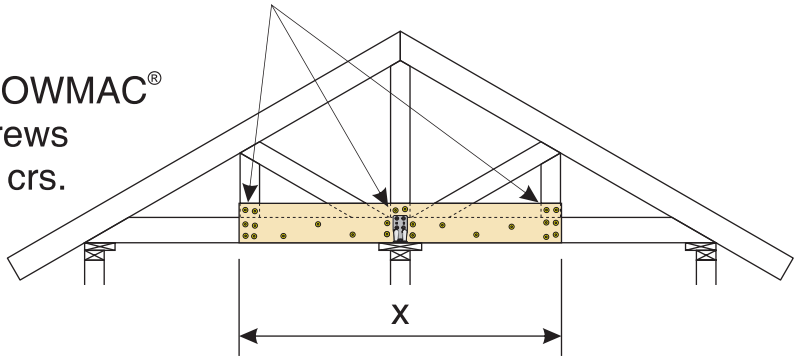
DOUBLE TRUSS TO TRIPLE STUDS - INTERNAL WALL CONNECTION



Timber scab

Fix 6 x BOWMAC® SL125 Screws as shown

Stagger BOWMAC® SL125 screws @150mm crs.

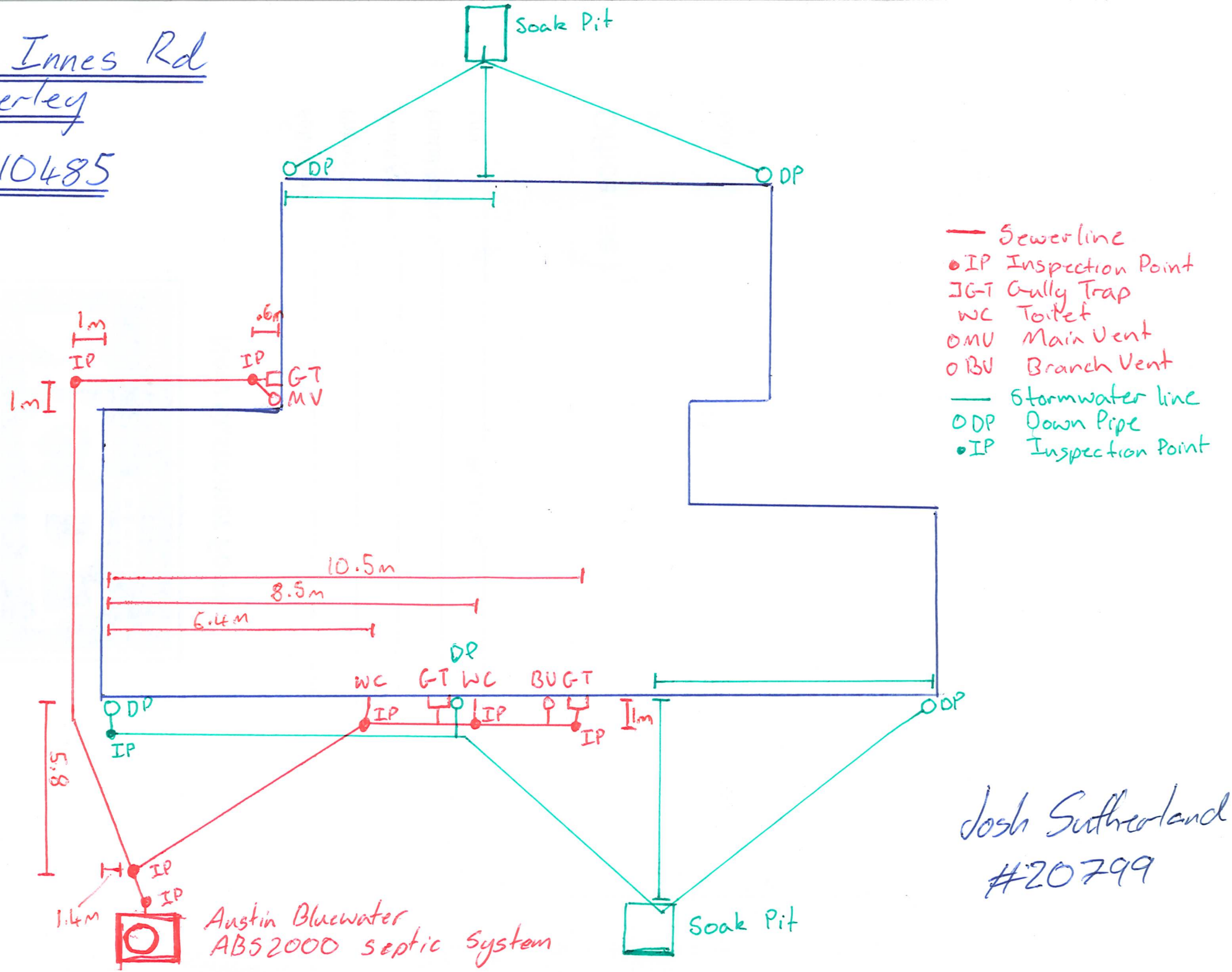


x - minimum of 600mm or 2 panel lengths

Note: Refer to page 1 for stud and bottom plate fixings

153 Innes Rd
Amberley

B.C. 210485



Josh Sutherland
#20799

Christchurch Laboratory
SGNT Limited
1/19 Repton Street, Merivale,
Christchurch 8014
Phone 021898295

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.
(This document may not be altered or reproduced except in full. This report relates only to the positions tested.)

Stephen Gardner
Approved Signatory: Stephen Gardner
(Senior Technician)
IANZ Accredited Laboratory Number:1270
Date signed 15/2/22

Nuclear Density Report

Principal: Bryan Donnelly
Client : Bryan Donnelly

Project No: SGNT00875
Report No: CHRIW01571
Project Name: 153 Innes Road

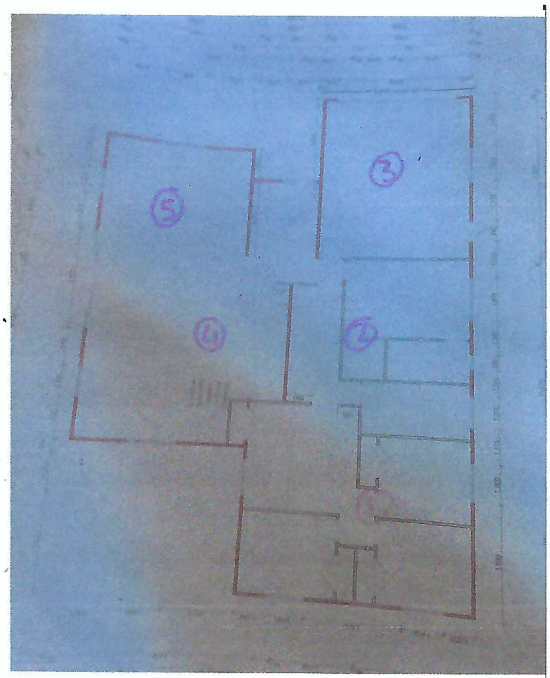
Testing Details				Compaction Target Details	
Site Tested:	153 Innes Road - House Foundation Final Layer			Material Sample ID:	External
Date:	11/02/2022	Time:	12.00	Max.Dry Density :	2.34 (t/m^3) @ 5.0%
Material :	AP 40			Min. Dry Density (t/m^3)	2.22
Field methods :	NZS 4407:2015 Test 4.3			Solid density:	Assumed

Moisture Content Determined by Ndm

Test Results

Site No	Moisture (%)	Wet Density (t/m^3)	Dry Density (t/m^3)	Relative Compaction (%)
1	6.0	2.43	2.29	98
2	6.1	2.44	2.30	98
3	5.8	2.43	2.30	98
4	6.2	2.40	2.26	97
5	5.9	2.38	2.25	96

Ndm test locations
not to scale



5 NDM TEST Locations

Comments
MDD Method : Test was conducted externally and is not accredited by this laboratory.

ELECTRICAL CERTIFICATE OF COMPLIANCE & ELECTRICAL SAFETY CERTIFICATE

REFERENCE/CERTIFICATE ID NO.: ecc-136C1

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 Details: 153 Innes Road, Amberley, Canterbury 7482

Contact Details: (Name and address) Graham

Name of Electrical worker: Graham Bavis

Registration/Practising licence number: E256145

Phone & email: 021381800

Name and registration number of person(s) supervised: Eddie Poswillo, Jackson Iles

Certificate of Compliance

Type of work: ☐ Addition ☐ Alteration ☑ New work

The prescribed electrical work is: ☐ Low risk ☐ General ☑ High-risk (Specify):

New mains, New driven main earth

Means of compliance: ☐ Part 1 of AS/NZS 3000 ☑ Part 2 of AS/NZS 3000

Additional Standards or electrical code of practice were required: ☑ No ☐ Yes (specify):

Date or range of dates that prescribed electrical work undertaken: 15/6/2022 to 15/3/2023

Contains fittings that are safe to connect to a power supply? ☑ Yes ☐ No

Specify type of supply system:

The installation has an earthing system that is correctly rated (where applicable) ☑ Yes ☐ No

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

☑ All ☐ Parts (specify)

The work relies on manufacturers instructions: ☑ Yes ☐ No

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 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 a Supplier Declaration of Conformity (SDoC): ☑ Yes ☐ No

If yes - identify the SDoC including name, date and version OR EESS registration. Also attach a copy of the SDoC to this certificate.
(Or provide reference to readily accessible electronic format, eg Internet link.)

Identify:
Link:

The installation has been satisfactorily tested in accordance with the Electricity (Safety) Regulations 2010 ☐ No ☑ Yes

Description of Work:
Electrical installation as per plans attached, mains supply from solar unit (installed by others) underground 16mm 1c n/s. 32a single pole circuit protection, Driven main earth with single 6mm green to DB.

Test Results (provide values)		
Polarity (Independent earth):	PASS	
Insulation resistance:	PASS	Ohms
Earth Continuity:	PASS	Ohms
Bonding:	PASS	Ohms
Fault Loop impedance	PASS	Ohms
Other (specify):		

By signing this document I certify that the completed prescribed electrical work to which this Certificate of Compliance applies has been done lawfully and safely, and the information in the certificate is correct.

Certifier's signature: **Date:** 22/8/2023

Electrical Safety Certificate

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

Certifier's name: Graham Bavis

Registration/Practising licence number: E256145

Certifier's signature:

Certificate Issue Date: 22/8/2023

Connection Date: 22/8/2023

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

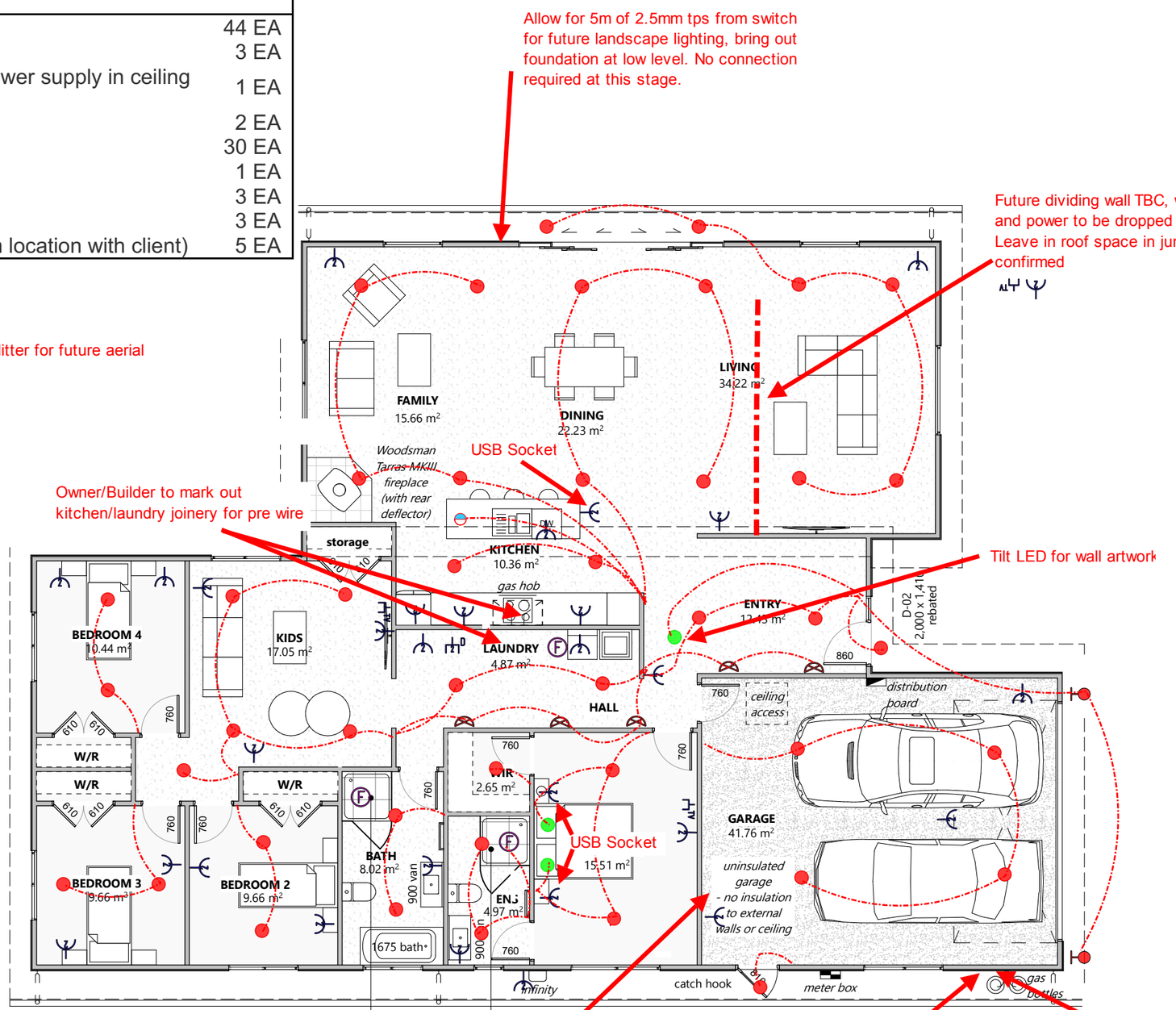
This Electrical Safety Certificate also confirms that the electrical work complies with the building code for the purposes of Section 19(1)(e) of the Building Act 2004.

Powered by Fergus

house	
Led downlight	44 EA
Led mini downlight	3 EA
Client supplied pendant light (leave power supply in ceiling until 2nd fix)	1 EA
LED wall up/down light	2 EA
Socket Outlet	30 EA
Data outlet	1 EA
TV outlet	3 EA
Extraction Fan (Client supplied)	3 EA
Low level night light on switch (confirm location with client)	5 EA

Note:

- Tv aerial cables to be left in ceiling space ready for splitter for future aerial
- No towel rails or heaters to bathroom
- Gas water and Hob
- No TV ariel to be installed, run cables for tv's and leave within ceiling space for future use.
- Confirm power supply location for septic tar



Graham Bavis | Electrician | Managing Director
Cell: **021381800**
Email: **Graham@eastcoastconnections.co.nz**
Website: **www.eastcoastconnections.co.nz**

Name	Bryan & Pip Donnelly
Address	153 Innes Rd
Date	13/06/22

Revision No	2
Installation type	Electrical /Hvac

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-8816 | Fax 03 314-9181 | Email info@hurunui.govt.nz
Web hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil
Skype hdc_customer_services | twitter.com/hurunuidc

B & P Donnelly
176 Kivers Road
RD 7
Christchurch 7677

30 October 2023

Dear Sir/Madam,

CODE COMPLIANCE CERTIFICATE – EXTENSION OF TIME

Building Consent No: 210485
Proposal: 4-bedroom dwelling with attached garage and woodburner
Site Address: 153 Innes Road

Your request for an extension of time to apply for your Code Compliance Certificate is acknowledged in terms of Section 93 of the NZ Building Act 2004. An extension has been granted for a further six months to enable you to complete work on the building work authorised by the above building consent.

Please note that relevant building work must be completed by 30/04/2024 and must not be varied from the plans and specifications approved without prior written approval from Council.

Should you wish to apply for a further extension or have any queries regarding this letter, please contact the team at building@hurunui.govt.nz or by phoning 03 314 8816.

Regards,

Brooke Parker
Building Support Officer

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-8816 | Fax 03 314-9181 | Email info@hurunui.govt.nz
Web hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil
Skype hdc_customer_services | twitter.com/hurunuidc

B & P Donnelly
176 Kivers Road
RD 7
Christchurch 7677

3 April 2024

Dear Sir/Madam,

CODE COMPLIANCE CERTIFICATE – EXTENSION OF TIME

Building Consent No: 210485
Proposal: 4-bedroom dwelling with attached garage and woodburner
Site Address: 153 Innes Road

Your request for an extension of time to apply for your Code Compliance Certificate is acknowledged in terms of Section 93 of the NZ Building Act 2004. An extension has been granted for a further three months (from the date of extension request) to enable you to complete work on the building work authorised by the above building consent.

Please note that relevant building work must be completed by 02/07/2024 and must not be varied from the plans and specifications approved without prior written approval from Council.

Should you wish to apply for a further extension or have any queries regarding this letter, please contact the team at building@hurunui.govt.nz or by phoning 03 314 8816.

Regards,

Brooke Parker
Building Support Officer

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-8816 | Fax 03 314-9181 | Email info@hurunui.govt.nz
Web hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil
Skype hdc_customer_services | twitter.com/hurunuidc

B & P Donnelly
176 Kivers Road
RD 7
Christchurch 7677

1 July 2024

Dear Sir/Madam,

CODE COMPLIANCE CERTIFICATE – EXTENSION OF TIME

Building Consent No: 210485
Proposal: 4-bedroom dwelling with attached garage and wood burner
Site Address: 153 Innes Road

Your request for an extension of time to apply for your Code Compliance Certificate is acknowledged in terms of Section 93 of the NZ Building Act 2004. An extension has been granted for a further six months to enable you to complete work on the building work authorised by the above building consent.

Please note that relevant building work must be completed by 01/01/2025 and must not be varied from the plans and specifications approved without prior written approval from Council.

Should you wish to apply for a further extension or have any queries regarding this letter, please contact the team at building@hurunui.govt.nz or by phoning 03 314 8816.

Regards,

Brooke Parker
Building Support Officer

A1 Gas & Heat Ltd

3 Martyn St, Rangiora, 7400

Ph. 0-3-313 3388 cell
021565688. Email.
corranvincent@outlook.com.

Certificate No JP22-167

General gas Fitting

Gas Compliance & Safety Certificate.

Owner. Bryan Donnelly, 153 Innes road, Amberley

DESCRIPTION OF GASFITTING TO WHICH THIS CERTIFICATE APPLIES

Work conducted at the above address comprised of:

1) Install Rinnai W/H. F & P Gas hob
2) 25mm Refing pipe from Bottle to w/h with 15mm Branch to gas hob.
3) Gas station away from house on fence next to the Garage.
4) A satisfactory pressure drop test was conducted.
5) The design was to AS/NZ 5601 2013 Part 1
6) John Phung Rego 25838 assisted in this installation.
7) I confirm that the work as described above has been done lawfully and safety, and that the information on this certificate is correct and complies with AS/NZ 5601 Part 1 And the GMS 2013. that all parts of the installation are safe to be connected and operate on NZ L.P.G. line gas at a maximum pressure of 3K.P.A.

Gas water heater Rinnai REU-1-2430WG 199mj/hr.

Gas hob Fisher & Paykel CG604 GX 42Mj/hr

Signed: Date 16th June. 2023.

Corran Arthur Vincent

Registration No.: 09401 A/P 0015.

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: 153 Innes Road	
Suburb: Glasnevin	
Town/City: Canterbury	Postcode: 7482

THE PROJECT

Building consent number: 210485

THE OWNER(S)

Name(s): B & P Donnelly	
Mailing address: 153 Innes Rd, Glasnevin	
Suburb: Glasnevin	PO Box/Private Bag:
Town/City: Canterbury	Postcode: 7482
Phone number: 027 375 1899	Email address: BryanVisBuilt@gmail.com

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 ✓	If necessary, describe the restricted building work.	Tick ✓ whether you carried out the restricted building work or supervised someone else carrying out the restricted building work.
Foundations and subfloor framing ☐		◯ Carried out ◯ Supervised
Walls ☑	Erection of Pre-Made frames as per As-Builts	◯ Carried out ☑ Supervised
Roof ☑	Erection of Premade Trusses, Purlins as per As-builts and 3604 standards	◯ Carried out ☑ Supervised
Columns and beams ☐		◯ Carried out ◯ Supervised
Bracing ☑	Installation of Roof strap bracing, Gib Bracing elements and Bracing Ply Pre-wrap	◯ Carried out ☑ Supervised
Other ☐		◯ Carried out ◯ Supervised

EXTERNAL MOISTURE MANAGEMENT SYSTEMS		
Work that is restricted building work	**Description of restricted building work**	**Carried out or supervised**
Tick ✓	If necessary, describe the restricted building work.	Tick ✓ whether you carried out the restricted building work or supervised someone else carrying out the restricted building work.
Damp proofing ☐		◯ Carried out ◯ Supervised
Roof cladding or roof cladding system ☑	Installation of Long Run Roofing/Wrap	◯ Carried out ◉ Supervised
Ventilation system (for example, subfloor or cavity) ☑	Installation of Tekton Wrap + CLD Cavity Batterns for External Cladding system	◯ Carried out ◉ Supervised
Wall cladding or wall cladding system ☑	Installation of James Hardie Sycon Axon panel/Flashings	◯ Carried out ◉ Supervised
Waterproofing ☐		◯ Carried out ◯ Supervised
Other ☐		◯ Carried out ◯ Supervised

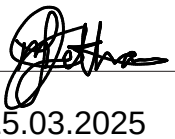
ISSUED BY

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

Name: Matthew Latham	LBP number: BP129107
Class(es) licensed in: Carpentry	
Plumbers, Gasfitters and Drainlayers registration number (if applicable):	
Mailing address (if different from below): 164 MacKenzie Avenue Opawa Chch	
Street address/Registered office: As above	
Suburb:	Town/City:
PO Box/Private Bag	Postcode:
Phone number:	Mobile: 02102226227
After hours:	Fax:
Email address: mattlatham@redmattconstruction.co.nz	Website:

DECLARATION

I Matthew Latham ~~carried out~~ or supervised the restricted building work recorded on this form.

Signature: 

Date: 15.03.2025

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: 153 Innes Road	
Suburb:	
Town/City: Amberley	Postcode: 7482

THE PROJECT
Building consent number: 210485

THE OWNER(S)	
Name(s): BRYAN + PIP DONNELLY	
Mailing address: 153 INNES RD	
Suburb: AMBERLEY	PO Box/Private Bag:
Town/City:	Postcode: 7482
Phone number: 0273751899	Email address: bryanvizbuilt@gmail.com

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 ✓	If necessary, describe the restricted building work.	Tick ✓ whether you carried out the restricted building work or supervised someone else carrying out the restricted building work.
Foundations and subfloor framing ☑	Installed Ribraft Concrete Foundation to Engineers design and as per consented plans	✓ Carried out ○ Supervised
Walls ☐		○ Carried out ○ Supervised
Roof ☐		○ Carried out ○ Supervised
Columns and beams ☐		○ Carried out ○ Supervised
Bracing ☐		○ Carried out ○ Supervised
Other ☐		○ Carried out ○ Supervised

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

ISSUED BY

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

Name: Blair McIlroy	LBP number: BP 130583
Class(es) licensed in:	
Carpentry	
Plumbers, Gasfitters and Drainlayers registration number (if applicable):	
Mailing address (if different from below):	
Street address/Registered office: 63 Stott Drive	
Suburb:	Town/City: Darfield
PO Box/Private Bag	Postcode: 7571
Phone number:	Mobile: 021414048
After hours:	Fax:
Email address: mcilroycontractingltd@gmail.com	Website:

DECLARATION

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

Signature: B. McIlroy

Date: 28-2-22

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-0006 | Fax 03 314-9181 | Email info@hurunui.govt.nz
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Skype hdc_customer_services | twitter.com/hurunuidc

Certification
Plumbing

Issued by (plumber) :

(To Hurunui District Council)

OWNER'S DETAILS	
Owner's name :	Brian Donnelly
Project address :	153 Innes road Amberley
Building consent number :	210485
Description of building work :	New build

I (plumber) Joshua Cottle

have been engaged by (building consent applicant)

to undertake the plumbing work on the above building consent.

I hereby certify that hot and cold water pipes have been pressure tested to 1500kPa for a period of not less than 15 minutes without pressure drop complying with NZ Building Code G12/AS1 clause 7.5.1

I understand that this certificate, if accepted, will be relied upon by Hurunui District Council for the purpose of establishing compliance with the Building Consent.

PLUMBER'S DETAILS			
Plumber's name :	Joshua Cottle		
Address :	133 Blackett street Rangiora 7400		
Registration number :	26118	Mobile phone :	0212618678
Phone (work) :		E-mail address :	josh@cottleplumbing.co.nz
Signature :		Date :	12/12/2022

GoGet CCC Processing Summary Report

Consent No: 210485

Site Address: 153 Innes Road

Description: 4-bedroom dwelling with attached garage and woodburner

Checklist/Elements	Status	Notes	Processed By
SOC Checklist	Pass	Inspections Prepaid: 10 Inspections Done: 16 (over 10 site visits) Development Contributions Paid: N/A CCC to owner - bryanvizbuilt@gmail.com (Bryan) Required : - Form 6 requires correct gas reg # - UPDATED - PS3 for effluent field installation - RECEIVED - Plumber's pressure test declaration needs BC number added - UPDATED - PS3 for wet area tanking needs updated to correct form - UPDATED - As-built roof truss & wall frames design - RECEIVED - Wood burner installer's certificate needs completed on correct form - RECEIVED - Foundations LBP RoW needs owners details added - UPDATED	Brendon Wells,Brooke Parker
Amendment check	N/A		BJW
Amendment description added to Form 7	N/A		BJW
Evidence of ownership check	Pass		BAP
Inspection check	Pass		BJW
Additional inspections charged	N/A		BJW
Site visits completed	Pass		BJW
Inspection notices complete and all items followed up	Pass		BJW
Final inspection completion photos	Pass		BJW
Notification for inspection result recorded in contacts	N/A		BJW
No Warnings and Bans identified	N/A		BJW
Correct description of building works	Pass		BJW
BC conditions met	Pass		BJW
Stormwater documentation received	N/A		BJW
Notices to fix resolved	N/A		BJW
Producer statement assessments completed by processor	Pass		BJW
Updated MagicQ to include year first constructed and correct current use	Pass		BJW
Durabilty Form	N/A		BJW
Documentation sign off	Pass		BJW
Pool details updated	N/A		BJW
Resource consent issued	N/A		BJW
Restricted building work	Pass		BJW
Energy Works Certificates	Pass		BJW
Residential - supervision required	Pass		BJW

Checklist/Elements	Status	Notes	Processed By
Commerical - supervision required	N/A		BJW
Compliance schedule required	N/A		BJW
Compliance Schedule reviewed and signed	N/A		BJW
Alarm type specified matches FPIS certificate	N/A		BJW
The supplied current manufacturers certificates for modular components establish that the building work to which the certificate applies complies with the building consent.	N/A		BJW
Fees/ Development contributions paid	N/A		BJW
Admin check	Pass		BJW
The BCA is satisfied, on reasonable grounds that the building work complies with the building consent	Pass		BJW
Approve to issue Code Compliance Certificate	Pass		BJW
Approve to issue Certificate for Public Use	N/A		BJW

CCC RFI

Request:	Please provide a PS3 document for the septic effluent field installation - see blank copy attached	BJW
Response:	Document submitted	BJW

CCC RFI

Request:	The plumber's pressure test declaration needs the project building consent number added - please let me know if it is OK for me to update this form on behalf	BJW
Response:	Document updated on request from applicant	BJW

CCC RFI

Request:	Please provide a revised PS3 document for installation of the wet area tanking to showers - see attached correct form	BJW
Response:	Document submitted	BJW

CCC RFI

Request:	Please provide a copy of the framing company's as-built roof truss and wall frames design documentation - this should have been issued when the trusses and frames were delivered to site	BJW
Response:	Documentation submitted	BJW

CCC RFI

Request:	Please have the wood burner installer complete a copy of the correct installer's certificate - see blank copy attached	BJW
Response:	Document submitted	BJW

CCC RFI

Request:	The foundations LBP Record of Work document needs the property owner's details added - please provide the LBP's confirmation if they are happy for me to update this form on behalf	BJW
Response:	Updated page 1 submitted as required	BJW

I am satisfied on reasonable grounds that the provisions of the Building Code will be met if the building work in relation to the attached application is properly completed in accordance with the attached plans and specifications.

Signed: _____ Date: 22 April 2025 9:38 am

Brendon Wells

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**819722**
Land Registration District	**Canterbury**
Date Issued	22 June 2021

Prior References
754318

Estate	Fee Simple
Area	4.5694 hectares more or less
Legal Description	Lot 4 Deposited Plan 520186

Registered Owners
Bryan Donnelly and Philippa Anne Donnelly

Interests

Subject to Sections 6 & 8 Mining Act 1971

Subject to Section 3 Petroleum Act 1937

Subject to Section 3 Geothermal Energy Act 1953

Subject to Section 8 Atomic Energy Act 1945

Subject to Part IV A Conservation Act 1987

Subject to Sections 5 & 261 Coal Mines Act 1979

Land Covenant in Easement Instrument 10342105.1 - 11.8.2016 at 2:36 pm

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
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Skype hdc_customer_services | twitter.com/hurunuidc

Producer Statement Construction (PS3)

All sections of this PS3 must be completed

☐ Building ☐ Emergency Lighting ☐ Fire Alarm ☑ Drainlayer
☐ Fire Sprinkler ☐ Lift ☐ Mechanical (HVAC)
☐ Cladding ☐ Other (specify).....

Issued by (contractor / installer)..... NCD Ltd .....
to Hurunui District Council

OWNER'S DETAILS	
Owner's name:	Bryan & Pippa Donnelly
Project address:	183 Innes Rd, Culverden.
Building consent number:	210485
Description of building work:	Drainage
Scope of work covered by statement:	Septic system inc effluent field.
System / Product used (if applicable):	As per design

I (constructor/installer)..... NCD Ltd ..... have been engaged by (building consent applicant)..... Bryan Donnelly ..... to construct:

(ALL) PART ONLY (circle one)

As specified in the attached particulars of the above mentioned building consent number and its attached conditions, I am satisfied on reasonable grounds that the building work specified above has been completed to the extent required by that building consent and complies with the building consent.

Specific reference to the Building Code:								
What Clauses of the Building Code are covered by the Certificate?	B1	B2	C1	C2	C3	C4	D1	D2
	E1	E2	E3	F1	F2	F3	F4	F5
(Circle applicable clauses)	F6	F7	F8	G1	G2	G3	G4	G5
	G6	G7	G8	G9	G10	G11	G12	(G13)
	G14	G15	H1					

I understand that this Certificate, if accepted, will be relied upon by Hurunui District Council for the purpose of establishing compliance with the Building Consent.

CONTRUCTOR'S / INSTALLER'S DETAILS		
Name:	Josh Sutherland	
Company name (if applicable):	North Canterbury Drainage Limited (NCD)	
Address:		
Registration number:	20799	Mobile phone:
Phone (work):	027 038 2190	E-mail address:
Signature:		Date: 8-4-25

HURUNUI DISTRICT COUNCIL
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Skype hdc_customer_services | twitter.com/hurunuidc

Producer Statement Construction (PS3)

All sections of this PS3 must be completed

☐ Building ☐ Emergency Lighting ☐ Fire Alarm ☐ Drainlayer
☐ Fire Sprinkler ☐ Lift ☐ Mechanical (HVAC)
☐ Cladding ☐ Other (specify) Tanking

Issued by (contractor / installer) Gimbert Vicente
to Hurunui District Council

OWNER'S DETAILS	
Owner's name:	Bryan + Pip Donnelly
Project address:	153 Innes Road Amberley
Building consent number:	210485
Description of building work:	Tanking Wet Areas
Scope of work covered by statement:	Main Bathroom + Ensuite Showers
System / Product used (if applicable):	As per design

I (constructor/installer) Gimbert Vicente have been engaged by (building consent applicant) Bryan Donnelly to construct:

(ALL) PART ONLY (circle one)

As specified in the attached particulars of the above mentioned building consent number and its attached conditions, I am satisfied on reasonable grounds that the building work specified above has been completed to the extent required by that building consent and complies with the building consent.

Specific reference to the Building Code:

What Clauses of the Building Code are covered by the Certificate?

(Circle applicable clauses)

(B1)	B2	C1	C2	C3	C4	D1	D2
E1	E2	(E3)	F1	F2	F3	F4	F5
F6	F7	F8	G1	G2	G3	G4	G5
G6	G7	G8	G9	G10	G11	G12	G13
G14	G15	H1					

I understand that this Certificate, if accepted, will be relied upon by Hurunui District Council for the purpose of establishing compliance with the Building Consent.

CONTRUCTOR'S / INSTALLER'S DETAILS		
Name:	Gimbert Vicente	
Company name (if applicable):	R+K Tiling Services LTD	
Address:	54 Staveley Street, Avonhead, Christchurch 8042	
Registration number:	14951	Mobile phone: 0224214201
Phone (work):		E-mail address: gimbertvicente@gmail.com
Signature:		Date: 14/4/25

HURUNUI DISTRICT COUNCIL
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Producer Statement Construction (PS3)

All sections of this PS3 must be completed

☐ Building ☐ Emergency Lighting ☐ Fire Alarm ☐ Drainlayer
☒ Fire Sprinkler ☐ Lift ☐ Mechanical (HVAC)
☐ Cladding ☐ Other (specify) FIRE INSTALLATION

Issued by (contractor / installer) JONATHAN TOULSON
to Hurunui District Council

OWNER'S DETAILS	
Owner's name:	BRYAN DONNELLY
Project address:	153 INNES RD
Building consent number:	BC 210485
Description of building work:	FIRE INSTALLATION
Scope of work covered by statement:	FIRE INSTALLATION
System / Product used (if applicable):	WOODSMAN TARRAS MKIII FIRE

I (constructor/installer) JONATHAN TOULSON have been engaged by (building consent applicant) BRYAN DONNELLY to construct:

(ALL) PART ONLY (circle one)

As specified in the attached particulars of the above mentioned building consent number and its attached conditions, I am satisfied on reasonable grounds that the building work specified above has been completed to the extent required by that building consent and complies with the building consent.

Specific reference to the Building Code: What Clauses of the Building Code are covered by the Certificate? (Circle applicable clauses)								
	B1	B2	C1	C2	C3	C4	D1	D2
	E1	E2	E3	F1	F2	F3	F4	F5
	F6	F7	F8	G1	G2	G3	G4	G5
	G6	G7	G8	G9	G10	G11	G12	G13
	G14	G15	H1					

I understand that this Certificate, if accepted, will be relied upon by Hurunui District Council for the purpose of establishing compliance with the Building Consent.

CONTRUCTOR'S / INSTALLER'S DETAILS			
Name:	JONATHAN TOULSON		
Company name (if applicable):	WAITAPU CONTRACTORS LTD		
Address:	4 PURIRI ST, PEGASUS		
Registration number:	15592	Mobile phone:	
Phone (work):	021498442	E-mail address:	jt@aquaflame.co.nz
Signature:		Date:	17.10.23

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Solid/Liquid/Fuel Heater Installer's Installation Certificate

Building Consent Number : **210485** Site Address : 153 Innes Road ,Glasnevin

Make : Woodsman Model : Tarras MKIII Clean Air Registration Number : 143492

☑ Solid Fuel Heater ☐ Liquid Fuel Heater ☑ Free Standing ☐ Inbuilt

	Yes	No	N/A
The existing chimney has been cleaned prior to installation			✓
Is the fireplace surround/chimney face junction sealed up with heat resistant material	✓		
The flue pipe is constructed of austenitic stainless steel	✓		
Seismic restraint has been fitted	✓		
The flue sections are secured together with stainless steel rivets	✓		
The flue is secured to the appliance	✓		
The chimney void has been vented at the top			✓
Is the Solid Fuel Burner and Flue as per the building consent	✓		
Flue joints sealed in accordance with manufactures instructions	✓		
Fire safety valve connected and working correctly (diesel burners)			
Flue and appliance clearances have been achieved in terms of the manufacturer's instructions (NZS 7421 or AS/NZS 2918:2001)	✓		
The flue height meets the minimum specified in the manufacturer's instructions, NZS7421, and Regional Council rules	✓		
The application has been installed and commissioned in accordance with the manufacture's installation and operating instructions (Liquid fuel only)			✓
The liquid fuel storage tank and feed system has been installed in accordance with AS1691, or equivalent, and with the requirements of the Council's Hazardous Substances Officer			✓
Smoke detectors as detailed on the building consent documents are installed	✓		

If response to any of the items is 'no' please comment :

Water heater – model and part number :

I Jonathan Toulson **(name)** certify that the above specified installation has been carried out as described and in accordance with the manufacturers installation instructions and the current approved building code requirements

Installers Signature : (Installer) Date : 18/4/2025

RESOURCE MANAGEMENT ACT MATTERS – LIQUID FUEL HEATER

	Yes	No
Does the fuel storage tank have secondary containment in accordance with the District Plan (NB: Audit monitoring will be carried out)		

If response is 'no' please comment why :

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FORM 6

CODE COMPLIANCE CERTIFICATE APPLICATION

Section 92, Building Act 2004

APPLICATION

Building Consent No : Consent issued by Hurunui District Council

THE OWNER	AGENT – APPLICANT N/A ☐ *(leave section blank)*
Owner's Name :	Agent's Name :
Contact Person : (if owner is not an individual)	Contact Person :
Mailing Address : Postcode :	Mailing or Billing Address : Postcode :
Street Address or Registered Office : Postcode :	Street Address or Registered Office : Postcode :
Mobile Phone :	Mobile Phone :
Phone :	Phone :
After Hours Phone :	After Hours Phone :
Landline number :	Landline number :
Daytime phone :	Daytime phone :
Fax number :	Fax number :
E-mail Address :	E-mail Address :
Website :	Website :

Note – The Agent (if appointed) will be the first point of contact for communications with the Council / Building Consent Authority regarding this application / building work and will receive all correspondence including all invoices

The Code Compliance certificate should be sent to : ☐ Owner ☐ Agent

All building work carried out under the above Building Consent was completed on - Date :

The following evidence of ownership is attached to this application : ☐ Certificate of Title
☐ Sale and Purchase Agreement (only if new purchase)

SIGNATURE

I request that the Hurunui District Council Building Consent Authority issue a Code Compliance Certificate for this work (under section 95 of the Building Act 2004)

Signature of owner / or agent on behalf of and with the authority of the owner :

☐ Owner ☐ Agent Date :

Note : If acting "for and on behalf", please read the following declaration before signing :

"I hereby declare that I am authorised to act as Agent of the Owner"

THE PERSONNEL WHO CARRIED OUT WORK **OTHER THAN** RESTRICTED BUILDING WORK	
Name of Builder :	Phone Number :
Postal Address :	Registration Number :
E-mail Address :	
Name of Craftsman Plumber :	Phone Number :
Postal Address :	Registration Number :
E-mail Address :	
Name of Craftsman Gasfitter :	Phone Number :
Postal Address :	Registration Number :
E-Mail Address :	
Name of Registered Drain-layer :	Phone Number :
Postal Address :	Registration Number :
E-mail Address :	
Name of Electrician :	Phone Number :
Postal Address :	Registration Number :
E-mail Address :	
Name of soild / liquid fuel burner installer :	Phone Number :
Postal Address :	Registration Number :
E-mail Address :	
Name of other Contractor / Tradesperson :	Phone Number :
Postal Address :	Registration Number :
E-mail Address :	
Add any additional persons on another (separate) sheet.	

ATTACHMENTS

The following supporting documents are attached to this application :

- ☐ Certificates / other documents from the personnel who carried out the work
- ☐ Certificates that relate to the energy work
- ☐ Evidence that Specified Systems are capable of performing to the performance standards set out in the building consent
- ☐ Memoranda from Licensed Building Practitioner(s) stating what Restricted Building Work they carried out or supervised

Notes by applicant: (Other notes or comments which you as the applicant may wish to add)

RESTRICTED BUILDING WORK

Did the Building Consent work include any restricted building work ☐ Yes ☐ No

If yes, provide the following details of all licensed building practitioners who were involved in the carrying out or supervising the restricted building work

Licensing Class	Name and address	Licensed building practitioner number (or registration number treated as being licensed under section 291 of the building Act 2004)	Description of particular work carried out or supervised
Foundations			
Carpentry			
Exterior Plasterer			
Brick-layer			
Block-layer			
Roofer			

SPECIFIED SYSTEMS

Are there specified systems associate with this project? ☐ Yes (as listed below) ☐ No

The following specified systems are contained on the compliance schedule for the building and, in the opinion of the personnel who installed them, are capable of performing to the performance standards set out in the building consent.

SS1 Automatic systems for fire suppression
SS2 Emergency warning systems
SS3/1 Automatic doors
SS3/2 Access controlled doors
SS3/3 Interfaced fire or smoke doors and / or w indows
SS4 Emergency lighting systems
SS5 Escape route pressurisation systems
SS6 Riser Mains
SS7 Automatic back flow preventers
SS8/1 Passenger carrying lifts
SS8/2 Service lifts
SS8/3 Escalator and moving walks
SS9 Mechanical ventilation or air conditioning systems
SS10 Building maintenance units
SS11 Laboratory fume cupboards
SS12/1 Audio loops
SS12/2 FM radio and infrared beam transmission systems
SS13/1 Mechanical smoke control
SS13/2 Natural smoke control
SS13/3 Smoke curtains
SS14/1 Emergency power systems
SS14/2 Sign44s for SS1-13
SS15/1 Spoken information intended to facilitate evacuation
SS15/2 Final exits
SS15/3 Fire separations
SS15/4Signs for facilitating evacuation
SS15/5 Smoke separations
SS16 Cable cars

Additional Information to Note

1. A final inspection must have been completed prior to this application being sought.
2. The Code Compliance Certificate will be based on the approved building consent documents, so any variations to the original approved plans are required to be documented and approved prior to the work being carried out.
3. A Code Compliance Certificate will not be issued until all of the information required on this form that is relevant to the job is provided to the Council. This includes all names, certificates from personnel who carried out the work, registration numbers, producer statements, or any other required documents

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CODE COMPLIANCE CERTIFICATE

Form 7, Section 95, Building Act 2004

THE BUILDING	
Street address of building:	153 Innes Road
Legal description of land where building is located:	Lot 4 DP 520186
Current, Lawful established use:	Housing – Detached dwelling
Year first constructed:	2024

OWNER	
Name of owner:	B & P Donnelly
Contact person:	Bryan Donnelly
Mailing Address:	153 Innes Road, Glasnevin, Amberley 7482
Street address/registered office:	153 Innes Road, Glasnevin, Amberley
Contact phone number:	027 375 1899
Contact email address:	bryanvizbuilt@gmail.com
First point of contact for communication with the Council/Building Control Authority (BCA):	
B & P Donnelly	153 Innes Road, Glasnevin, Amberley 7482 bryanvizbuilt@gmail.com

BUILDING WORK	
Building Consent No: **210485**	Issued by: Hurunui District Council
Project: 4-bedroom dwelling with attached garage and wood burner	

CODE COMPLIANCE

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

(a) The building work complies with the building consent

Position: Building Officer

Signature:

On behalf of: Hurunui District Council

Date: 22 April 2025

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Consent No: **210485**

Applicant: **B & P Donnelly**

Site Address: **153 Innes Road**

Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Drains**

Inspection Outcome: **Pass Non Compliance**

Inspected By: **Henry Stikkelman**

Inspection Date: **28 February 2022 3:24 p.m.**

Duration: **45 minutes**

Inspection Element	Status
General	Pass
Inspection carried out **Inspection carried out.** **OK to backfill**	Pass
Approved plans reviewed ***Yes - Electronic documents checked***	Pass
Warnngs and Bans **None**	Pass
Inspection Photos **Yes, taken**	Pass
Drainlayer details	Pass
Drainlayer registration number **Josh Sutherland #20799**	Pass
Sewerage	Pass
Drain Material **PVC**	Pass
Gradients **>1 in 100**	Pass
Inspection Points **In place where required**	Pass
Bedding Material **AP20 fill**	Pass
Cover **>375mm**	Pass
Lateral Connection **Connection with IA in place**	Pass
Joint Test **Sighted**	Pass
Main Vent size/location **100mm stub-up(s) in place as drawn**	Pass
Branch Vent size/location **100mm stub-up(s) in place as drawn**	Pass
Septic Tank Type **Austin Bluewater**	Pass
Septic Tank Location **As shown on plans**	Pass
ECAN Effluent approved **Documentation in file**	Pass
Effluent Location **As shown on plans, not yet fenced**	Pass
Effluent Type **Drip-line irrigation system - as designed OK**	Pass

Stormwater	Pass Non Compliance
Drain Material **PVC**	Pass
Gradients **>1 in 100**	Pass
Inspection Points **In place where required**	Pass
Bedding Material **AP20 fill**	Pass
Cover **>375mm**	Pass
Lateral Connection **Storm water to soak holes on site**	Pass
Soak Pit sizes **Provide soakage test results for file.**	Pass Non Compliance
Soak Pit filter cloth **In place to sides & top of pit as reqd**	Pass
Soak Pit Locations **Suitable locations**	Pass
Gutter Sizes and Overflows	Pass Non Compliance
Downpipe Positions **All sized as per plans**	Pass
Deck Drains	N/A
Internal Deck Overflows	N/A
Internal Deck Overflows	N/A
Bubble-up Sumps	N/A
Driveway drainage	N/A

Drip line
Taken at 3:12 PM on Monday 28/02/2022

South side
Taken at 3:22 PM on Monday 28/02/2022

To soak pit
Taken at 3:23 PM on Monday 28/02/2022

Septic tank
Taken at 3:23 PM on Monday 28/02/2022

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Consent No: **210485**

Applicant: **B & P Donnelly**

Site Address: **153 Innes Road**

Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Drains**

Inspection Outcome: **Pass**

Inspected By: **Nigel Smith**

Inspection Date: **20 December 2024 10:50 a.m.**

Duration: **30 minutes**

Inspection Element	Status
Site hazard check completed	Pass
Is the inspection within my competency? **Yes the inspection is within my competency**	Pass
Stormwater	Pass
Soak Pit sizes **Sufficient volume for catchment**	Pass
Gutter Sizes and Overflows **All gutters as drawn with overflows**	Pass

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Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Final - Residential**
Inspection Outcome: **Pass**
Inspected By: **Nigel Smith**
Inspection Date: **20 December 2024 10:49 a.m.**
Duration: **60 minutes**

Inspection Element	Status
Site hazard check completed	Pass
Is the inspection within my competency? **Yes the inspection is within my competency**	Pass
General	Pass
Inspection carried out	Pass
Approved plans reviewed ***Yes - Electronic documents checked***	Pass
Warnngs and Bans	Pass
Inspection Photos	Pass
Exterior	Pass
FFL above GL **Good - sufficient**	Pass
FFL above paving **Good - sufficient - OK**	Pass
Cladding clearances **Good - sufficient for cladding types - OK**	Pass
Flashings correct **All as designed - OK**	Pass
Penetrations sealed **YES - silicone sealed - OK**	Pass
Access level height **<190mm step at each door - OK**	Pass
Non-slip access **Bare ground** **Across-profiled timber decking**	Pass
Stair/step access, tread/riser/pitch, head clearance	N/A
Handrails/barriers	N/A
Roof fixed sufficiently **Appear adequate**	Pass
Roof penetrations **Soaker and boot flashings**	Pass
Snow straps/boards **In place as required**	Pass
Vermin proofing **Gaps sealed as required - OK**	Pass
Effluent field/tank **Installed and located as designed**	Pass
S/W discharge location **From DP's through drains to soak-hole(s)**	Pass
S/W sumps/strip drain	N/A
Downpipes clipped	Pass

YES - 2 x clips each	
ORG clipped **150mm clearance & loose grate**	Pass
Gully heights **Min heights above surfaces as required**	Pass
MV/BV size/location **80mm in place as drawn**	Pass
Gas bottle location **All as per gas install standards**	Pass
Weep holes sealed (at gas storage)	N/A
Veneer top vented	N/A
Mechanical vents to exterior **YES - vented to soffit outlets**	Pass
Duct covers installed **YES - exterior grilles in place**	Pass
Soffit lines sealed **YES - all OK**	Pass
Solar panel fitting	N/A
Fire fighting water provided as per consent documents	Pass
Photo Record **YES - All relevant photos taken**	Pass
Interior	Pass
Wet areas sealed **Yes**	Pass
Safety glass installed **Previously checked at Preline**	Pass
Window restraints **Not required - ground level dwelling**	Pass
Aluminium joinery ID **Labels fitted - H zoned**	Pass
Ventilation/Light **Sufficient glazing & mech. venting**	Pass
Smoke dectectors **In place as consented, tested**	Pass
Impervious flooring **In place where required**	Pass
Stair/step access, tread/riser/pitch, head clearance	N/A
Handrails/barriers	N/A
Gas hob protection **All clearances to combustibles OK**	Pass
Means of heating **Woodburner - (separate prompt sheet)** **Heat pump(s)**	Pass
Heating unit - n/a if no appliance fitted	N/A
Plumbing	N/A
Roof space	Pass
Insulation fitment **Good cover, tidy, no gaps**	Pass
Downlight clearance **Abutted & clear; all compliant**	Pass
Ducting connected **YES - all extract vent ducts connected**	Pass
Underlay fitment/laps **Fitment & laps OK**	Pass

Pipework insulated — Pass
Yes

Pipework clipped/supported — Pass
Yes

Amendments/Site Instructions — Pass

As-built building aligns with consent plans/documents — Pass
Yes

Site instructions signed off — Pass
Yes

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Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Foundation - Combined concrete footings & slab**
Inspection Outcome: **Pass**
Inspected By: **John Arthur**
Inspection Date: **18 February 2022 8:11 a.m.**
Duration: **30 minutes**

Inspection Element	Status
General	Pass
Inspection carried out **Yes**	Pass
Approved plans reviewed ***Yes - Approved documents onsite checked***	Pass
Warnngs and Bans	Pass
Concrete production **Audited plant - load dockets sighted.**	Pass
Engineering inspections carried out (Required items checked)	N/A
Inspection Photos **Yes**	Pass
Site Factors	Pass
Survey Pegs	N/A
Siting certifcate required (Required items checked)	N/A
Boundary Clearances **Only fence lines available - distances appear OK**	Pass
Site Stability **Level site**	Pass
Ground Bearing **Firm, gravelly soil**	Pass
Vegetation **Removed**	Pass
Excavations	Pass
Horizontal Rods **SED - as drawn**	Pass
Vertical Rods	N/A
Starters/Floor Ties	N/A
Steel Identified **Seismic 500 E**	Pass
Bottom Cover **>75 & <=100mm**	Pass
Side Cover **>50 & <=75mm**	Pass
Lapping **800mm min (SE500)**	Pass
Tying **Wire tied - OK**	Pass
Depth **min 300mm as drawn**	Pass
Width **min 300mm**	Pass

Formwork **Constructed timber**	Pass
Level Bottom **Yes - OK**	Pass
Stepped Foundations	N/A
Other items	Pass
Waste Ducts **In place - OK**	Pass
Steel around blockouts	N/A
Drains under building	N/A
Subfloor ventilation	N/A
Engineer Design **Yes - Rib raft**	Pass
Engineer site inspection required	N/A
Damp Proofing	Pass
DPM **Heavy polythene**	Pass
Lapping/Sealing **Lapped & taped**	Pass
Penetrations	N/A
Slab thickness **Nom. 100mm**	Pass
Base Course	Pass
Material **AP40**	Pass
Depth **100 - 200mm**	Pass
Sand Blinding **Yes, Minimum 20mm**	Pass
Compaction **Compaction certificate required**	Pass
Reinforcing	Pass
Mesh size **SE62 500E**	Pass
Mesh lapping **1¼ laps**	Pass
Mesh concrete cover **Nom. 30mm**	Pass
Mesh chairs **Yes**	Pass
Floor tie lapping	N/A
Floor tie connection	N/A
Supplementary bars **In place as per plan**	Pass
Equipotential Bonding in place **Bonding installed and connected**	Pass
Thickenings	Pass
Depth **As shown on plans**	Pass
Width **As per plans**	Pass
Horizontal rods **SED - as drawn**	Pass
Links	Pass

SED as per plans

Services	Pass
Materials **PVC**	Pass
Gradients **Good**	Pass
Sizes **As per plan**	Pass
Sleeving **Plastic & foam wrapped & taped**	Pass
Cylinder Drain	N/A
Safe Tray Drain	N/A
Other items	Pass
Bottom plate anchors	N/A
Shrinkage control	N/A
Heating	N/A
Insulation **.225 poly pods as per rib raft**	Pass

Rib raft ready to pour
Taken at 8:09 AM on Friday 18/02/2022

Bonding rod and PVC wastes in place
Taken at 8:10 AM on Friday 18/02/2022

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Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Pre-Roof**
Inspection Outcome: **Pass Non Compliance**
Inspected By: **Henry Stikkelman**
Inspection Date: **13 June 2022 8:52 a.m.**
Duration: **15 minutes**

Inspection Element	Status
Bracing wall and roof	Pass Non Compliance
Fixing/Connections	Pass Non Compliance

- Internal bottom plate fixings to be completed as per Gib manual

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Consent No: **210485**

Applicant: **B & P Donnelly**

Site Address: **153 Innes Road**

Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Pre-Roof**

Inspection Outcome: **Pass**

Inspected By: **Mark Milnes**

Inspection Date: **27 September 2022 10:43 a.m.**

Duration: **15 minutes**

Inspection Element	Status
Bracing wall and roof	Pass
Fixing/Connections	Pass

- Internal bottom plate fixings to be completed as per Gib manual inspected at preline all now as drawn

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Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Pre-Cladding - Mid Cladding**
Inspection Outcome: **Pass**
Inspected By: **Tom Race**
Inspection Date: **1 August 2022 11:34 a.m.**
Duration: **30 minutes**

Inspection Element	Status
General	Pass
Inspection carried out	Pass
Approved plans reviewed ***Yes - Electronic documents checked***	Pass
Warnngs and Bans	Pass
Inspection Photos	Pass
Cladding System	Pass
Cladding system installed as per plans/ specs	Pass
Cladding Fixings	Pass
Cavity Batten size	Pass
Cavity Batten spacing **600mm centres**	Pass
Cavity Batten treatment **CLD - fibre-cement**	Pass
Vermin proofing **PVC vent strip in place**	Pass
Head flashings **Most joinery to soffit; folded alum. w/stop-ends to other**	Pass
Sill flashings	N/A
Jamb flashings	N/A
WANZ bars fitted **Fitted to every window & door**	Pass
Photos taken **YES - Any relevant photos taken**	Pass

Taken at 11:34 AM on Monday 1/08/2022

Taken at 11:34 AM on Monday 1/08/2022

Taken at 11:34 AM on Monday 1/08/2022

Taken at 11:34 AM on Monday 1/08/2022

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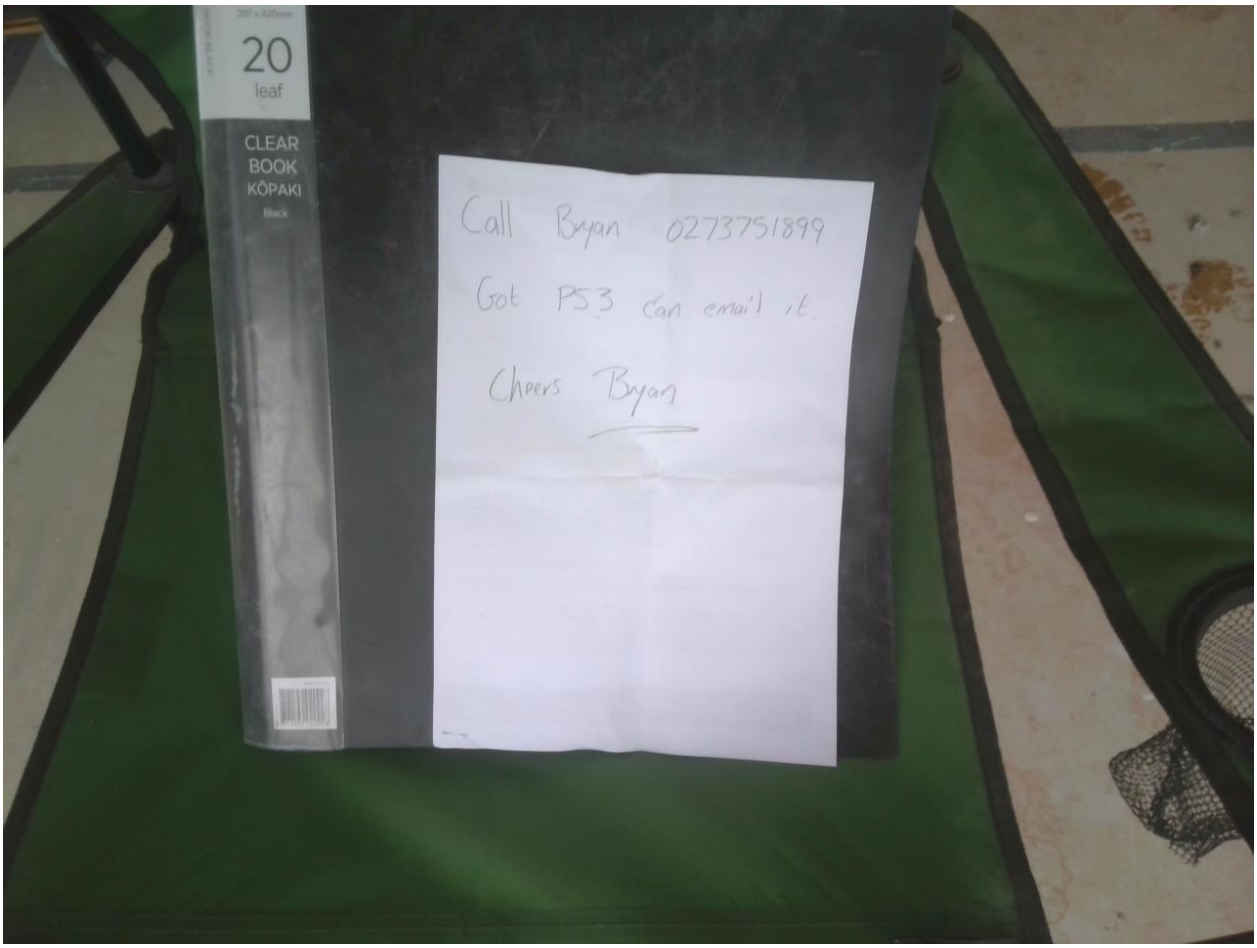
Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Interior Tanking**
Inspection Outcome: **Pass**
Inspected By: **Kerry Walsh**
Inspection Date: **20 December 2022 10:25 a.m.**
Duration: **15 minutes**

Inspection Element	Status
General	Pass
Please email PS3 to building@hurunui.govt.nz	
Inspection carried out	Pass
Approved plans reviewed	Pass
Yes - Electronic documents checked	
Warnngs and Bans	Pass
Inspection Photos	Pass
Materials/installation	Pass
Tanking Location	Pass
Showers only - Bathroom(s) & En Suite(s)	
Slope to shower base	Pass
As per manufacturer's specs - sufficient, OK	
Slope to soap recesses	N/A
Products Used (On approved list)	Pass
Aquadex system (Jaydex International)	
Taping to Corners and Junctions	Pass
Mesh tape in place as per manufacturer's specs - OK	
Splash Protection Installed	N/A



Note to inspector with tanking applicators number
Taken at 10:16 AM on Tuesday 20/12/2022

shower tanking in main bathroom
Taken at 10:17 AM on Tuesday 20/12/2022

Banking etc
Taken at 10:18 AM on Tuesday 20/12/2022

suite shower tanking
Taken at 10:19 AM on Tuesday 20/12/2022

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Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Pre-Line**
Inspection Outcome: **Pass Non Compliance**
Inspected By: **Mark Milnes**
Inspection Date: **27 September 2022 11:14 a.m.**
Duration: **45 minutes**

Inspection Element	Status
General	Pass
Inspection carried out	Pass
Approved plans reviewed ***Yes - Approved documents onsite checked***	Pass
Warnngs and Bans	Pass
Engineering inspections carried out (Required items checked)	N/A
Building weathertight	Pass
Inspection Photos	Pass
Framing	Pass
Framing Moisture **<16%**	Pass
Ceiling Batten Material **Pinus timber**	Pass
Ceiling Batten Size **70 x 35mm**	Pass
Ceiling Batten Centres **600mm**	Pass
Ceiling Batten Moisture **<15%**	Pass
Bracing location and type **Previously checked**	Pass
Bracing clear of wet areas	Pass
Bracing fixings/connections **Previously checked**	Pass
Brace openings **All OK**	Pass
Dragon ties	N/A
Diaphragms	N/A
Other	Pass Non Compliance
Fire Walls	N/A
Safety Glazing **In place - as drawn & required - OK**	Pass
Window/joinery Rating **Joinery displays correct ID rating for site wind speed**	Pass
Internal Ventilation **Natural - opening windows & doors** **Mechanical - designed system**	Pass
Metal angle to showers **provide photos**	Pass Non Compliance

Insulation Material **Pink Batts®**	Pass
R Value Walls **R2.4 - as designed**	Pass
R Value Ceilings **R3.6 - as designed**	Pass
Insulation Placement **not fully provided yet / delayed south room ceilings**	Pass Non Compliance
Stair Head Clearance (2m min)	N/A
Opening Air Seals **Good, tidy**	Pass
Water Services	Pass
Pipework **Polybutylene to hot & cold.**	Pass
Jointing **Brass, crimped**	Pass
Support/Clipping **Good - secure - OK**	Pass
Lagging **Inside insulated envelope**	Pass
Shut Off Valve **In place, as required (in Garage) pump**	Pass
Pressure Test **Carried out - OK- Plumber to supply test declaration.**	Pass
Equipotential Bonding in place **Bonding installed and connected**	Pass
Waste Services	Pass
Pipework **PVC**	Pass
Sizes **All as drawn**	Pass
Support	Pass
Gradients **All in slab - prev. inspected - appear OK**	Pass
Internal AAV's (hidden)	N/A

earth straped
Taken at 11:10 AM on Tuesday 27/09/2022

windows sealed
Taken at 11:11 AM on Tuesday 27/09/2022

GoGet Inspection Audit Report

Consent No: **210485**

Applicant: **B & P Donnelly**

Site Address: **153 Innes Road**

Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Pre-Line**

Inspection Outcome: **Pass**

Inspected By: **Sven Rigarlsford**

Inspection Date: **3 November 2022 3:48 p.m.**

Duration: **15 minutes**

Inspection Element	Status
Other	Pass
Metal angle to showers **provide photos** **Galv 40 x 40mm in place as required**	Pass
Insulation Placement **not fully provided yet / delayed south room ceilings** **Good - tidy**	Pass

GoGet Inspection Audit Report

Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Pre-Stop**
Inspection Outcome: **Fail**
Inspected By: **Sven Rigarlsford**
Inspection Date: **3 November 2022 3:50 p.m.**
Duration: **30 minutes**

Inspection Element	Status
General	Pass
Inspection carried out	Pass
Approved plans reviewed ***Yes - Electronic documents checked***	Pass
Warnngs and Bans	Pass
Inspection Photos	Pass
Bracing **all bracing not complete re inspection required**	Fail
Locations **Not sufficient - re-design required**	Fail
Types **Not as designed - rectification / redesign required**	Fail
Ceiling Diaphragms	N/A
Edge Nailing	Fail
Holes in elements **All OK**	Pass
Materials	Pass
Wet Areas **10mm GIB Aqualine**	Pass
Wet Area Ceilings **approved plasterboard product - as drawn**	Pass
Other Walls **approved plasterboard - as drawn**	Pass
Other Ceilings **approved plasterboard product**	Pass
Fire Walls	N/A

GoGet Inspection Audit Report

Consent No: **210485**

Applicant: **B & P Donnelly**

Site Address: **153 Innes Road**

Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Pre-Stop**

Inspection Outcome: **Pass**

Inspected By: **Sven Rigarlsford**

Inspection Date: **9 November 2022 8:51 a.m.**

Duration: **15 minutes**

Inspection Element	Status
Bracing	Pass
all bracing not complete re inspection required	
Locations	Pass
All as drawn extra added	
Types	Pass
All GIB systems - as drawn	
Edge Nailing	Pass
Wall bracing fixings	

Typical brace
Taken at 8:37 AM on Wednesday 9/11/2022

Pre stop
Taken at 8:38 AM on Wednesday 9/11/2022

Right of entry Gs1
Taken at 8:39 AM on Wednesday 9/11/2022

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66 Carters Road
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SITE NOTICE

Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**
Building Category: **R2**

Inspection Type: **Foundation - Combined concrete footings & slab**
Inspection Outcome: **Pass**
Inspected By: **John Arthur**
Inspection Date: **18 February 2022**

Passed Items

General	
Inspection carried out	**Yes**
Approved plans reviewed	**Yes - Approved documents onsite checked**
Warnngs and Bans	
Concrete production	**Audited plant - load dockets sighted.**
Inspection Photos	**Yes**
Site Factors	
Boundary Clearances	**Only fence lines available - distances appear OK**
Site Stability	**Level site**
Ground Bearing	**Firm, gravelly soil**
Vegetation	**Removed**
Excavations	
Horizontal Rods	**SED - as drawn**
Steel Identified	**Seismic 500 E**
Bottom Cover	**>75 & <=100mm**
Side Cover	**>50 & <=75mm**
Lapping	**800mm min (SE500)**
Tying	**Wire tied - OK**
Depth	**min 300mm as drawn**
Width	**min 300mm**
Formwork	**Constructed timber**
Level Bottom	**Yes - OK**
Other items	
Waste Ducts	**In place - OK**
Engineer Design	**Yes - Rib raft**
Damp Proofing	
DPM	**Heavy polythene**
Lapping/Sealing	**Lapped & taped**
Slab thickness	**Nom. 100mm**

Base Course	
Material	**AP40**
Depth	**100 - 200mm**
Sand Blinding	**Yes, Minimum 20mm**
Compaction	**Compaction certificate required**
Reinforcing	
Mesh size	**SE62 500E**
Mesh lapping	**1¼ laps**
Mesh concrete cover	**Nom. 30mm**
Mesh chairs	**Yes**
Supplementary bars	**In place as per plan**
Equipotential Bonding in place	**Bonding installed and connected**
Thickenings	
Depth	**As shown on plans**
Width	**As per plans**
Horizontal rods	**SED - as drawn**
Links	**SED as per plans**
Services	
Materials	**PVC**
Gradients	**Good**
Sizes	**As per plan**
Sleeving	**Plastic & foam wrapped & taped**
Other items	
Insulation	**.225 poly pods as per rib raft**

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SITE NOTICE

Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**
Building Category: **R2**

Inspection Type: **Drains**
Inspection Outcome: **Pass Non Compliance**
Inspected By: **Henry Stikkelman**
Inspection Date: **28 February 2022**

Pass Non-Compliance

Stormwater

Soak Pit sizes	**Provide soakage test results for file.**
Gutter Sizes and Overflows	

Passed Items

General

Inspection carried out	**Inspection carried out. OK to backfill**
Approved plans reviewed	**Yes - Electronic documents checked**
Warnngs and Bans	**None**
Inspection Photos	**Yes, taken**

Drainlayer details

Drainlayer registration number	**Josh Sutherland #20799**

Sewerage

Drain Material	**PVC**
Gradients	**>1 in 100**
Inspection Points	**In place where required**
Bedding Material	**AP20 fill**
Cover	**>375mm**
Lateral Connection	**Connection with IA in place**
Joint Test	**Sighted**
Main Vent size/location	**100mm stub-up(s) in place as drawn**
Branch Vent size/location	**100mm stub-up(s) in place as drawn**
Septic Tank Type	**Austin Bluewater**
Septic Tank Location	**As shown on plans**
ECAN Effluent approved	**Documentation in file**
Effluent Location	**As shown on plans, not yet fenced**
Effluent Type	**Drip-line irrigation system - as designed OK**

Stormwater

Drain Material	**PVC**

Gradients	**>1 in 100**
Inspection Points	**In place where required**
Bedding Material	**AP20 fill**
Cover	**>375mm**
Lateral Connection	**Storm water to soak holes on site**
Soak Pit filter cloth	**In place to sides & top of pit as reqd**
Soak Pit Locations	**Suitable locations**
Downpipe Positions	**All sized as per plans**

Support Documentation	**Status**
Application for CCC	Required
Electrical safety certificate (itemised)	Required
Gas safety certificate	Required
As-built drainage plan	Required
Effluent Field certificate	Required
Plumbers pressure test declaration	Required
Wet Area tanking Certificate	Required
Design statement (truss manufacturer)	Required
Design statement (frame manufacturer)	Required
Under-slab hardfill compaction certificate	Required
Woodburner installers certificate	Required

PGDB Registration	**Status**
Plumber	Required
Drainlayer	Required
Gasfitter	Required

Record of Restricted Building Work (LBP #)	**Status**
Designer	Accepted
Alastair Carleton - Received	
Carpentry	Required
Foundations	Required
Roofing	Required

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SITE NOTICE

Consent No:	**210485**
Applicant:	**B & P Donnelly**
Site Address:	**153 Innes Road**
Work Type:	**4-bedroom dwelling with attached garage and woodburner**
Building Category:	**R2**

Inspection Type:	**Pre-Roof**
Inspection Outcome:	**Pass Non Compliance**
Inspected By:	**Henry Stikkelman**
Inspection Date:	**12 May 2022**

Pass Non-Compliance

Bracing wall and roof

Fixing/Connections	**- Internal bottom plate fixings to be completed as per Gib manual** **- HandiBracs each side of garage door to be completed (each side in corner)**

Passed Items

General

Inspection carried out	**Inspection completed.** **Bottom plate hold downs to be completed and checked at next inspection.** **OK to continue.**
Approved plans reviewed	**Yes - Approved documents onsite checked**
Warnngs and Bans	**None**
Inspection Photos	**Yes, taken**

Framing

Timber Species	**Pinus Radiata generally**
Timber Grades	**SG8 generally**
Timber treatments	**H1.2 throughout**
Stud sizes	**90 x 45mm throughout**
Stud spacing	**600mm centres throughout**
DPC bottom plates	**Yes**
Lintel sizes	**All as per consent**
Truss layout	**As per plan**
Truss support	**Double top plates - good**
Purlin size/spacing	**70 x 45mm SG8 on edge @ 900mm centres**

Fixings

Bottom Plates	**M12 galv. Reid bolts @ 1.2m centres ext. & drive pins @ 900mm centres int**
Top plate - stud	**Stud straps & nailing where reqd**
Trusses - top plate	**All as per manuf. specs**

Purlins/Tile Battens	**1 gun nail & 2 blue screws**
Lintels	**All as per manuf. specs**
Bracing wall and roof	
Location/type	
Ply nailing	**All galv nailed 150mm centres**
Roof bracing	**Steel strap cross bracing as spec**
Ply treatment	**H3.2 as reqd**

Support Documentation	**Status**
As-built drainage plan	Accepted
Application for CCC	Required
Electrical safety certificate (itemised)	Required
Gas safety certificate	Required
Effluent Field certificate	Required
Plumbers pressure test declaration	Required
Wet Area tanking Certificate	Required
Design statement (truss manufacturer)	Required
Design statement (frame manufacturer)	Required
Under-slab hardfill compaction certificate	Required
Woodburner installers certificate	Required

PGDB Registration	**Status**
Plumber	Required
Drainlayer	Required
Gasfitter	Required

Record of Restricted Building Work (LBP #)	**Status**
Designer	Accepted
Alastair Carleton - Received	
Carpentry	Required
Foundations	Required
Roofing	Required

Framing type
Taken at 11:38 AM on Thursday 12/05/2022

Framing north elevation
Taken at 11:38 AM on Thursday 12/05/2022

Lintel & plate hold downs
Taken at 11:39 AM on Thursday 12/05/2022

Top plate hold downs
Taken at 11:39 AM on Thursday 12/05/2022

Wall strapping
Taken at 11:40 AM on Thursday 12/05/2022

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SITE NOTICE

Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**
Building Category: **R2**

Inspection Type: **Pre-Roof**
Inspection Outcome: **Pass Non Compliance**
Inspected By: **Henry Stikkelman**
Inspection Date: **13 June 2022**

Pass Non-Compliance

Bracing wall and roof

Fixing/Connections	**- Internal bottom plate fixings to be completed as per Gib manual**

Inspection Type: **Pre-Cladding - Wrap**
Inspection Outcome: **Pass Non Compliance**
Inspected By: **Henry Stikkelman**
Inspection Date: **13 June 2022**

Pass Non-Compliance

Flashings

Wrap Penetrations	

Passed Items

General

Inspection carried out	**Inspection carried out. OK to continue. Some areas not yet completed due to weather, Provide progress photos of works completed.**
Approved plans reviewed	**Yes - Electronic documents checked**
Warnngs and Bans	**None**
Inspection Photos	**Yes**

Wrap/tape

Wrap/Barrier type	**Tekton HouseWrap**
Wrap/Barrier fixing	**Good - well fixed**
Wrap overhang to founds	
Sill tape type	**"Protecto Sill" flashing tape system throughout (BRANZ No. 450)**
Roof Underlay	**Thermakraft 215 bituminous self supporting**
Netting support	**Galv. wire netting in place as required**

Flashings

Flashing tape sill fixing	**Full length as per manuf. specs**

Flashing tape head fixing	**Fitted at corners as per manuf. specs**
Flashing tape jamb fixing	

Support Documentation	**Status**
As-built drainage plan	Accepted
Application for CCC	Required
Electrical safety certificate (itemised)	Required
Gas safety certificate	Required
Effluent Field certificate	Required
Plumbers pressure test declaration	Required
Wet Area tanking Certificate	Required
Design statement (truss manufacturer)	Required
Design statement (frame manufacturer)	Required
Under-slab hardfill compaction certificate	Required
Woodburner installers certificate	Required

PGDB Registration	**Status**
Plumber	Required
Drainlayer	Required
Gasfitter	Required

Record of Restricted Building Work (LBP #)	**Status**
Designer	Accepted
Alastair Carleton - Received	
Carpentry	Required
Foundations	Required
Roofing	Required

South elevation
Taken at 8:57 AM on Monday 13/06/2022

West elevation
Taken at 8:58 AM on Monday 13/06/2022

Typical sill detail
Taken at 8:58 AM on Monday 13/06/2022

Head detail
Taken at 8:59 AM on Monday 13/06/2022

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SITE NOTICE

Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**
Building Category: **R2**

Inspection Type: **Pre-Cladding - Wrap**
Inspection Outcome: **Pass**
Inspected By: **Tom Race**
Inspection Date: **1 August 2022**

Passed Items

Flashings

Wrap Penetrations	**Taped & sealed appropriately**

Inspection Type: **Pre-Cladding - Mid Cladding**
Inspection Outcome: **Pass**
Inspected By: **Tom Race**
Inspection Date: **1 August 2022**

Passed Items

General

Inspection carried out	
Approved plans reviewed	**Yes - Electronic documents checked**
Warnngs and Bans	
Inspection Photos	

Cladding System

Cladding system installed as per plans/ specs	
Cladding Fixings	
Cavity Batten size	
Cavity Batten spacing	**600mm centres**
Cavity Batten treatment	**CLD - fibre-cement**
Vermin proofing	**PVC vent strip in place**
Head flashings	**Most joinery to soffit; folded alum. w/stop-ends to other**
WANZ bars fitted	**Fitted to every window & door**
Photos taken	**YES - Any relevant photos taken**

penatrations tapped
Taken at 11:28 AM on Monday 1/08/2022

Taken at 11:34 AM on Monday 1/08/2022

Taken at 11:34 AM on Monday 1/08/2022

Taken at 11:34 AM on Monday 1/08/2022

Taken at 11:34 AM on Monday 1/08/2022

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SITE NOTICE

Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**
Building Category: **R2**

Inspection Type: **Pre-Roof**
Inspection Outcome: **Pass**
Inspected By: **Mark Milnes**
Inspection Date: **27 September 2022**

Passed Items

Bracing wall and roof

Fixing/Connections	**- Internal bottom plate fixings to be completed as per Gib manual inspected at preline all now as drawn**

Inspection Type: **Pre-Line**
Inspection Outcome: **Pass Non Compliance**
Inspected By: **Mark Milnes**
Inspection Date: **27 September 2022**

Pass - Non Compliance

Other

Metal angle to showers	**provide photos**
Insulation Placement	**not fully provided yet / delayed south room ceilings**

Passed Items

General

Inspection carried out	
Approved plans reviewed	**Yes - Approved documents onsite checked**
Warnngs and Bans	
Building weathertight	
Inspection Photos	

Framing

Framing Moisture	**<16%**
Ceiling Batten Material	**Pinus timber**
Ceiling Batten Size	**70 x 35mm**
Ceiling Batten Centres	**600mm**
Ceiling Batten Moisture	**<15%**
Bracing location and type	**Previously checked**
Bracing clear of wet areas	
Bracing fixings/connections	**Previously checked**

Brace openings	**All OK**
Other	
Safety Glazing	**In place - as drawn & required - OK**
Window/joinery Rating	**Joinery displays correct ID rating for site wind speed**
Internal Ventilation	**Natural - opening windows & doors**
	Mechanical - designed system
Insulation Material	**Pink Batts®**
R Value Walls	**R2.4 - as designed**
R Value Ceilings	**R3.6 - as designed**
Opening Air Seals	**Good, tidy**
Water Services	
Pipework	**Polybutylene to hot & cold.**
Jointing	**Brass, crimped**
Support/Clipping	**Good - secure - OK**
Lagging	**Inside insulated envelope**
Shut Off Valve	**In place, as required (in Garage) pump**
Pressure Test	**Carried out - OK- Plumber to supply test declaration.**
Equipotential Bonding in place	**Bonding installed and connected**
Waste Services	
Pipework	**PVC**
Sizes	**All as drawn**
Support	
Gradients	**All in slab - prev. inspected - appear OK**

earth straped
Taken at 11:10 AM on Tuesday 27/09/2022

windows sealed
Taken at 11:11 AM on Tuesday 27/09/2022

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SITE NOTICE

Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**
Building Category: **R2**

Inspection Type: **Pre-Stop**
Inspection Outcome: **Pass**
Inspected By: **Sven Rigarlsford**
Inspection Date: **9 November 2022**

Passed Items

Bracing	**all bracing not complete re inspection required**
Locations	**All as drawn extra added**
Types	**All GIB systems - as drawn**
Edge Nailing	**Wall bracing fixings**

Typical brace
Taken at 8:37 AM on Wednesday 9/11/2022

Pre stop
Taken at 8:38 AM on Wednesday 9/11/2022

Right of entry Gs1
Taken at 8:39 AM on Wednesday 9/11/2022

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SITE NOTICE

Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**
Building Category: **R2**

Inspection Type: **Interior Tanking**
Inspection Outcome: **Pass**
Inspected By: **Kerry Walsh**
Inspection Date: **20 December 2022**

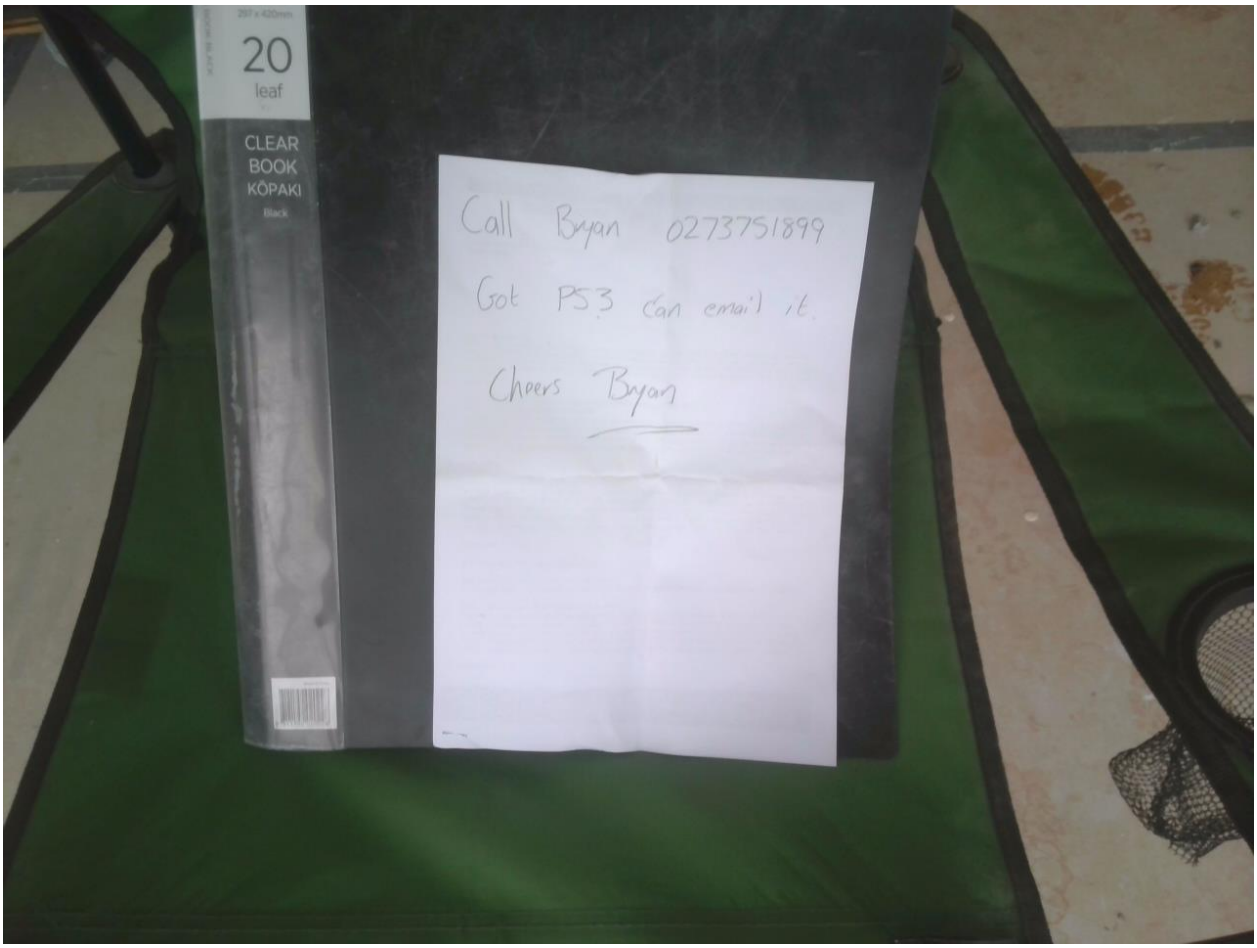
Passed Items

General	**Please email PS3 to building@hurunui.govt.nz**
Inspection carried out	
Approved plans reviewed	**Yes - Electronic documents checked**
Warnngs and Bans	
Inspection Photos	
Materials/installation	
Tanking Location	**Showers only - Bathroom(s) & En Suite(s)**
Slope to shower base	**As per manufacturer's specs - sufficient, OK**
Products Used (On approved list)	**Aquadex system (Jaydex International)**
Taping to Corners and Junctions	**Mesh tape in place as per manufacturer's specs - OK**

Support Documentation	Status
As-built drainage plan	Accepted
Application for CCC	Required
Electrical safety certificate (itemised)	Required
Gas safety certificate	Required
Effluent Field certificate	Required
Plumbers pressure test declaration	Required
Wet Area tanking Certificate	Required
Design statement (truss manufacturer)	Required
Design statement (frame manufacturer)	Required
Woodburner installers certificate	Required
Under-slab hardfill compaction certificate	Required

PGDB Registration	Status
Plumber	Required
Drainlayer	Required
Gasfitter	Required

Licensed Building Practitioners	Status
Designer	Accepted
Alastair Carleton - Received	
Carpentry	Required
Foundations	Required
Roofing	Required



Note to inspector with tanking applicators number
Taken at 10:16 AM on Tuesday 20/12/2022

shower tanking in main bathroom
Taken at 10:17 AM on Tuesday 20/12/2022

Banking etc
Taken at 10:18 AM on Tuesday 20/12/2022

suite shower tanking
Taken at 10:19 AM on Tuesday 20/12/2022

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SITE NOTICE

Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**
Building Category: **R2**

Inspection Type: **Drains**
Inspection Outcome: **Pass**
Inspected By: **Nigel Smith**
Inspection Date: **20 December 2024**

Passed Items

Site hazard check completed
Is the inspection within my competency? **Yes the inspection is within my competency**
Stormwater
- Soak Pit sizes **Sufficient volume for catchment**
- Gutter Sizes and Overflows **All gutters as drawn with overflows**

Inspection Type: **Heating Unit - Solid Fuel**
Inspection Outcome: **Pass**
Inspected By: **Nigel Smith**
Inspection Date: **20 December 2024**

Passed Items

Site hazard check completed
Is the inspection within my competency? **Yes the inspection is within my competency**
General
- Inspection carried out **Yes**
- Approved plans reviewed **Yes - Electronic documents checked**
- Warnngs and Bans **None.**
- Inspection Photos **Photos Taken.**

Installation
- Correct fire model **Woodsman Tarras MKIII free-standing (dry)**
- Clearances to combustibles **As per the manufacturer's instructions.**
- Clean Air approval
- Seismic Restraints **2 x M8 Dyna bolts**
- Flue secured to unit **Installed as per specs**
- Chimney cavity ventilation provided **Ventilation provided**
- Insulation Kit **Fitted as per specs**
- Smoke Alarms **Multiple in place as required - tested OK**
- Roof Flashings **Boot flashing @ 45° on pan soaker**

Number of Shields (above ceiling - flue and shield)

Number of Shields	**Flue + two**
Flue top above roof clearance	
Flue Shield Height	**1/2 Height**
Flue/outer shield clearance to combustibles	
General Condition	
General condition	**New**
Photo Record	**YES - All relevant photos taken**

Inspection Type:	**Final - Residential**
Inspection Outcome:	**Pass**
Inspected By:	**Nigel Smith**
Inspection Date:	**20 December 2024**

Passed Items

Site hazard check completed	
Is the inspection within my competency?	**Yes the inspection is within my competency**
General	
Inspection carried out	
Approved plans reviewed	**Yes - Electronic documents checked**
Warnngs and Bans	
Inspection Photos	
Exterior	
FFL above GL	**Good - sufficient**
FFL above paving	**Good - sufficient - OK**
Cladding clearances	**Good - sufficient for cladding types - OK**
Flashings correct	**All as designed - OK**
Penetrations sealed	**YES - silicone sealed - OK**
Access level height	**<190mm step at each door - OK**
Non-slip access	**Bare ground** **Across-profiled timber decking**
Roof fixed sufficiently	**Appear adequate**
Roof penetrations	**Soaker and boot flashings**
Snow straps/boards	**In place as required**
Vermin proofing	**Gaps sealed as required - OK**
Effluent field/tank	**Installed and located as designed**
S/W discharge location	**From DP's through drains to soak-hole(s)**
Downpipes clipped	**YES - 2 x clips each**
ORG clipped	**150mm clearance & loose grate**
Gully heights	**Min heights above surfaces as required**
MV/BV size/location	**80mm in place as drawn**
Gas bottle location	**All as per gas install standards**
Mechanical vents to exterior	**YES - vented to soffit outlets**
Duct covers installed	**YES - exterior grilles in place**
Soffit lines sealed	**YES - all OK**
Fire fighting water provided as per consent documents	
Photo Record	**YES - All relevant photos taken**
Interior	
Wet areas sealed	**Yes**
Safety glass installed	**Previously checked at Preline**
Window restraints	**Not required - ground level dwelling**

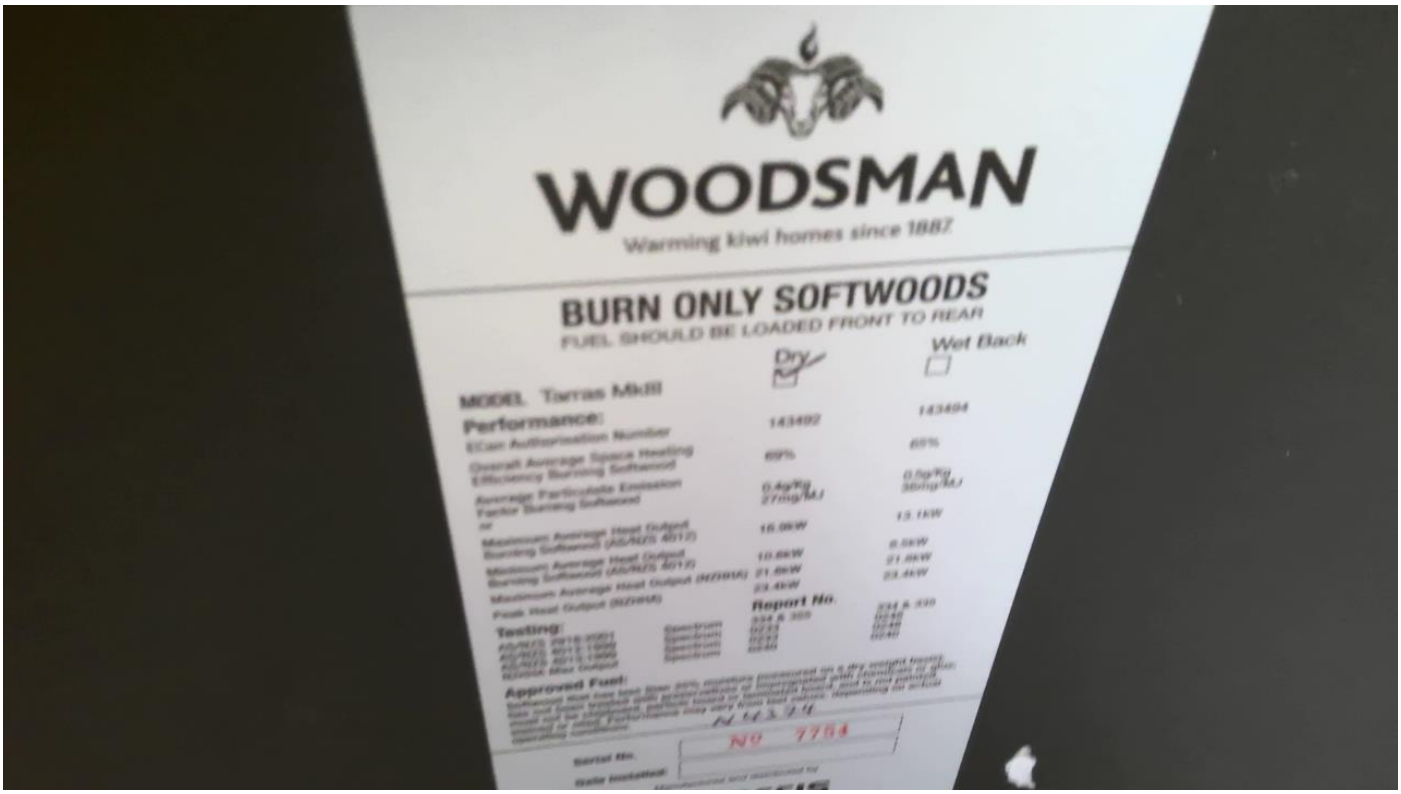
Aluminium joinery ID	**Labels fitted - H zoned**
Ventilation/Light	**Sufficient glazing & mech. venting**
Smoke dectectors	**In place as consented, tested**
Impervious flooring	**In place where required**
Gas hob protection	**All clearances to combustibles OK**
Means of heating	**Woodburner - (separate prompt sheet)**
	Heat pump(s)
Roof space	
Insulation fitment	**Good cover, tidy, no gaps**
Downlight clearance	**Abutted & clear; all compliant**
Ducting connected	**YES - all extract vent ducts connected**
Underlay fitment/laps	**Fitment & laps OK**
Pipework insulated	**Yes**
Pipework clipped/supported	**Yes**
Amendments/Site Instructions	
As-built building aligns with consent plans/documents	**Yes**
Site instructions signed off	**Yes**

Woodsman fireplace as per plan
Taken at 10:56 AM on Friday 20/12/2024

Fireplace same as plans
Taken at 10:56 AM on Friday 20/12/2024

Flu fixed to firebox
Taken at 10:57 AM on Friday 20/12/2024

Flu pot river together
Taken at 10:57 AM on Friday 20/12/2024



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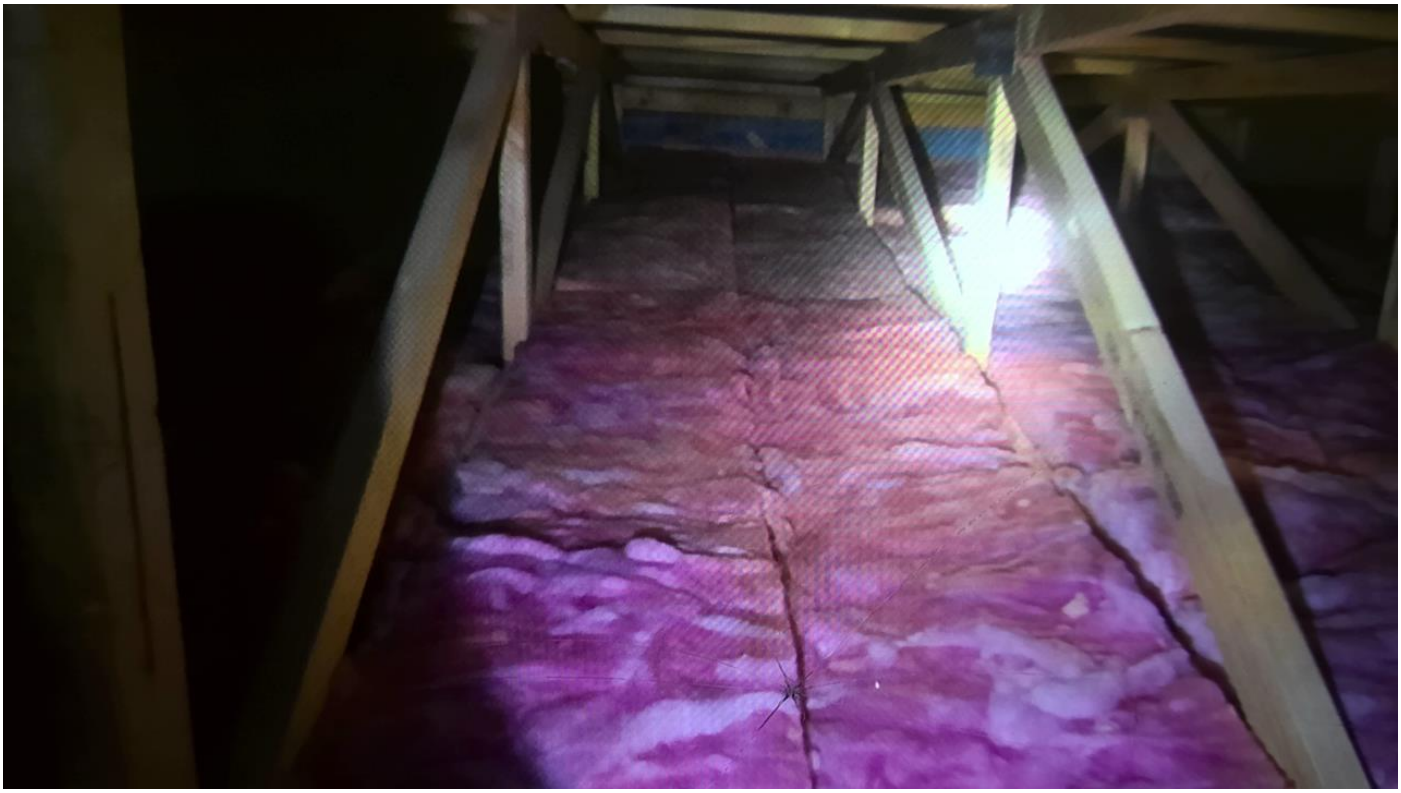

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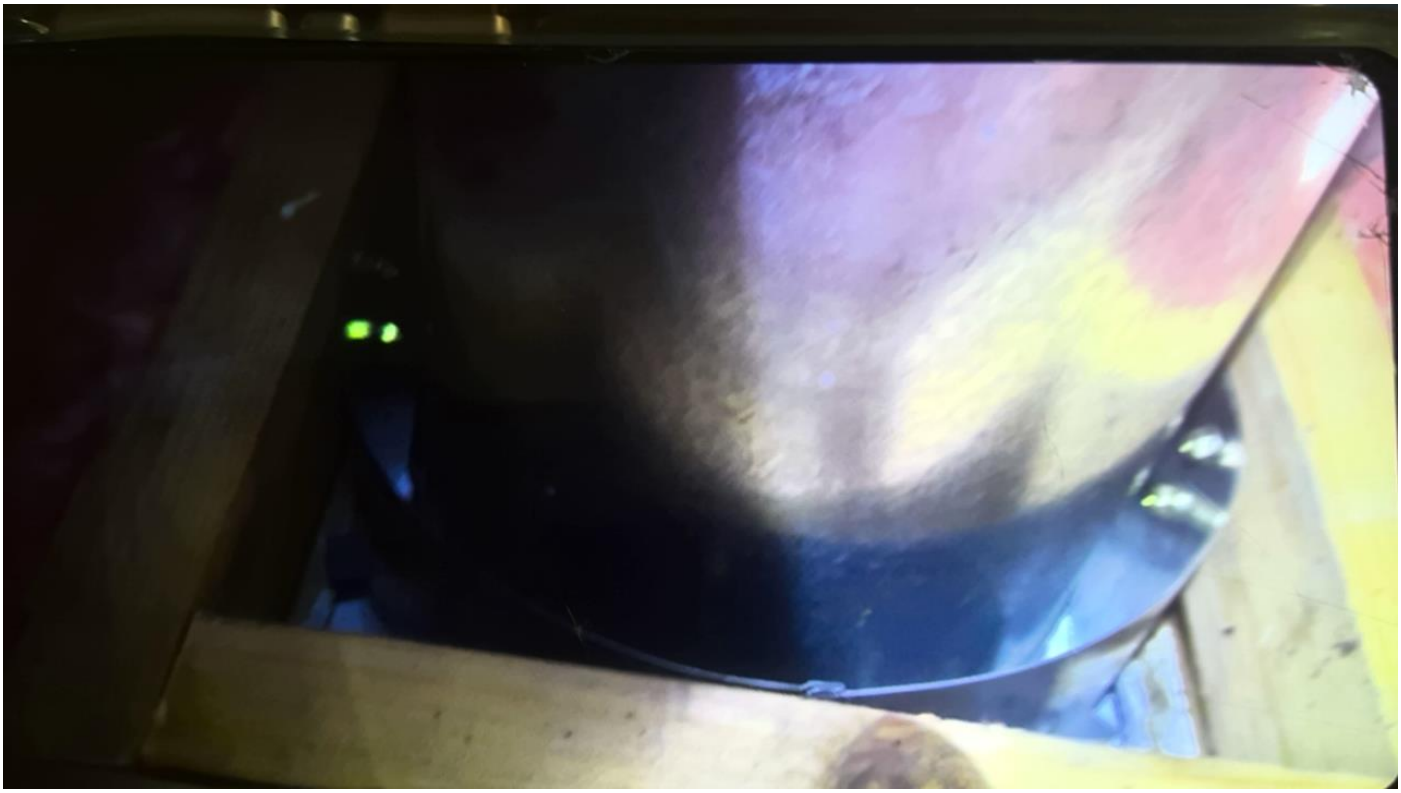

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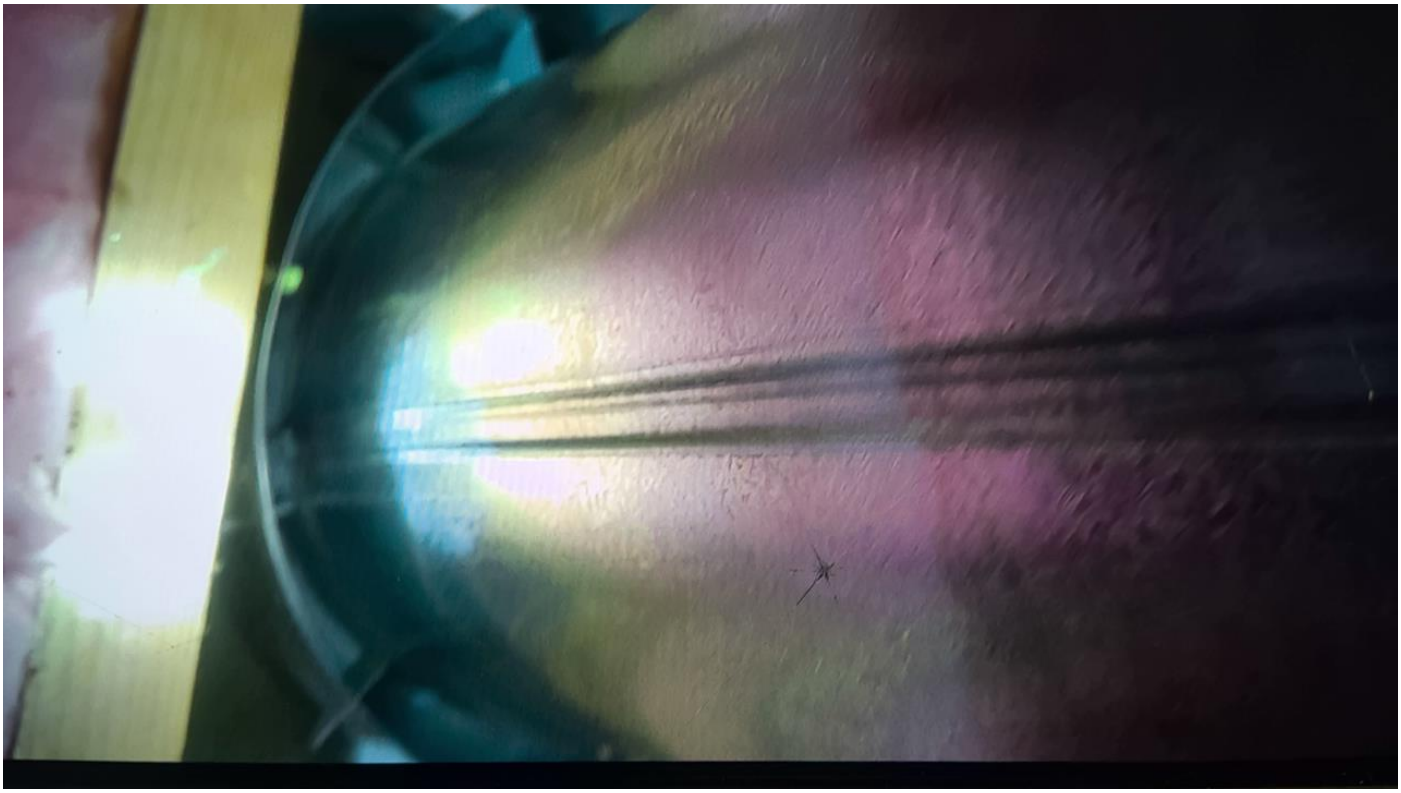

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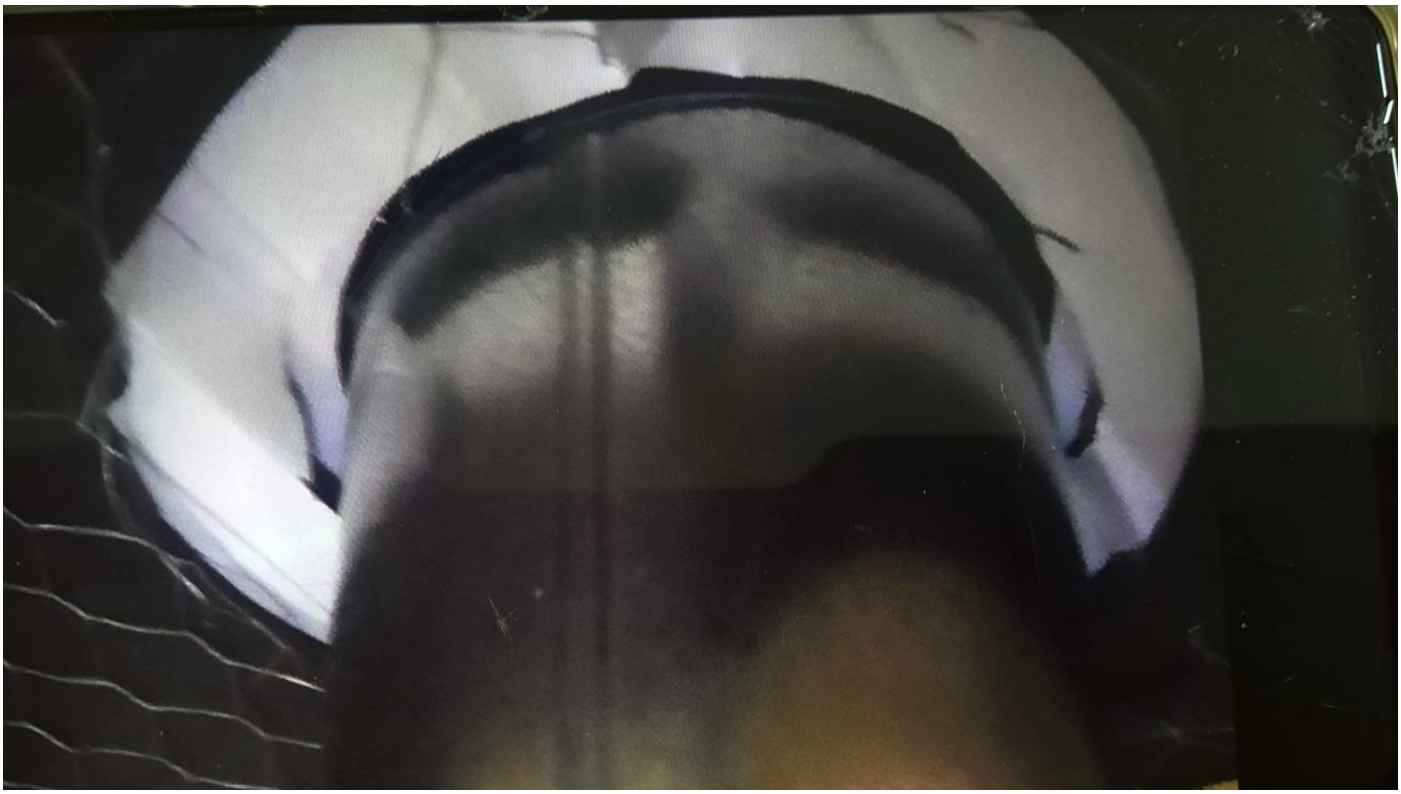

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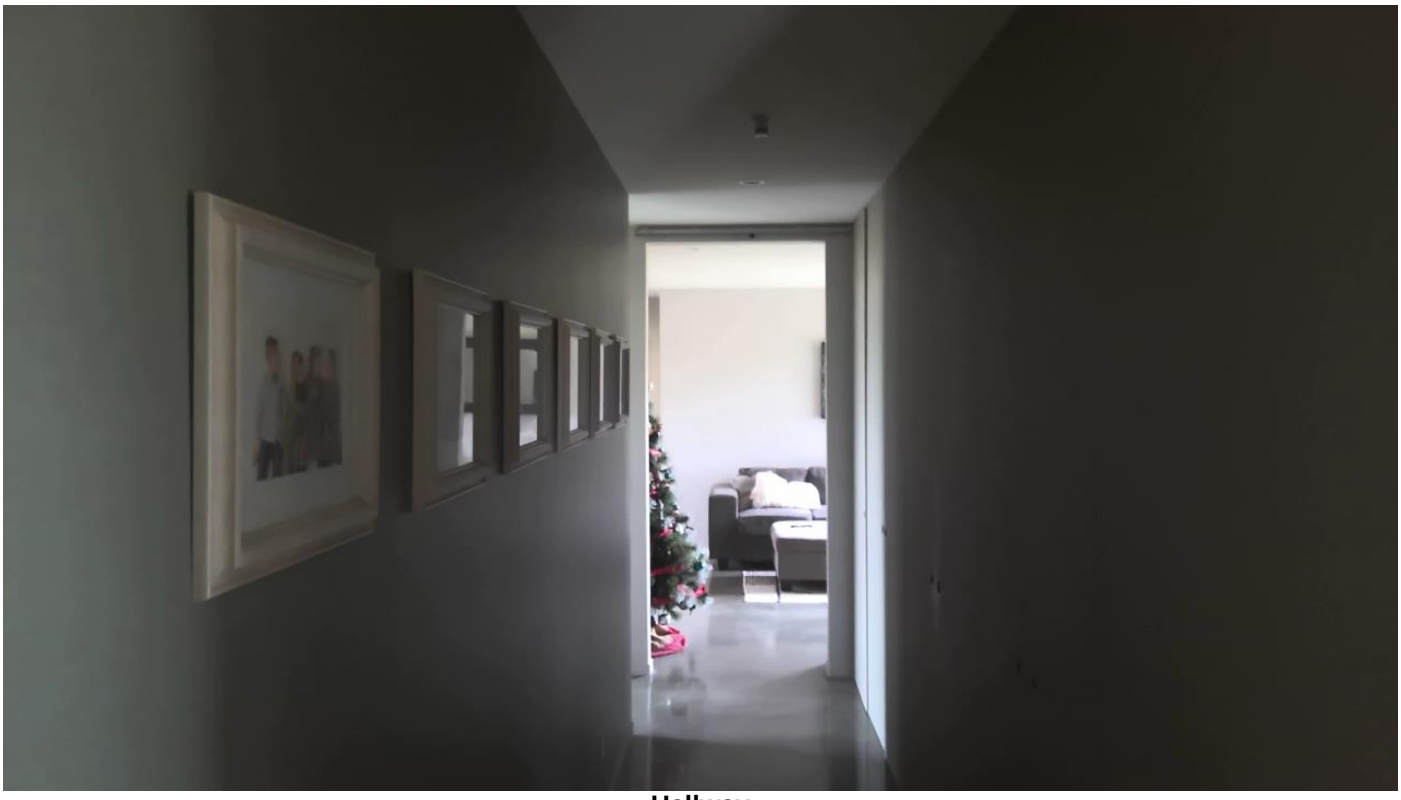

Hallway
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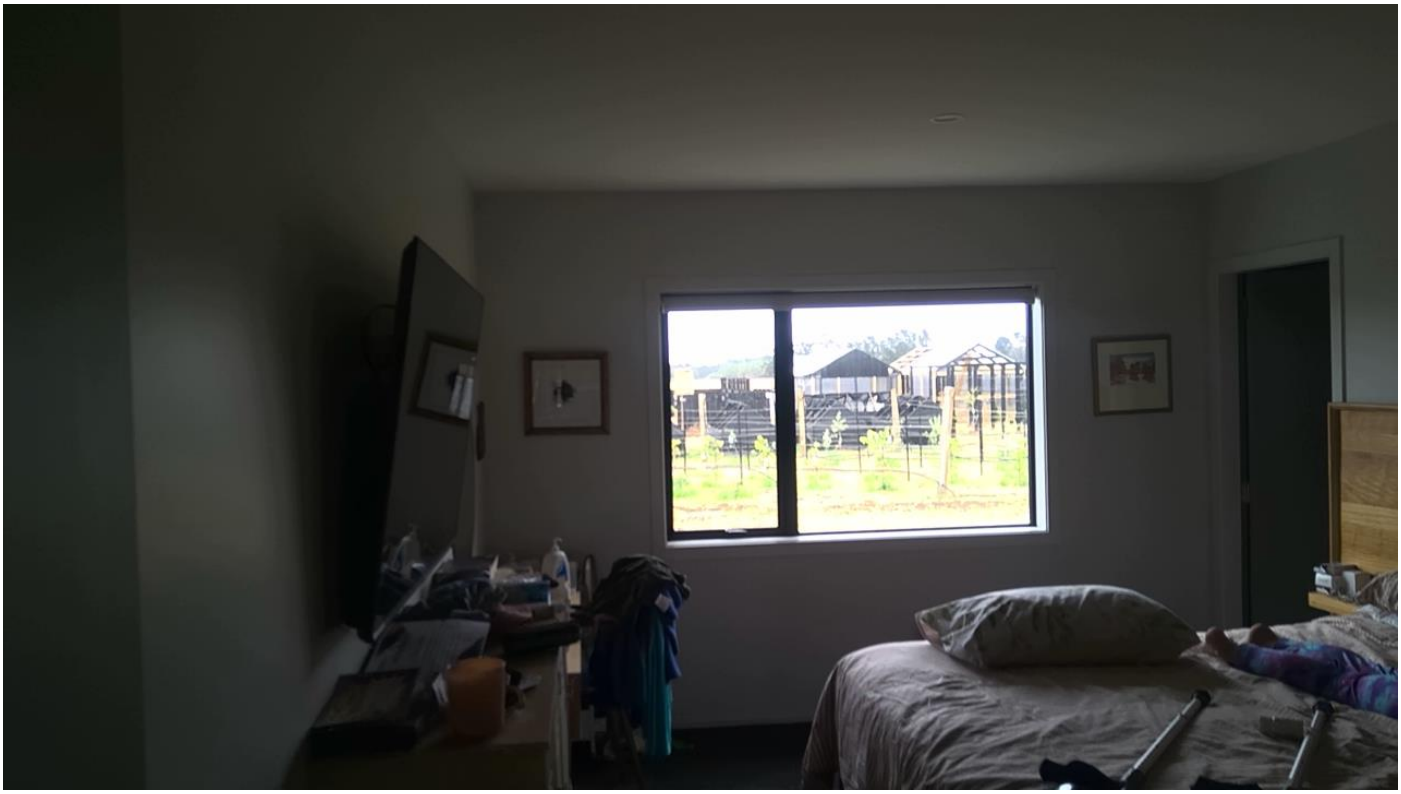

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Bathroom shower
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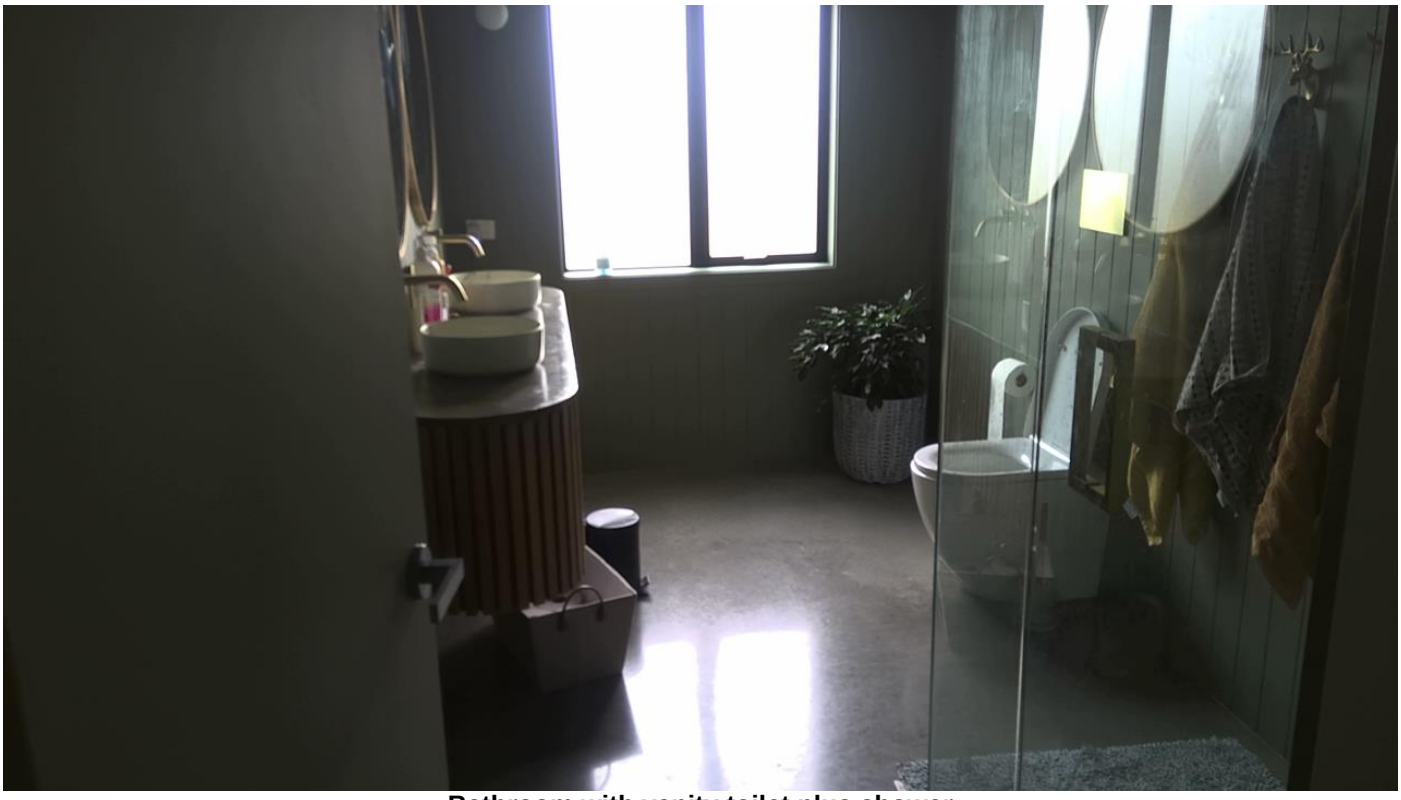

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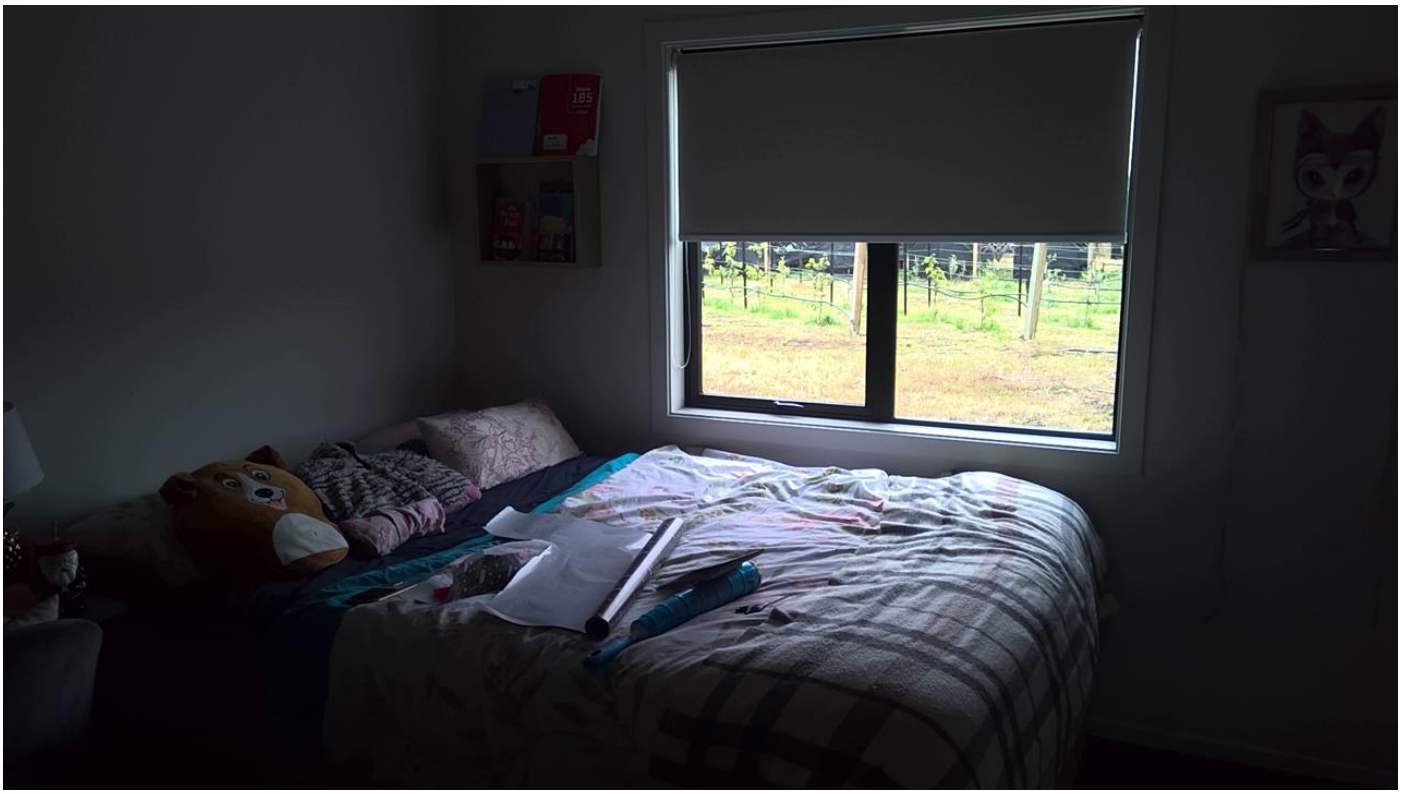

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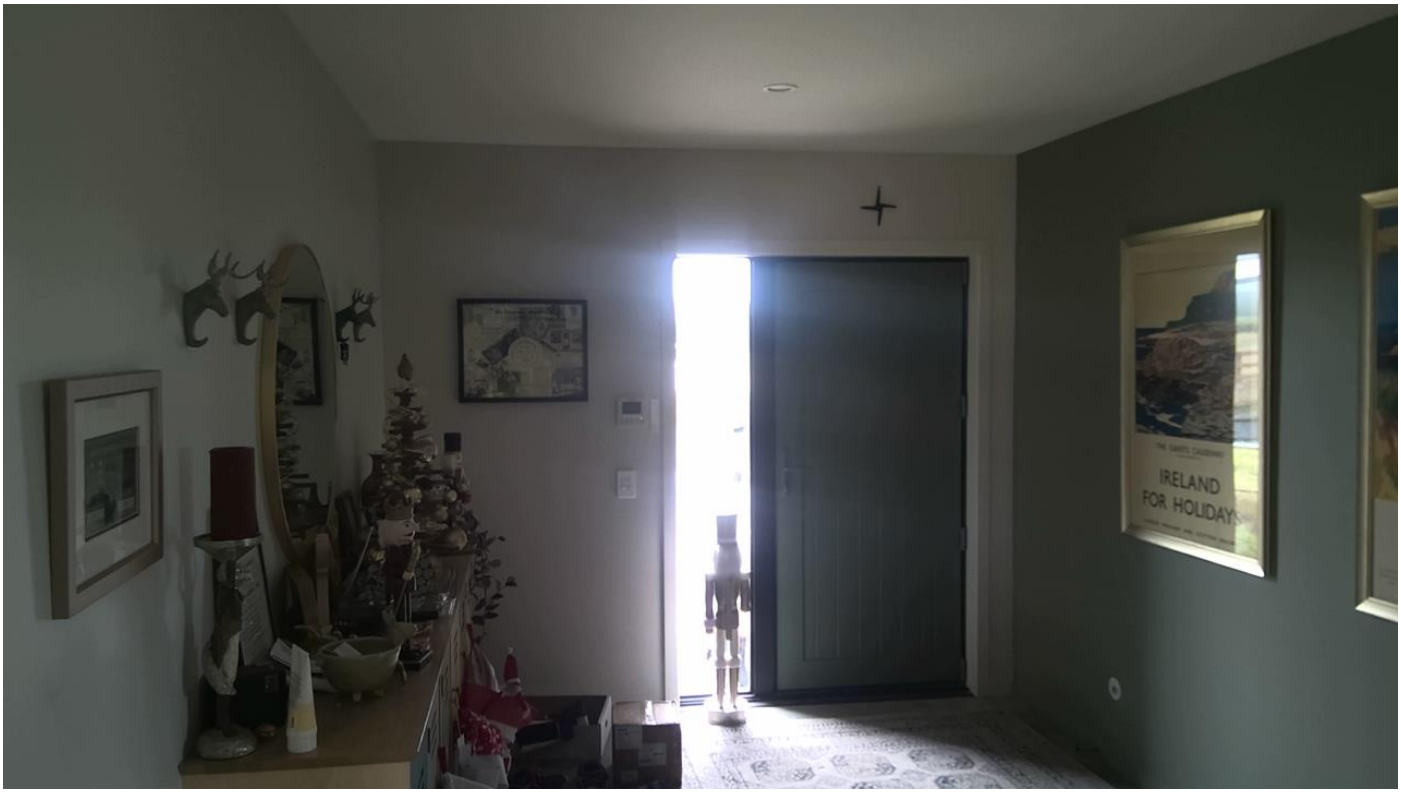

Front door of house
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Living room
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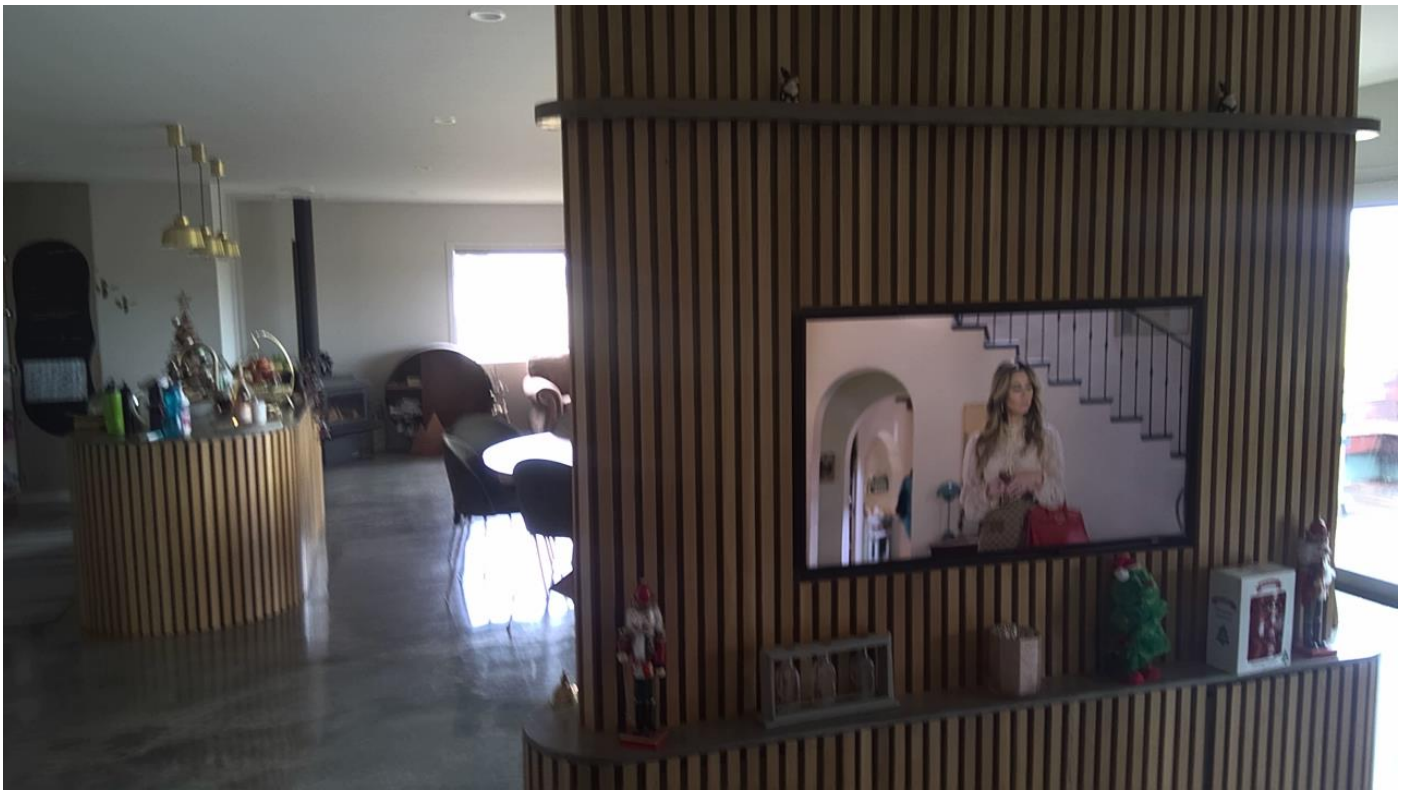

Living room looking through to family room
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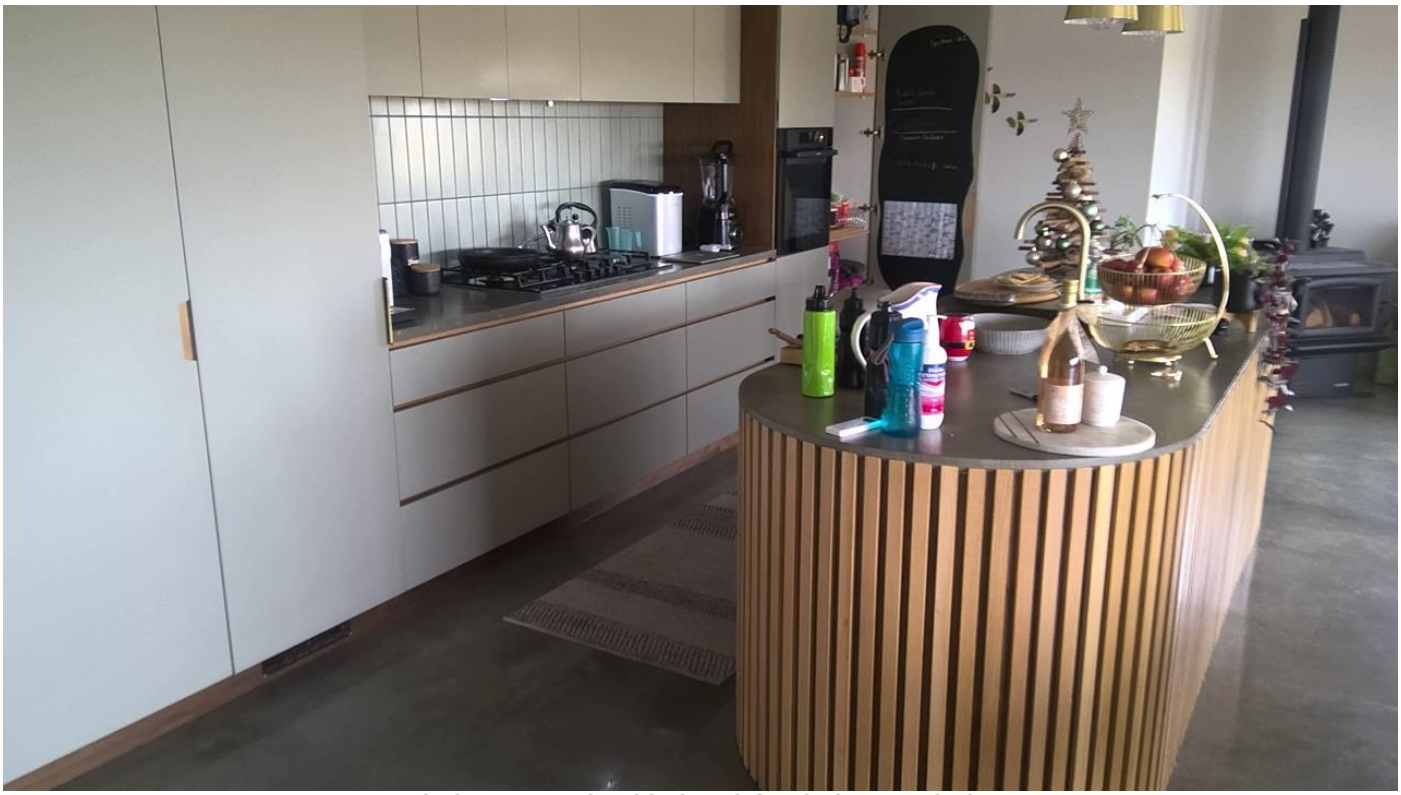

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Effluent field drip lines fenced
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Consent No: **210485**

Applicant: **B & P Donnelly**

Site Address: **153 Innes Road**

Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Heating Unit - Solid Fuel**

Inspection Outcome: **Pass**

Inspected By: **Nigel Smith**

Inspection Date: **20 December 2024 10:55 a.m.**

Duration: **45 minutes**

Inspection Element	Status
Site hazard check completed	Pass
Is the inspection within my competency? **Yes the inspection is within my competency**	Pass
General	Pass
Inspection carried out **Yes**	Pass
Approved plans reviewed ***Yes - Electronic documents checked***	Pass
Warnngs and Bans **None.**	Pass
Inspection Photos **Photos Taken.**	Pass
Installation	Pass
Correct fire model **Woodsman Tarras MKIII free-standing (dry)**	Pass
Clearances to combustibles **As per the manufacturer's instructions.**	Pass
Clean Air approval	Pass
Seismic Restraints **2 x M8 Dyna bolts**	Pass
Flue secured to unit **Installed as per specs**	Pass
Chimney cavity ventilation provided **Ventilation provided**	Pass
Insulation Kit **Fitted as per specs**	Pass
Wall Shield	N/A
Wetback system	N/A
Tempering Valve	N/A
Wet Back open vented	N/A
Cylinder Restraint	N/A
Smoke Alarms **Multiple in place as required - tested OK**	Pass
Roof Flashings **Boot flashing @ 45° on pan soaker**	Pass
Number of Shields (above ceiling - flue and shield)	Pass
Number of Shields ***Flue + two***	Pass
Flue top above roof clearance	Pass
Flue Shield Height	Pass

1/2 Height

Flue/outer shield clearance to combustibles	Pass
General Condition	Pass
General condition	Pass
New	
Photo Record	Pass
YES - All relevant photos taken	

Woodsman fireplace as per plan
Taken at 10:56 AM on Friday 20/12/2024

Fireplace same as plans
Taken at 10:56 AM on Friday 20/12/2024

Flu fixed to firebox
Taken at 10:57 AM on Friday 20/12/2024

Flu pot river together
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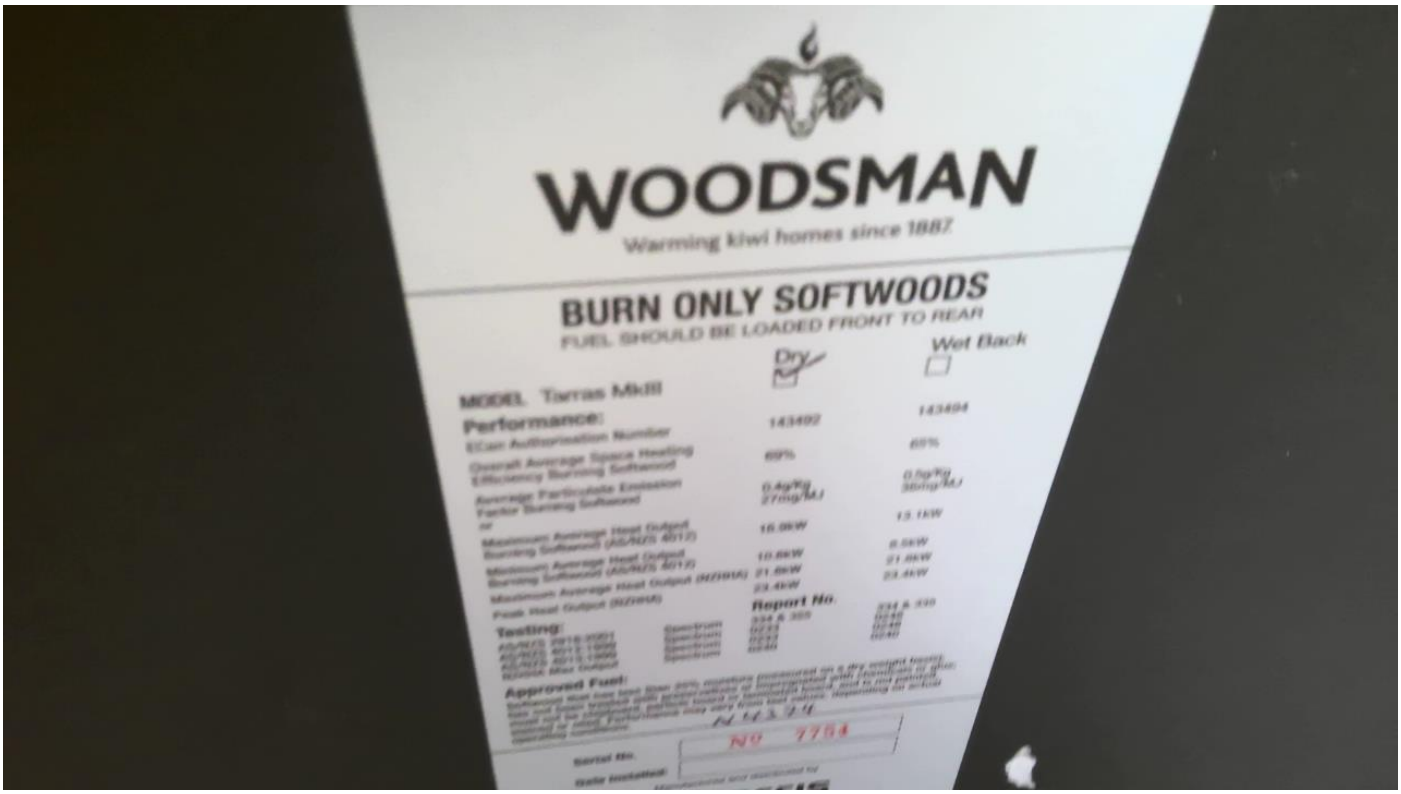

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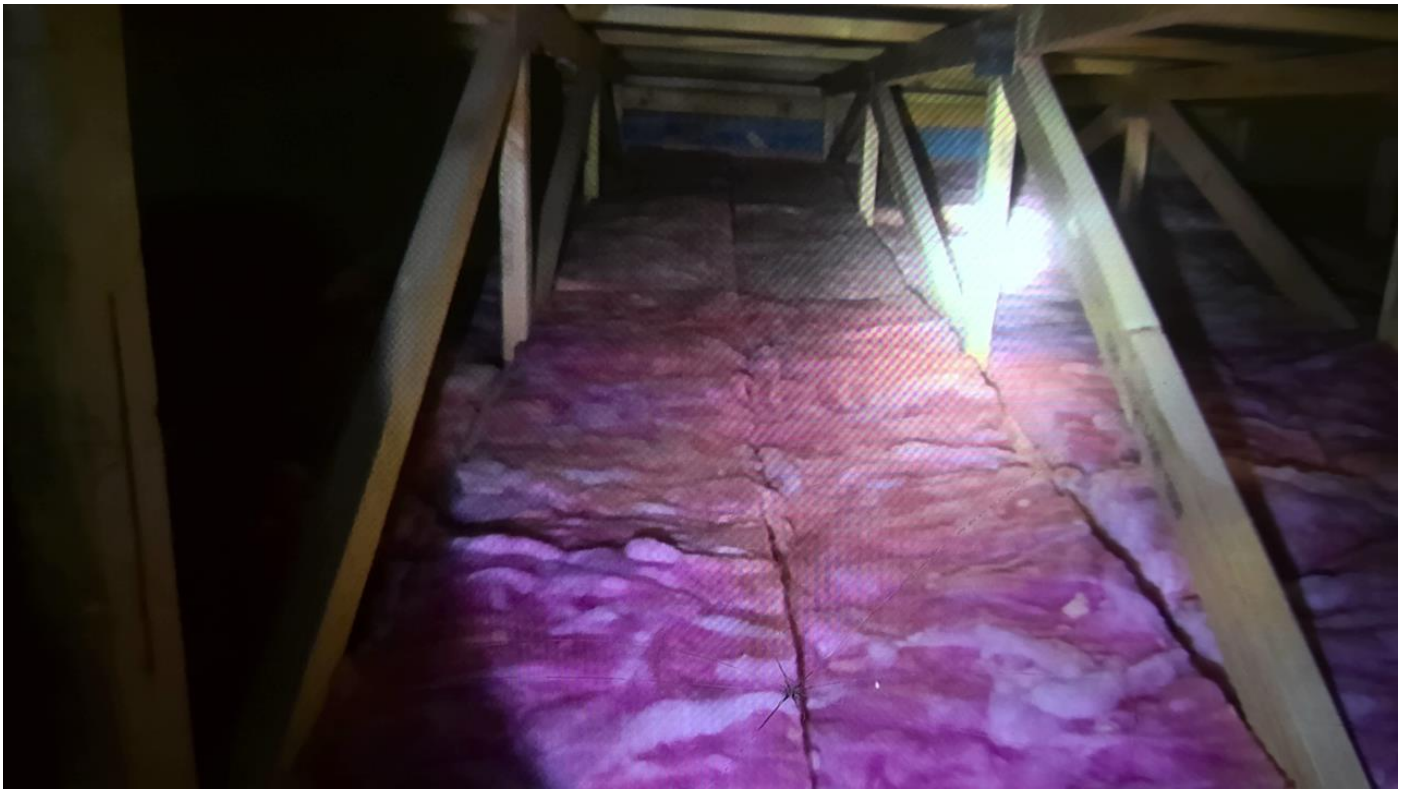

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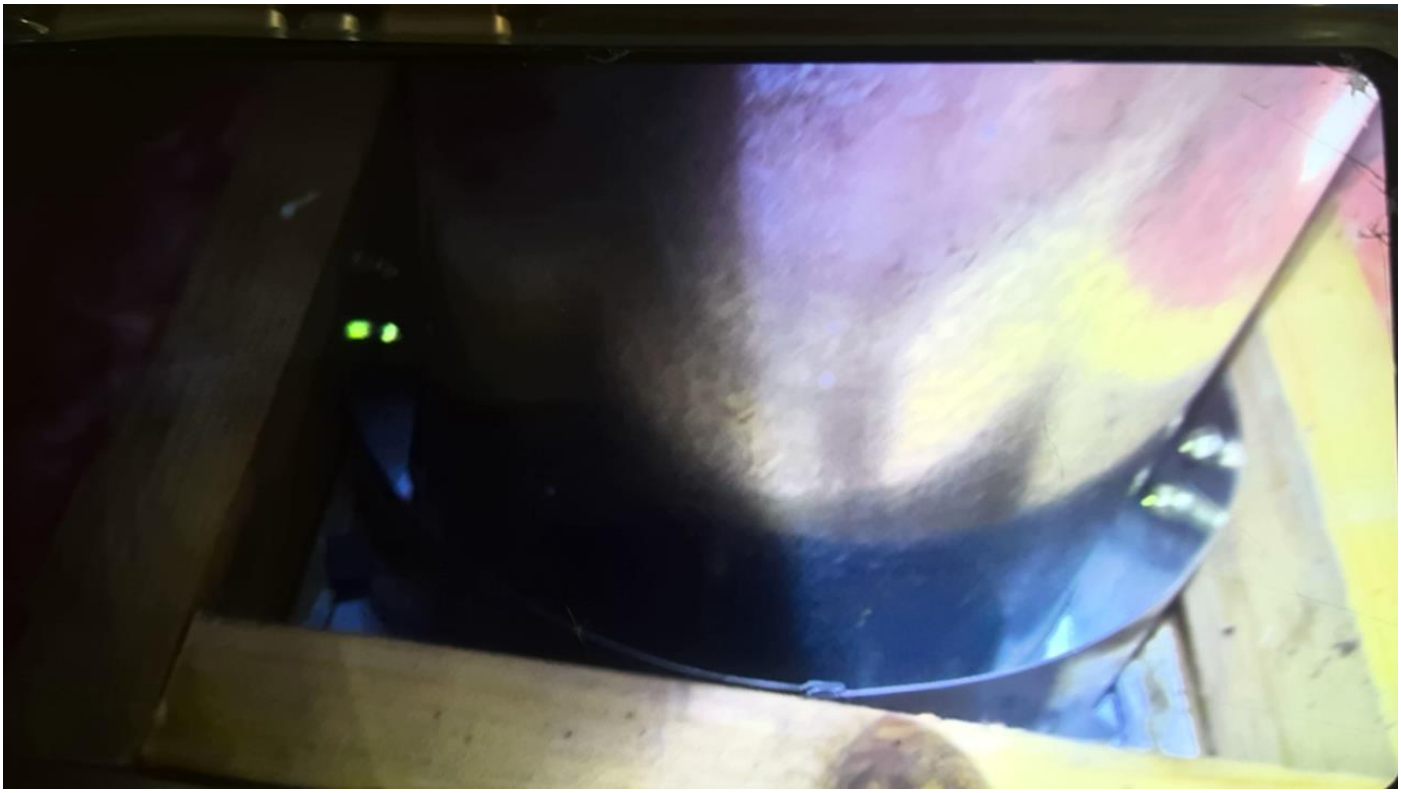

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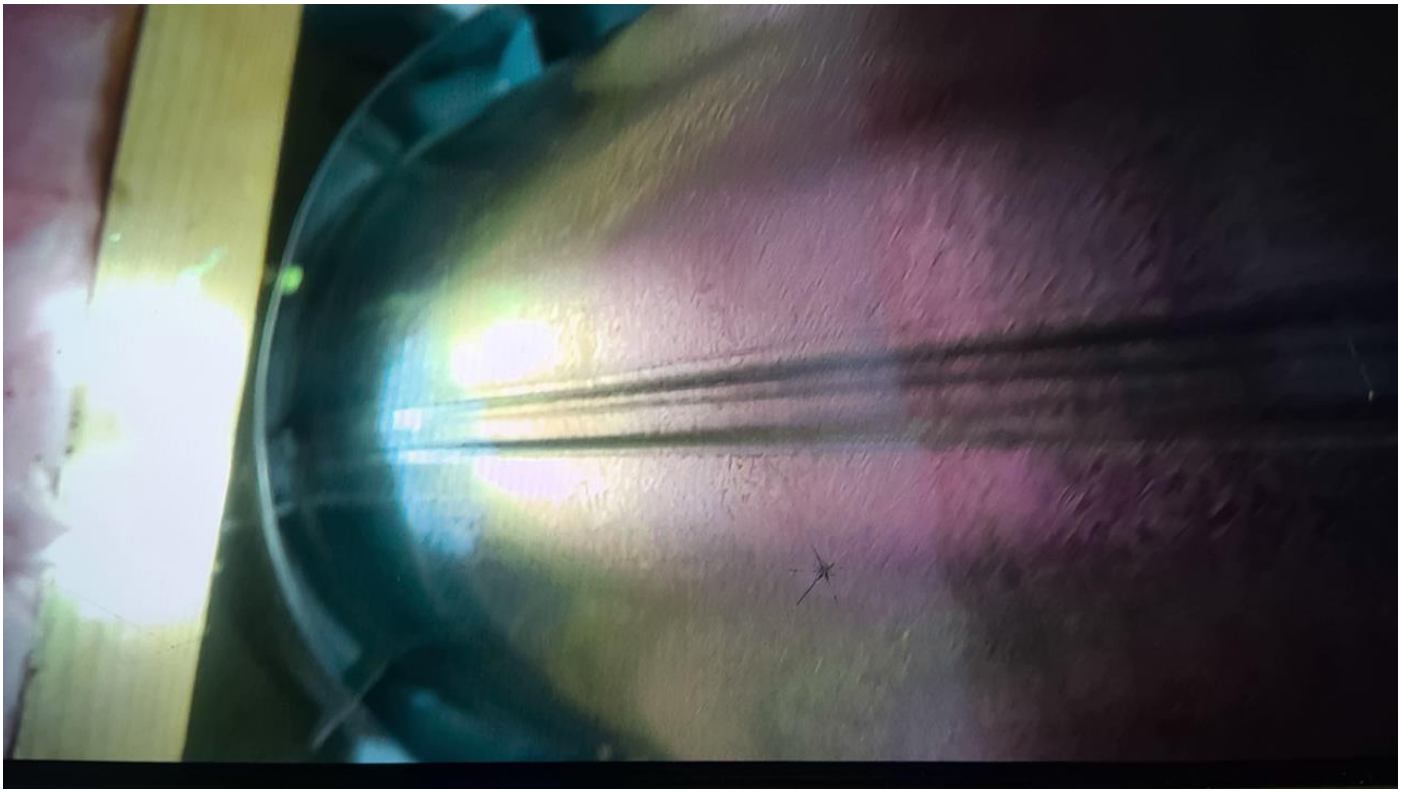

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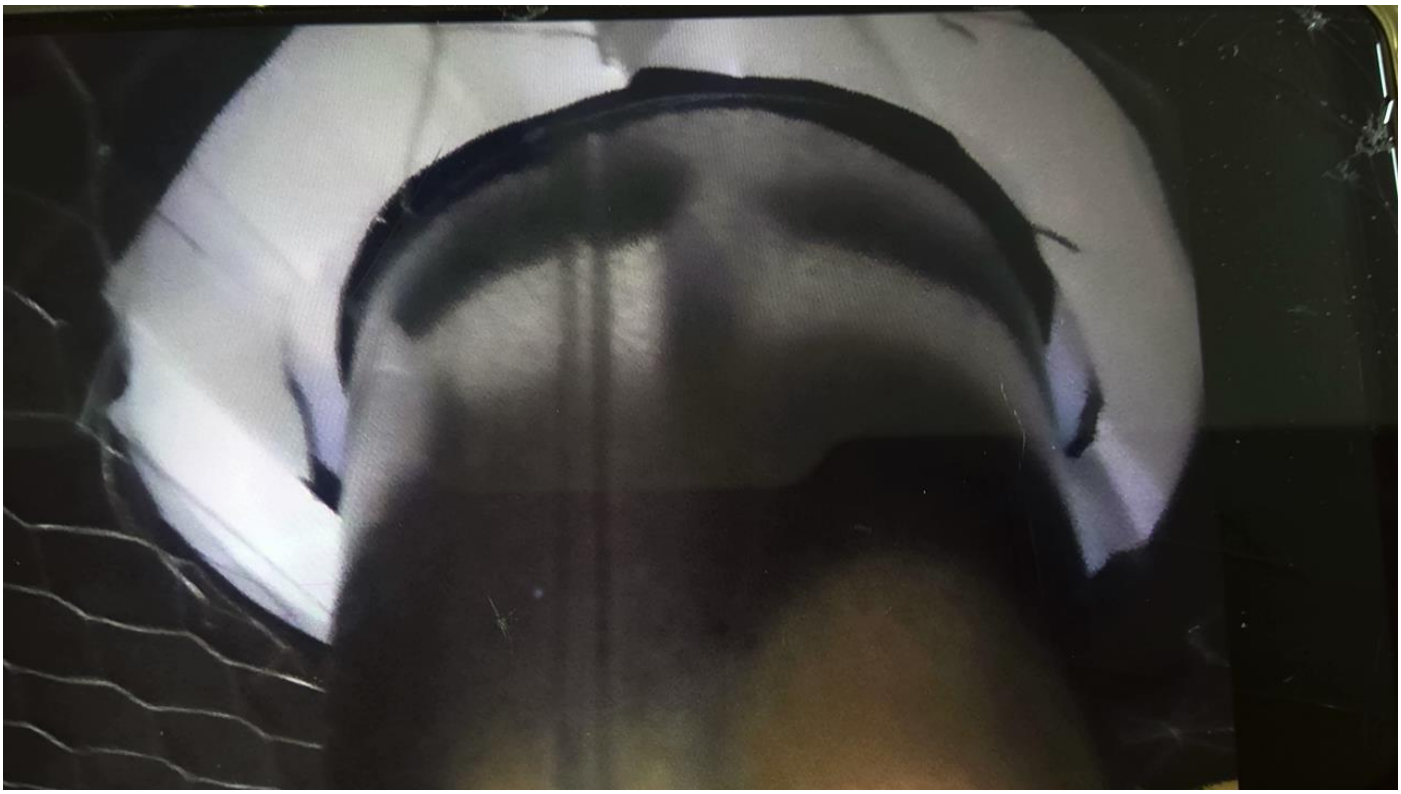

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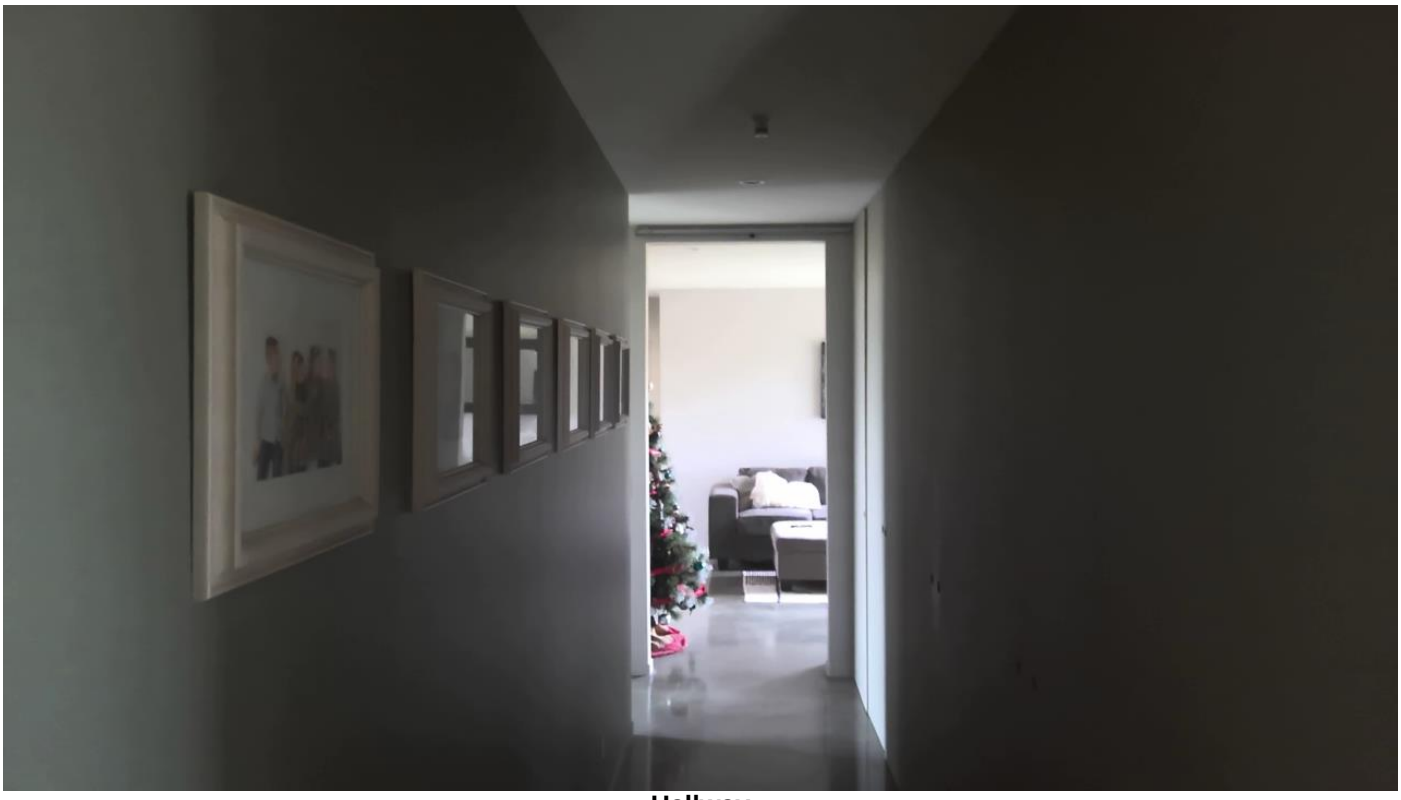

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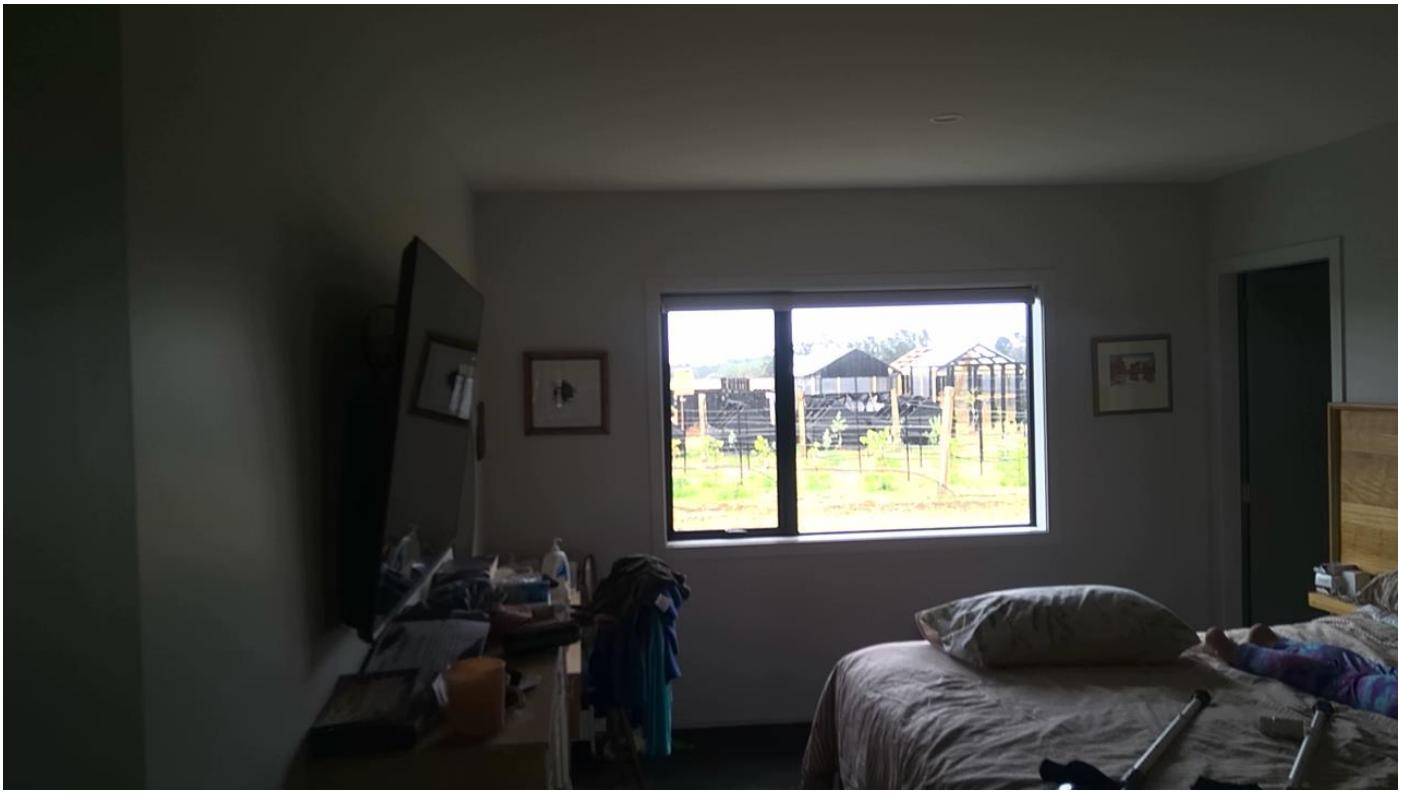

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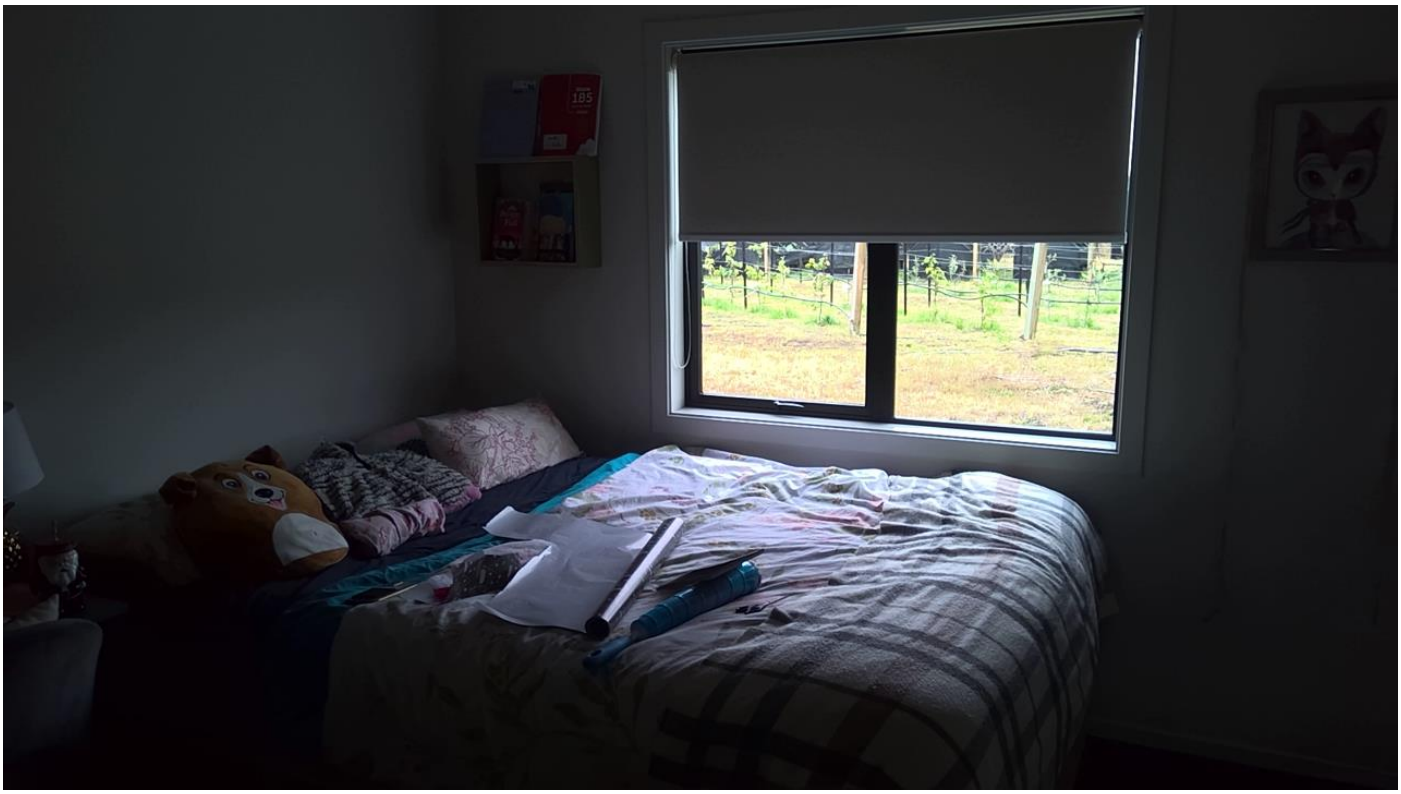

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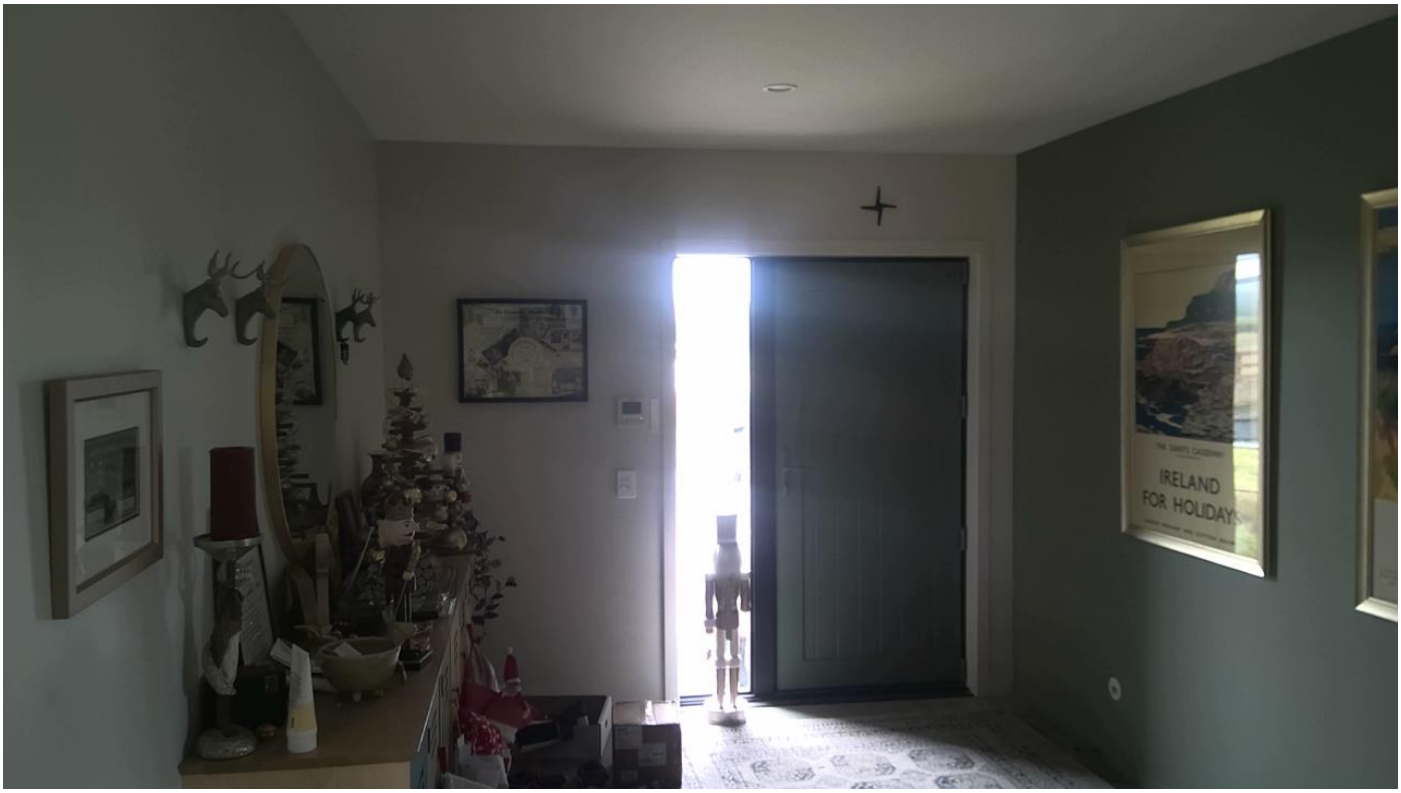

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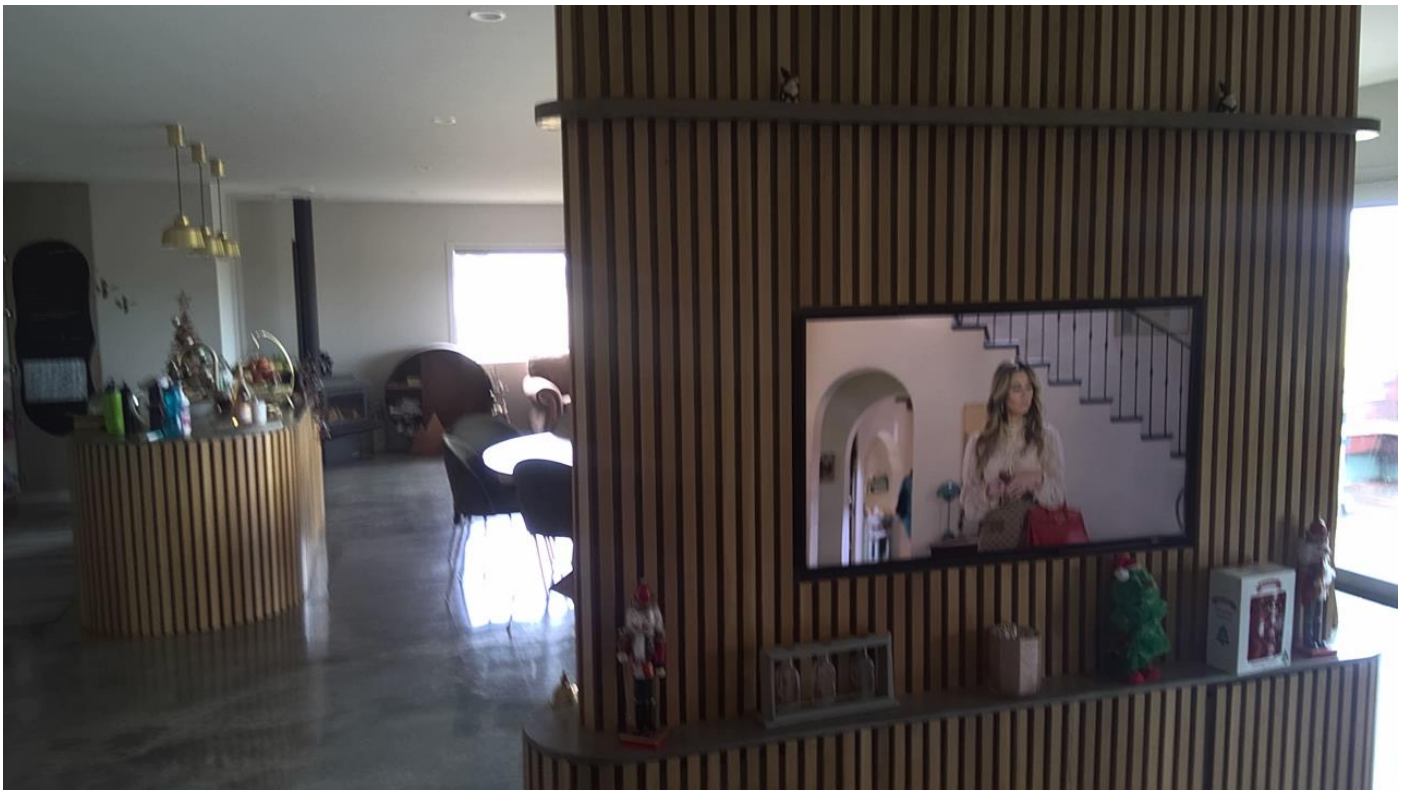

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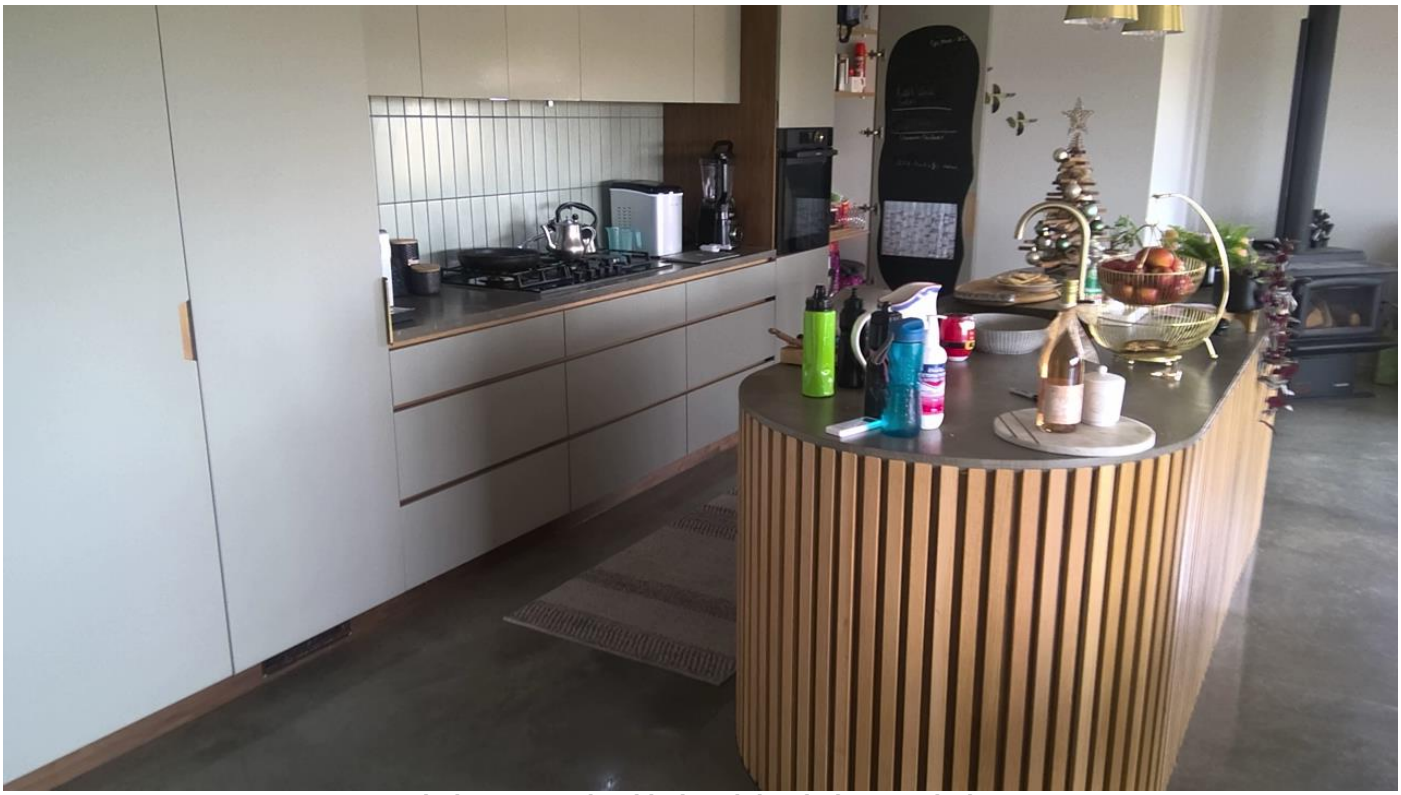

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Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Pre-Cladding - Wrap**
Inspection Outcome: **Pass Non Compliance**
Inspected By: **Henry Stikkelman**
Inspection Date: **13 June 2022 8:59 a.m.**
Duration: **30 minutes**

Inspection Element	Status
General	Pass
Inspection carried out **Inspection carried out.** **OK to continue.** **Some areas not yet completed due to weather, Provide progress photos of works completed.**	Pass
Approved plans reviewed ***Yes - Electronic documents checked***	Pass
Warnngs and Bans **None**	Pass
Inspection Photos **Yes**	Pass
Wrap/tape	Pass
Wrap/Barrier type **Tekton HouseWrap**	Pass
Wrap/Barrier fixing **Good - well fixed**	Pass
Wrap overhang to founds	Pass
Sill tape type **"Protecto Sill" flashing tape system throughout (BRANZ No. 450)**	Pass
Roof Underlay **Thermakraft 215 bituminous self supporting**	Pass
Netting support **Galv. wire netting in place as required**	Pass
Flashings	Pass Non Compliance
Flashing tape sill fixing **Full length as per manuf. specs**	Pass
Flashing tape head fixing **Fitted at corners as per manuf. specs**	Pass
Flashing tape jamb fixing	Pass
Wrap Penetrations	Pass Non Compliance
Meter box flashing	N/A
Direct Fix cladding requirements met (sill and jamb blocks)	N/A
Thermal Barrier	N/A

South elevation
Taken at 8:57 AM on Monday 13/06/2022

West elevation
Taken at 8:58 AM on Monday 13/06/2022

Typical sill detail
Taken at 8:58 AM on Monday 13/06/2022

Head detail
Taken at 8:59 AM on Monday 13/06/2022

GoGet Inspection Audit Report

Consent No: **210485**
Applicant: **B & P Donnelly**
Site Address: **153 Innes Road**
Work Type: **4-bedroom dwelling with attached garage and woodburner**

Inspection Type: **Pre-Cladding - Wrap**
Inspection Outcome: **Pass**
Inspected By: **Tom Race**
Inspection Date: **1 August 2022 11:28 a.m.**
Duration: **15 minutes**

Inspection Element	Status
Flashings	Pass
Wrap Penetrations	Pass
Taped & sealed appropriately	

penatrations tapped
Taken at 11:28 AM on Monday 1/08/2022

HURUNUI District Council

Address: PO Box 13, Amberley
Telephone: (03) 314 8816
Facsimile: (03) 314 9181

B & P Donnelly
176 Kivers Road
RD 7
Christchurch 7677

Customer No BC210485
Date 7/12/21

GST Reg No 53-915-477

Tax Invoice 54380

210485 : 153 Innes Road
4-bedroom dwelling with attached garage and woodburner
Owner: B & P Donnelly

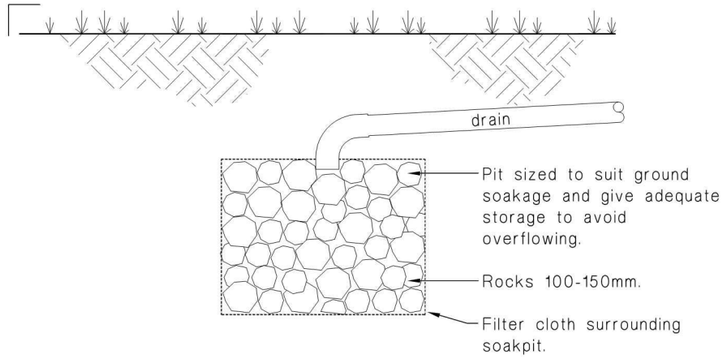
Additional RFI Letter	145.00	*
BRANZ levy	350.00	OG
DBH Levy	612.50	*
Set Fee	4,475.00	*
Planning/PIM Processing	295.00	*
BCA Levy	280.00	*
Code Compliance Certificate	275.00	*
BEFORE GST	**5,639.13**	
(* Includes GST) **GST**	793.37	
Sub Total	**$6,432.50**	
Cash Received	1,500.00CR	

Total incl GST **$4,932.50**

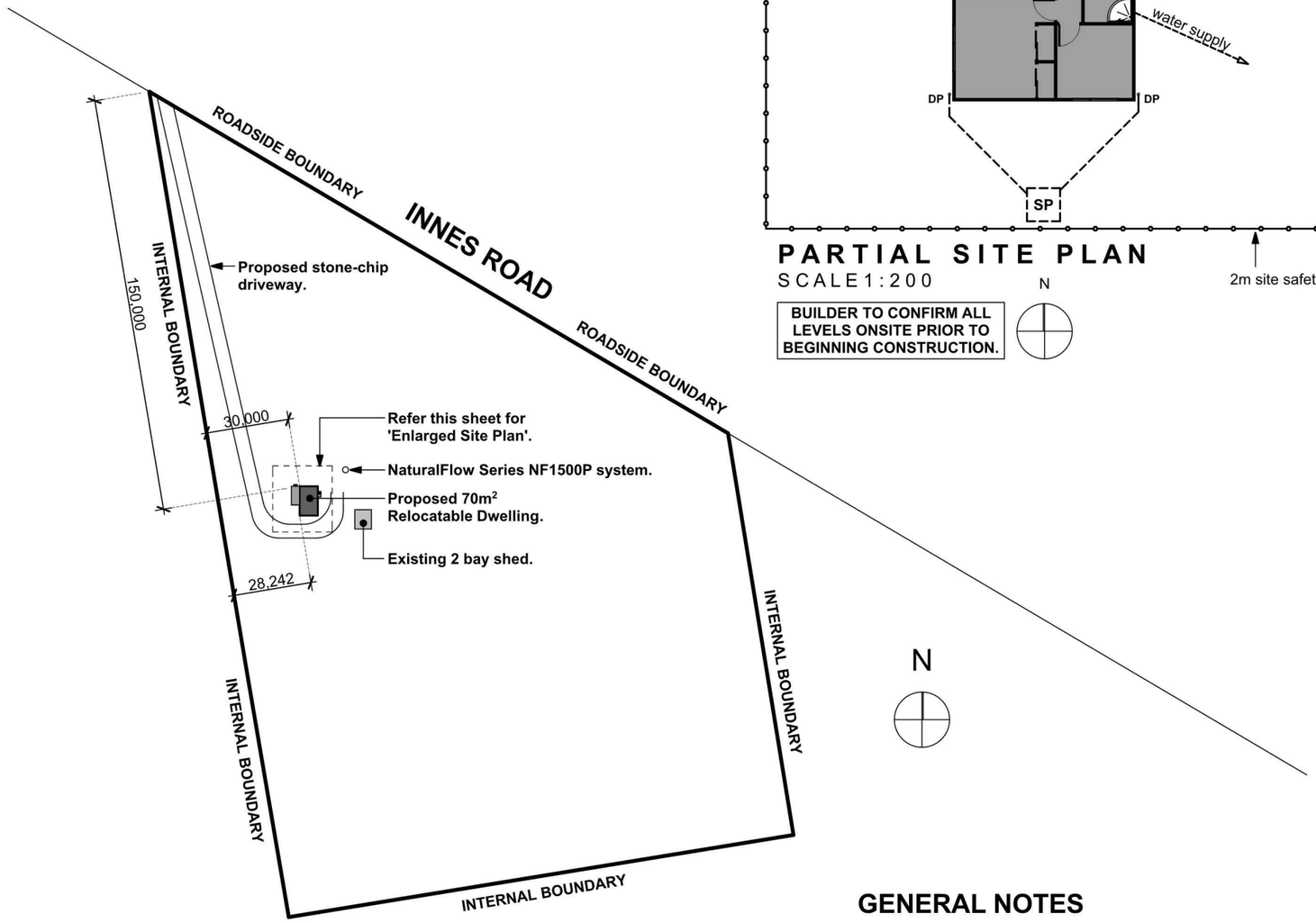
Council's bank account 03-0802-0946666-00

B & P Donnelly

Customer No BC210485
Date 7/12/21
Invoice No 54380
Total Due $4,932.50

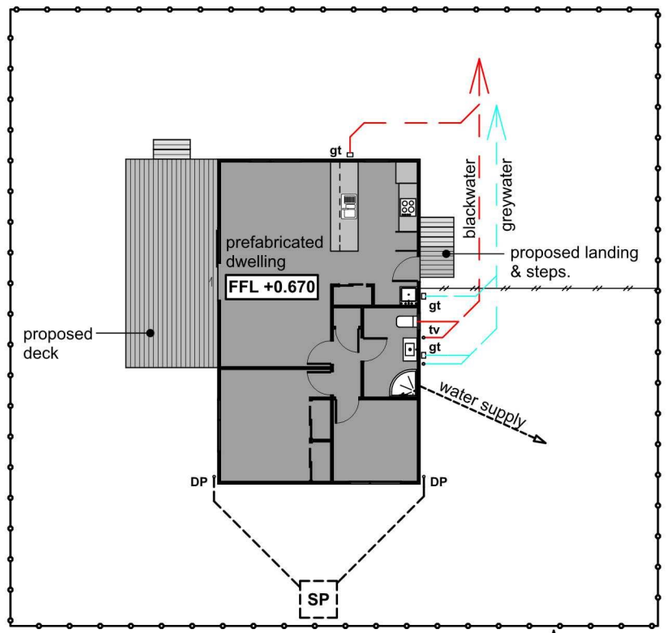


(a) Rock soak pit



LOCATION PLAN
SCALE 1:2000

Note: Boundary Lines are approximates only. Refer to Certificate of Title.



PARTIAL SITE PLAN
SCALE1:200

N

BUILDER TO CONFIRM ALL LEVELS ONSITE PRIOR TO BEGINNING CONSTRUCTION.

GENERAL NOTES

Proposed dwelling is prefabricated within Laing Properties building yard. This Building Consent shall cover both of the following site addresses. The dwelling is to be prefabricated at 15 Hanworth Avenue, Christchurch (within the Laing Properties Ltd building yard). Once the building works are complete (except for piles and external drainage), the building shall be relocated to 147 Innes Road, Glasnevin, where the pile, drainage and final inspections shall occur.

LEGAL DESCRIPTION

Lot 2
D.P. 502943
147 Innes Road
Glasnevin

House Floor Area:	70 m²
Existing Shed:	42 m² approx
Site Area:	41887 m² approx
Coverage %:	less than 1%

GENERAL LEGEND

— —	New 100mm uPVC Foulwater drain. Min. fall 1 in 60 to proposed NaturalFlow Series NF1500 treatment system. Refer Supporting Documents.
– – – –	100mm uPVC Stormwater drain. Min fall 1 in 120 to new soak pit.
—o—o—	2.0m Safety Fencing
--------	New underground potable water supply pipe pumped from existing shed. Pipe material shall be a minimum of 20 or 25mm medium or high density polyethylene (MDPE/HDPE). Allow for toby box with isolation valve adjacent point of entry into building.
—//—//—	Indicates proposed underground power supply from Solar King off-grid solar system with inverter/batteries located in existing shed.
DP	80mm Colorsteel downpipe
tv	80mm uPVC Terminal vent pipe
gt	Indicates gully trap
SP	Indicates Proposed Soak Pit. Soakpit designed and installed in accordance with NZBC E1/VM1, AS3706.1. Ensure 3 metre separation minimum. Refer E1/VM1 detail.

SITE SEDIMENT CONTROL PLAN

Barriers and Fences
Install sediment fence made form specially manufactured geotextile sediment fencing material which must be buried to a depth of 200mm. Note that no fence must be built on council or neighbouring property.
Water Run Off
Where possible, divert flowing water paths around construction and storage areas by diversion banks and geotextile lined trenches.
Stockpiles
Ensure stockpiled materials are within the Sediment Fencing.
Maintenance
Have good fence fabric on site to make repairs. Make good existing driveway paving as needed.

Services on this plan are indicative only. All services are to be located on site before work begins.

All work shall comply with NZS 3604:2011 and NZBC:2004 and amendments.

PXA

229 Lichfield Street
P.O. Box 33 023
Christchurch 8244

tel (03) 365 7577
mob (027) 396 4388

www.pxa.co.nz

Laing DELIVERING HOUSING SOLUTIONS

THIS DRAWING IS COPYRIGHT AND SHALL NOT BE USED OR REPRODUCED IN ANY FORM WITHOUT THE WRITTEN APPROVAL OF PXA LTD.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO STARTING ANY WORK.

REVISIONS

Brian Chapman

NH354 - Chapman House

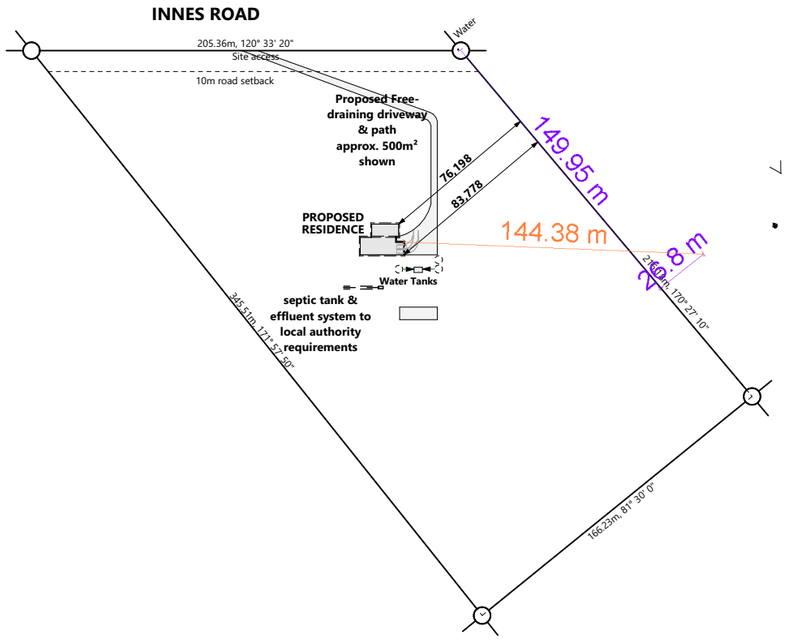
147 Innes Road
Glasnevin

SCALES INDICATED FOR A3 SHEET	
DATE	02 / 08 / 18
JOB No.	21836
DRAWN	N.C.P
CHECKED	J.L.M
SET	CONSENT

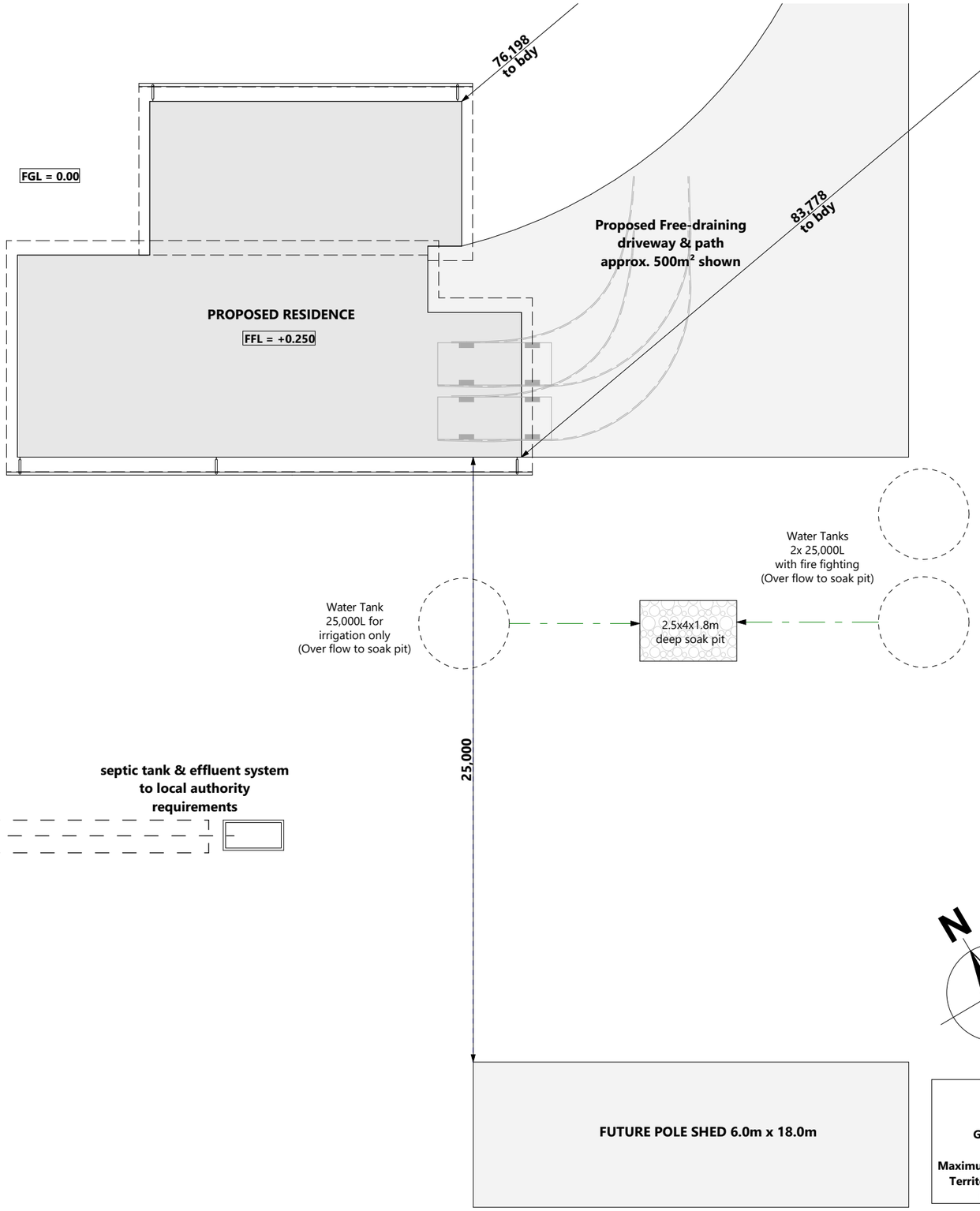
SHEET No.

A01

OF 10 SHEETS.



SITE LOCATION PLAN N.T.S



NZBC F5:
Construction and Demolition Hazards
Acceptable Solution F5/AS1

1.0 Work-Site Barriers
1.0.1 The necessity for barriers will depend mainly on the site location.
The need will be greater in areas with high levels of pedestrian traffic (i.e. in Central Business Districts), than in industrial or rural areas.
Barriers are not necessary for domestic dwellings up to 2 storeys above ground level unless specific hazards exist.

At all work-sites hazard evaluation will take account of:
1. Pedestrian counts adjacent to the site.
2. Car parking adjacent to the site.
3. Location of neighbouring buildings.
4. Presence of neighbouring work-sites or recreation areas.
5. Proximity to schools or early childhood centres.
6. Proximity to housing.
7. The depth of a water hazard.
8. The period of time for which ponded water will be present.
9. The accessibility and 'visibility' of the site.

1.0.2 If a work-site is not completely enclosed, and unauthorised entry by children is likely, it
is acceptable for specific hazards to be fenced only when workers are absent from the
immediate vicinity.

1.1 Site fences and hoardings
1.1.1 Fences and hoardings shall extend at least 2.0 m in height from ground level on the
side accessible to the public.

1.1.2 An acceptable fence may be constructed with galvanised chainlink netting having a
maximum sized grid of 50 mm x 50 mm. Post spacing shall be a maximum of 2.5 m, and the
gap between the bottom of the fence and ground no greater than 100 mm.

Finished Floor Level (FFL) shall be:
a) For sites level with or above the road, no less than 150 mm above the road crown on at least one cross-section through the building and roadway
b) For sites below the road, no less than 150 mm above the lowest point on the site boundary

Cautionary Notes:
BUILDING CONTRACTOR TO ASSESS SITE TO ENSURE DAYLIGHTING & BUILDING RESTRICTIONS ARE COMPLIED WITH.
NO LIABILITY FOR ENCROACHMENT SHALL BE HELD BY DESIGNER IF SITE IS NOT SURVEYED BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF FOUNDATIONS.

Construction Notes:
Before building is erected on site, all rubbish, noxious matter and organic matter shall be removed from the area to be covered by the building.
Ensure final building platform & finished ground have an even fall away from building to ensure water not be allowed to accumulate in buildings subfloor.
Any fill to be dry & approved by engineer & compacted down in accordance with NZS.3604.2011

Contractor to
• confirm ground has adequate bearing to comply with NZS 3604: 2011, except in the case of SED design, or when using Firth RibRaft Floor System (refer Ribraft manual).
• locate all service connections points on site prior to commencement of works. Check invert levels or pipes and manholes.
• confirm plumbing route and fixture positions on site prior to commencement of works.
• locate all electrical and water services on site.
• confirm on site all boundary bearings, lengths & peg locations on site prior to commencement of works, to ensure house position is correct.

HIRB = Height in Relation to Boundary

Sediment Control:
• No building work will be started on this project until the construction
of an approved stormwater outfall has been completed for this proposed Lot
• All erosion and sediment control structures are to be inspected and maintained daily
• Prevent any backfill or debris from washing onto council or neighbouring properties
• All ground cover vegetation outside the immediate building area to be preserved during the building phase
• All erosion and sediment control measures are to be installed prior to commencement of earthworks
• Stockpiles of clay and materials are to be covered with impervious sheeting
• Roof water downpipes to be connected to the main stormwater system as soon as roof sheathing & spouting is installed

Lot: 4
DP: 502943
Site Area: 45694 m²
Gross Plan Area: 246.09 m²
Site Coverage: 0.5%
Maximum Building Ht: 10m
Territorial Authority: Hurunui District Council
Planning Zone: Rural

DO NOT scale off drawings. Cross reference all drawings. Any discrepancies MUST be clarified with the designer immediately before commencing works or ordering. NO construction or site works are to commence until Building Consent becomes unconditional.

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SITE PLAN

Scale: 1:200
Rev:
Sheet no: **2**
Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

Call 0800 A1homes
2 1 4 6 6 3
www.A1homes.co.nz

Client Details:
Bryan & Philippa Donnelly

Address:
153 Innes Road
Amberley

Job no: **CH1054**
KH205 Alt.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry from our Listed Land Use Register (LLUR). The LLUR holds information about sites that have been used or are currently used for activities which have the potential to cause contamination.

The LLUR statement shows the land parcel(s) you enquired about and provides information regarding any potential LLUR sites within a specified radius.

Please note that if a property is not currently registered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR database is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; additional relevant information may be held in other files (for example consent and enforcement files).

Please contact Environment Canterbury if you wish to discuss the contents of this property statement.

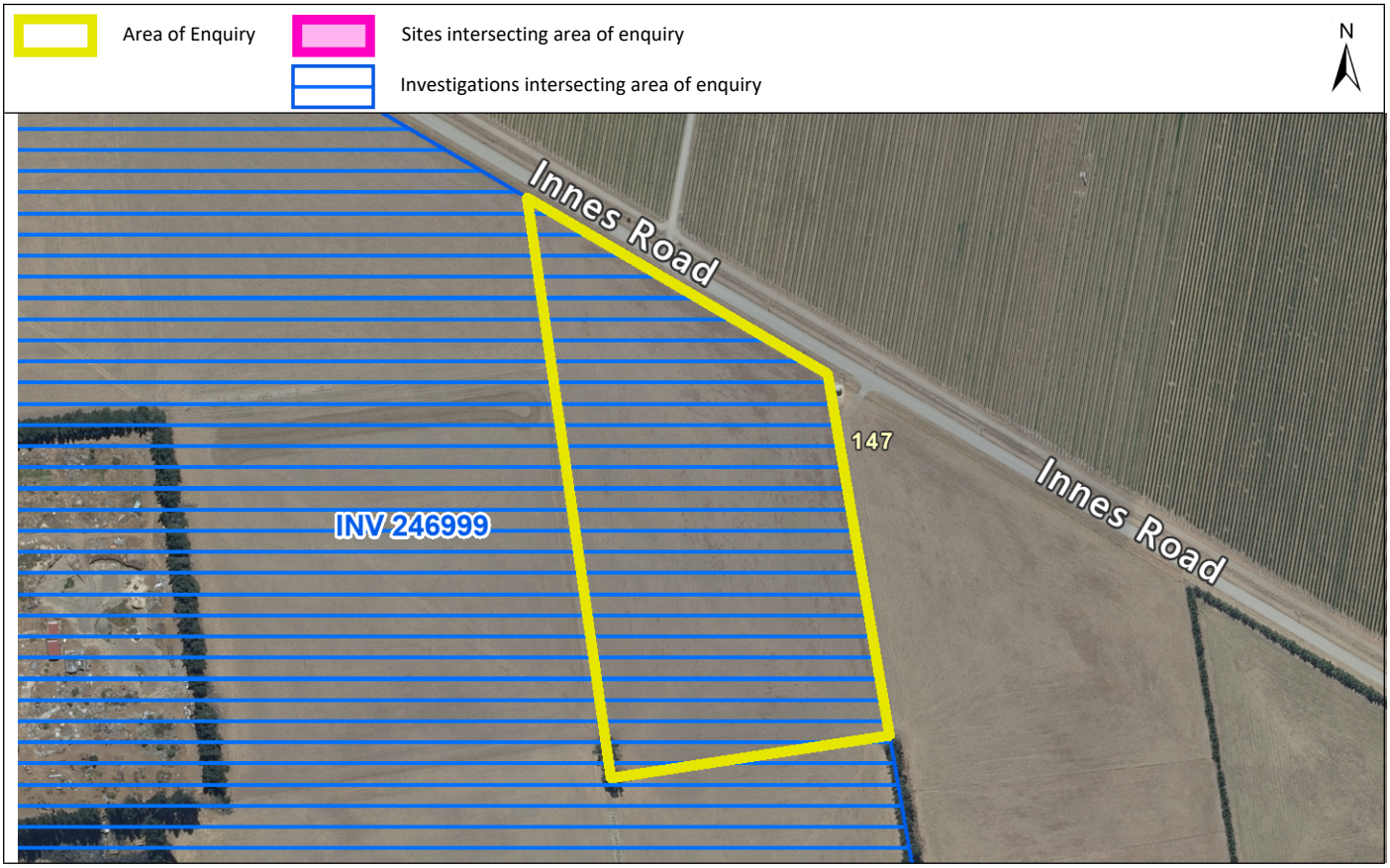
Yours sincerely

Contaminated Sites Team

Property Statement
from the Listed Land Use Register

Visit ecan.govt.nz/HAIL for more information or
contact Customer Services at ecan.govt.nz/contact/ and quote ENQ295191

Date generated: 01 October 2021
Land parcels: Lot 4 DP 520186



The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Sites at a glance

Sites within enquiry area

There are no sites associated with the area of enquiry.

More detail about the sites

There are no sites associated with the area of enquiry.

Nearby investigations of interest

INV 246999 **122 Racecourse Road, Amberley, Preliminary Site Investigation Report**
Fraser Thomas - Preliminary Site Investigation
26 Jan 2018

Summary of investigation(s):

Environment Canterbury has received a Preliminary Site Investigation report that includes all or part of the property you have selected.

A Preliminary Site Investigation seeks to identify potential sources of contamination resulting from current and historical land uses.

The preliminary site investigation may not have found any potential sources of contamination on the property you have enquired about. Where potential sources of contamination have been identified, a site identification number (e.g. SIT 1234) and land uses from the Hazardous Activities and Industries List (HAIL) will be shown on your statement.

This investigation has not been summarised.

Disclaimer

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987.

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Listed Land Use Register

What you need to know

Everything is connected

What is the Listed Land Use Register (LLUR)?

The LLUR is a database that Environment Canterbury uses to manage information about land that is, or has been, associated with the use, storage or disposal of hazardous substances.

Why do we need the LLUR?

Some activities and industries are hazardous and can potentially contaminate land or water. We need the LLUR to help us manage information about land which could pose a risk to your health and the environment because of its current or former land use.

Section 30 of the Resource Management Act (RMA, 1991) requires Environment Canterbury to investigate, identify and monitor contaminated land. To do this we follow national guidelines and use the LLUR to help us manage the information.

The information we collect also helps your local district or city council to fulfil its functions under the RMA. One of these is implementing the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil, which came into effect on 1 January 2012.

For information on the NES, contact your city or district council.

How does Environment Canterbury identify sites to be included on the LLUR?

We identify sites to be included on the LLUR based on a list of land uses produced by the Ministry for the Environment (MfE). This is called the Hazardous Activities and Industries List (HAIL)[1]. The HAIL has 53 different activities, and includes land uses such as fuel storage sites, orchards, timber treatment yards, landfills, sheep dips and any other activities where hazardous substances could cause land and water contamination.

We have two main ways of identifying HAIL sites:

- We are actively identifying sites in each district using historic records and aerial photographs. This project started in 2008 and is ongoing.
- We also receive information from other sources, such as environmental site investigation reports submitted to us as a requirement of the Regional Plan, and in resource consent applications.

[1] The Hazardous Activities and Industries List (HAIL) can be downloaded from MfE's website www.mfe.govt.nz, keyword search HAIL

How does Environment Canterbury classify sites on the LLUR?

Where we have identified a HAIL land use, we review all the available information, which may include investigation reports if we have them. We then assign the site a category on the LLUR. The category is intended to best describe what we know about the land use and potential contamination at the site and is signed off by a senior staff member.

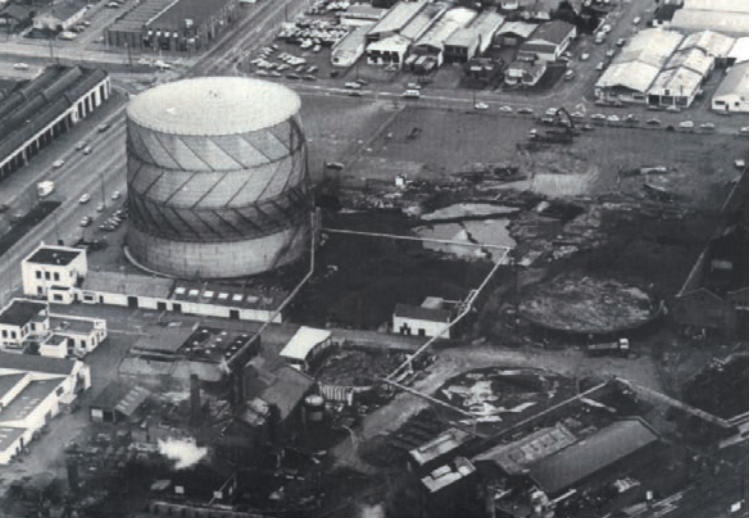
Please refer to the Site Categories and Definitions factsheet for further information.

What does Environment Canterbury do with the information on the LLUR?

The LLUR is available online at www.llur.ecan.govt.nz. We mainly receive enquiries from potential property buyers and environmental consultants or engineers working on sites. An inquirer would typically receive a summary of any information we hold, including the category assigned to the site and a list of any investigation reports.

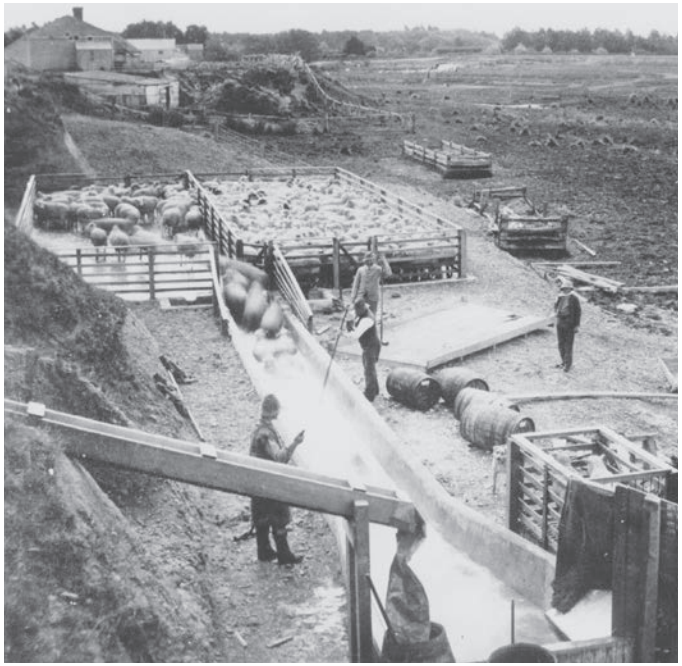
We may also use the information to prioritise sites for further investigation, remediation and management, to aid with planning, and to help assess resource consent applications. These are some of our other responsibilities under the RMA.

If you are conducting an environmental investigation or removing an underground storage tank at your property, you will need to comply with the rules in the Regional Plan and send us a copy of the report. This means we can keep our records accurate and up-to-date, and we can assign your property an appropriate category on the LLUR. To find out more, visit www.ecan.govt.nz/HAIL.



IMPORTANT!

The LLUR is an online database which we are continually updating. A property may not currently be registered on the LLUR, but this does not necessarily mean that it hasn't had a HAIL use in the past.



Sheep dipping (ABOVE) and gas works (TOP) are among the former land uses that have been identified as potentially hazardous. (Photo above by Wheeler & Son in 1987, courtesy of Canterbury Museum.)

My land is on the LLUR – what should I do now?

IMPORTANT! Just because your property has a land use that is deemed hazardous or is on the LLUR, it doesn't necessarily mean it's contaminated. The only way to know if land is contaminated is by carrying out a detailed site investigation, which involves collecting and testing soil samples.

You do not need to do anything if your land is on the LLUR and you have no plans to alter it in any way. It is important that you let a tenant or buyer know your land is on the Listed Land Use Register if you intend to rent or sell your property. If you are not sure what you need to tell the other party, you should seek legal advice.

You may choose to have your property further investigated for your own peace of mind, or because you want to do one of the activities covered by the National Environmental Standard for Assessing and Managing Contaminants in Soil. Your district or city council will provide further information.

If you wish to engage a suitably qualified experienced practitioner to undertake a detailed site investigation, there are criteria for choosing a practitioner on www.ecan.govt.nz/HAIL.

I think my site category is incorrect – how can I change it?

If you have an environmental investigation undertaken at your site, you must send us the report and we will review the LLUR category based on the information you provide. Similarly, if you have information that clearly shows your site has not been associated with HAIL activities (eg. a preliminary site investigation), or if other HAIL activities have occurred which we have not listed, we need to know about it so that our records are accurate.

If we have incorrectly identified that a HAIL activity has occurred at a site, it will be not be removed from the LLUR but categorised as Verified Non-HAIL. This helps us to ensure that the same site is not re-identified in the future.

Contact us

Property owners have the right to look at all the information Environment Canterbury holds about their properties.

It is free to check the information on the LLUR, online at www.llur.ecan.govt.nz.

If you don't have access to the internet, you can enquire about a specific site by phoning us on (03) 353 9007 or toll free on 0800 EC INFO (32 4636) during business hours.

Contact Environment Canterbury:

Email: ecinfo@ecan.govt.nz

Phone:
Calling from Christchurch: (03) 353 9007
Calling from any other area: 0800 EC INFO (32 4636)

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Everything is connected

Promoting quality of life through balanced resource management.

www.ecan.govt.nz E13/101

Listed Land Use Register

Site categories and definitions

When Environment Canterbury identifies a Hazardous Activities and Industries List (HAIL) land use, we review the available information and assign the site a category on the Listed Land Use Register. The category is intended to best describe what we know about the land use.

If a site is categorised as **Unverified** it means it has been reported or identified as one that appears on the HAIL, but the land use has not been confirmed with the property owner.

If the land use has been confirmed but analytical information from the collection of samples is not available, and the presence or absence of contamination has therefore not been determined, the site is registered as:

Not investigated:

- A site whose past or present use has been reported and verified as one that appears on the HAIL.
- The site has not been investigated, which might typically include sampling and analysis of site soil, water and/or ambient air, and assessment of the associated analytical data.
- There is insufficient information to characterise any risks to human health or the environment from those activities undertaken on the site. Contamination may have occurred, but should not be assumed to have occurred.

If analytical information from the collection of samples is available, the site can be registered in one of six ways:

At or below background concentrations:

The site has been investigated or remediated. The investigation or post remediation validation results confirm there are no hazardous substances above local background concentrations other than those that occur naturally in the area. The investigation or validation sampling has been sufficiently detailed to characterise the site.

Below guideline values for:

The site has been investigated. Results show that there are hazardous substances present at the site but indicate that any adverse effects or risks to people and/or the environment are considered to be so low as to be acceptable. The site may have been remediated to reduce contamination to this level, and samples taken after remediation confirm this.

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Managed for:

The site has been investigated. Results show that there are hazardous substances present at the site in concentrations that have the potential to cause adverse effects or risks to people and/or the environment. However, those risks are considered managed because:

- the nature of the use of the site prevents human and/or ecological exposure to the risks; and/or
- the land has been altered in some way and/or restrictions have been placed on the way it is used which prevent human and/or ecological exposure to the risks.

Partially investigated:

The site has been partially investigated. Results:

- demonstrate there are hazardous substances present at the site; however, there is insufficient information to quantify any adverse effects or risks to people or the environment; or
- do not adequately verify the presence or absence of contamination associated with all HAIL activities that are and/or have been undertaken on the site.

Significant adverse environmental effects:

The site has been investigated. Results show that sediment, groundwater or surface water contains hazardous substances that:

- have significant adverse effects on the environment; or
- are reasonably likely to have significant adverse effects on the environment.

Contaminated:

The site has been investigated. Results show that the land has a hazardous substance in or on it that:

- has significant adverse effects on human health and/or the environment; and/or
- is reasonably likely to have significant adverse effects on human health and/or the environment.

If a site has been included incorrectly on the Listed Land Use Register as having a HAIL, it will not be removed but will be registered as:

Verified non-HAIL:

Information shows that this site has never been associated with any of the specific activities or industries on the HAIL.

Please contact Environment Canterbury for further information:

(03) 353 9007 or toll free
on 0800 EC INFO (32 4636)
email ecinfo@ecan.govt.nz

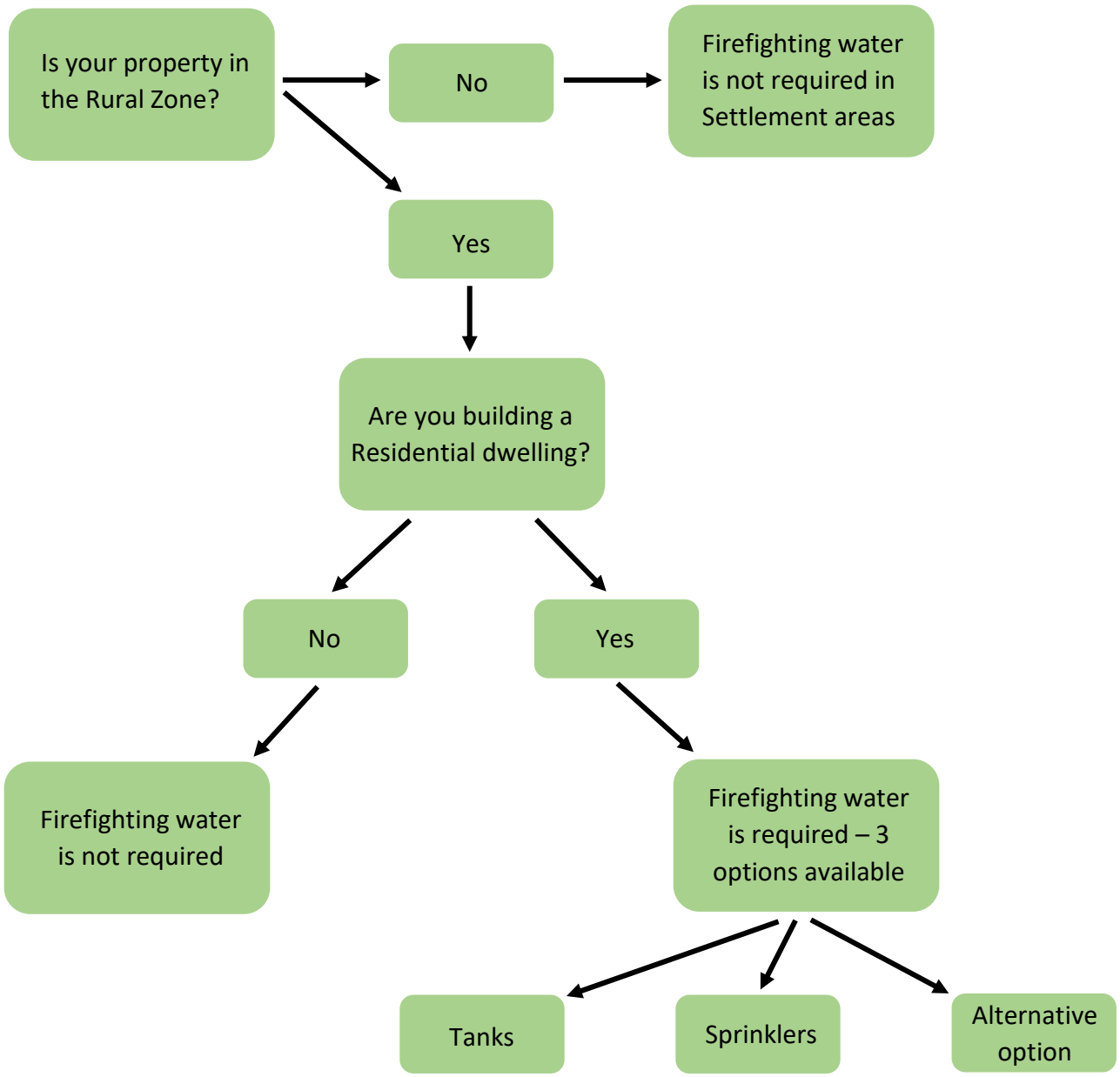
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

E13/102

Checklist for Firefighting Water Plans

Rule 3.4.3.23 of the Hurunui District Plan requires firefighting water for all new dwellings in the rural area; *At the time a residential dwelling is erected on any building site that is not provided with sufficient firefighting water supply via the Council's reticulated water supply a firefighting water supply that complies with the New Zealand Fire Service Firefighting Water Supplies Code of Practice: SNZ PAS 4509: 2008 (Code of Practice) is to be provided.*

Does your dwelling require firefighting water?



Tanks

Provide a site plan showing the location of the tank/s. The proposed tanks must meet the following requirements:

Requirements	Yes	No	N/A
Tank is within 90m of the dwelling, and no closer than 6m			
Tank/outlet is located forward of the dwelling[1]			
The tank holds 45,000L (or have engineer calculations to show how much is required[2]			
The tank has a 100mm threaded female coupling (unless elevated and pressured) to connect hoses			
The tank is within 6m of a hardstand surface			
The hardstand surface is at least 4.5m wide and 11m long			
If driveway is not the hardstand surface, new hardstand area is accessible via a hardstand track[3]			
Pipe to relocate outlet has been flow tested			

Sprinklers

Provide a plan/s showing the location of the sprinklers throughout the house and the location of the tank/s. The proposed must meet the following requirements:

Requirements	Yes	No	N/A
Sprinklers are located throughout the house			
Tank is within 90m of the dwelling, and no closer than 6m			
Tank/outlet is located forward of the dwelling[1]			
Tank holds 7000L dedicated to firefighting water			
The tank has 100mm threaded female coupling (unless elevated and pressured) to connect hoses			
The tank is within 6m of a hardstand surface			
The hardstand surface is at least 4.5m wide and 11m long			
If driveway is not the hardstand surface, new hardstand area is accessible via a hardstand track			

Alternative option

Provide a plan and necessary detail to demonstrate how the proposed alternative option meets the requirement for a supply of firefighting water.

Requirements	Yes	No	N/A
Option has been sent to a Planner at Hurunui District Council for approval			

NB: This option will be sent onto the Council's contact at FENZ to be approved

If you have any further questions or clarifications please contact the duty planner on 03-314 8816 or planning@hurunui.govt.nz

[1] The fire appliance must not drive past the dwelling to get to the firefighting water supply.
[2] A common approach is to install two 30000L tanks, retaining 45000L for firefighting water supply and using the other 15000L for general water supply. Place a 'restrictor' in one tank so no more than 45,000L can be taken at any time.
[3] The width and turn of the driveway must be able to be accessed by a fire engine, the gradient should be no greater than 16%.

210485 - PIM - Utilities Service Plan

153 Innes Road, Amberley

Hurunui District Council does not guarantee that the data in this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequences which may arise from relying on any information depicted. Cadastral and topographic data sourced from LINZ. Crown Copyright Reserved.

Date:	6/10/2021
Scale:	1:2,152
Print Size:	A4 Landscape
Projection:	NZTM
Produced by:	cxo

HURUNUI District Council

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

STAGE: PERMIT

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idesignarchitecture

The following design elements have been specified by other designers:

- Truss Design / Placemakers

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Proposed New Home for:
Bryan & Philippa Donnelly

Job no: **CH1054**

Address:
153 Innes Road
Amberley

Date: 3/09/2021

A1homes

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

Foundation (Firth RibRaft)

Firth RibRaft Floor System (Design not requiring specific engineering input for the Firth RibRaft Floor System): reinforced concrete waffle raft floor slab-on-ground, on 0.25 polythene DPM.
100mm thick slab supported by grid of ribs, 100mm wide at 1200crs each way.
Overall depth 305mm.
300mm wide Edge beams under load bearing walls laid in strict accordance with the latest FIRTH specification

Min. 5mm - 25mm max. sand blinding to cover hardfill to ensure the vapour barrier is protected from any granular protrusions
Malthoid under all bottom plates, overlapping timber by min. 6mm.

External Walls (SG8)

90x45 H1.2 frame + 140x35 H1.2 top plate packer, studs @ 600crs max, nogs @ 800crs.

James Hardie Scyon Axon Panel:
For timber cavity construction method the following framing is required:
• a minimum 70mm wide stud is required at vertical panel joint when fixing with HardieFlex 60 x 3.15mm nails.
• The framing must fully support all panel edges.
• The framing must be rigid and not rely on the cladding panel for stability.
• an extra stud is required in internal corners.

For CLD Structural Cavity construction method the following framing is required:
• A minimum 38mm wide stud is required at panel edges when using CLD Structural Cavity Battens.
• The framing must fully support all panel edges.
• The framing must be rigid and not rely on the cladding panel for stability.
• an extra stud is required in internal corners.

MARSHALL WATERPROOFING Tekton building wrap to all exterior frames

Standard 10mm GIB linings throughout, except wet areas. Fixed to comply with the latest Winstones GIB Manual - level 4 paint finish

Wall framing behind cavities
Where stud spacing's are greater than 400 mm, and flexible wall underlay's only are used, an intermediate means of restraining the flexible wall underlay and insulation from bulging into the drained cavity shall be installed.
An acceptable method to achieve this is using one of the following:
• intermediate cavity batten between the studs.
• 75mm galvanised mesh.
• Polypropylene tape or galvanized wire at 300 mm centres fixed horizontally and drawn taut

Bottom plate fixing: Refer to Ramset table (or equivalent fixing installed as per manufacturers specs). 150 mm off each end of the plate and be spaced at a max. of 900crs, or 600crs when used on slab edges formed by masonry header

Exterior Cladding

James Hardie Axon Panel installed, flashed and finished to the latest James Hardie specifications and in accordance with NZBC: E2/AS1 External Moisture. Merchant to include all flashings & fixings as required by cladding system.

CLD Structural cavity battens: (2450mm long, 70mm wide and 19mm thick)
The battens are fully sealed on all faces.
• Structural Cavity Batten must be fixed to the studs over building underlay or RAB Board.
• The battens are run continuously over the studs but they must have a gap at the floor joist level to allow for structural shrinkage and deflection in joists.
• The CLD Structural Cavity Batten can also be butt jointed over the studs within the floor height. The batten ends must be cut between 20°-45° and be installed to deflect the moisture to exterior.
• The ends must be sealed and butted using an adhesive sealant in the joint
• The minimum framing width required to fix CLD Structural Cavity Batten is 45mm
• All site cut ends of CLD Structural Cavity Battens must be sealed on site with Dulux Acraprime 501/1 sealer or Resene Quick Dry before installation.
• CLD Strutural Cavity Battens are not to be used in situations where design wind pressures are above 2.5kPa(uls).
• CLD Structural Cavity Battens must not be used to a length smaller than 300mm.

Refer to Table 2 for CLD Structural Cavity Batten spacing and fixing size and fixing centres. The fasteners must be driven at a minimum distance of 50mm from the batten ends.

External Joinery

Aluminium joinery installed to comply with NZBC: E2/AS1.
Pre-primed jambs, architraves.
Approved window sealing tape to all openings.
Protecto Tape flashing tape over flashing fixings. Do not fix cladding through flashings.
Glazing to comply with NZS:4223:2008/2016 amendments.

The windows to bedrooms 3 and 4 are required to have a minimum STC (Sound Transmission Class) 34 in order to meet the internal noise level. This can be achieved by a double glazed unit IGU (5mm / 14mm air space / 4mm). No minimum requirements apply to the windows of bedrooms 1 and 2. The window suites / frames are required to match the STC ratings noted above, complete with compressible weather seals. In order to meet the internal noise levels, windows in all bedrooms need to be closed. We would like to clarify that the windows are openable, i.e. those are not fixed windows.

Internal walls (incl. LBW) (SG8)

90x45 H1.2 frame + 140x35 H1.2 top plate packer, studs @ 600crs max, nogs @ 800crs.
Gib Noiseline 13mm to external walls & Standard 10mm gib linings throughout, except wet areas. Fixed to comply with the latest Winstones Gib Manual.- level 4 paint finish
Bottom plate fixing: Ramset HD875 drive pin + washer (or equivalent) @ 600crs (150 off each end) (or equivalent fixing installed as per manufacturers specs)

Wet Areas

Floor finish: Refer to Floor Plan, 'Floor Finishes Key'

Specialist contractor to provide polished concrete surface to floors where indicated on floor plan, with non-slip sealed finish, all in accordance with AS/NZS 4568 slip resistance classification.

Wall & Ceiling finish: BATHROOM & ENSUITE
GIB Aqualine: 13mm to exterior walls, GIB Aqualine: 10mm to interior walls and 13mm to ceilings 1/coat GIB Sealer with 2/coats semi-gloss or gloss, acrylic enamel paint

Ceilings (SG8)

70x35 H1.2 ceiling battens direct fixed to trusses @ 600crs. Ensure battens are straight prior to lining. 13mm Noiseline Gib linings, 13mm Aqualine to wet areas with 32mm x 6g GIB® Grabber™Screws @ 600crs. Glue daubs to be minimum of 200mm from centre screw. Do not screw where you glue. 32mm x 6g GIB® Grabber™ Screws @ 200crs around the perimeter. Gib stopping to level 4 paint finish. 1/850sq ceiling access to roof space.

Roof (SG8)

Pre-fabricated GANGNAIL 6 & 8° pitch H1.2 trusses @ 900crs - galv wire netting with Thermakraft 215 self supporting underlay laid horizontally with min 150mm lap.
75x45 H1.2 purlins, spanning 900mm.
Purlin spacings - End Span - 600mm, Intermediate Span - 900ctrs.
Fixing - Type T - 1/10g self-drilling screw, 80mm long purlin/truss connection (2.4KN fixing)

Lumberlok strip brace & tensioners tightened firmly across roof planes.

Longrun colorsteel roofing as per elevations. Roofing fixed with compatible roofing nails or screws and sealing washers, by qualified persons with flashings as required to all junctions - flashings fixed with compatible roofing screws and sealing washers
Fixing pattern = T1 fixing pattern = fix every crest
Note: every sheet of roof cladding to span at least 3 supports)

8.4.8 Fixings:
Fixings shall be as shown in Tables 11, 12, 14 and 15, and shall be a minimum 12-gauge screw, as shown in Figure 39, which complies with Class 4 ofAS 3566: Part 2.
8.4.8.1 Fixing requirements
Fixings shall:
a) Be fixed through crests,
b) Penetrate purlins by a minimum of 40 mm for nail fixings and 30 mm for screw fixings,
c) Include sealing washers of:
i) neoprene (having a carbon black content of 15% or less by weight),
ii) profiled washer and EPDM washer where required to allow for expansion of the profiled metal roof cladding.

Insulation

R3.6C pink Batts insulation to all ceilings, except garage.
Maintain a 25mm gap clearance between the insulation and roof underlay
R2.4W pink Batts insulation to all exterior wall cavities excluding garage, however including walls between house & garage. Friction fitted.

Soffit

4.5mm Hardiflex soffit lining fixed to underside of truss top chord extensions.
Refer to roof plan for eave widths, 25x19pp soffit mould.
Colorsteel Fascia & spouting with Marley Downpipe system.

Snow straps as required: Standard Metalcraft 30mm .55 gauge colorsteel straps fixed to roof with Tex screws and riveted to the gutter, fixed @ 600 crs.

Table 2

Batten fixing

Fixing Type	Framing	Basic Wind Pressure kPa (ULS)	Batten centres max. (mm)	Fixings centres max. (mm)
65mm x 2.8mm RounDrive ring shank nail hot dip galv./ s.steel	Timber	Up to 1.5 (Up to and including VH wind zone)	600	250
		Up to 2.5 (>VH wind zone)	400	200
50mm x 9-10g Countersunk head steel screw class 3/4	*Steel 0.55 to 1.6mm BMT	Up to 1.5 (Up to and including VH wind zone)	600	250
		Up to 2.5 (>VH wind zone)	400	200

For fastener durability information, refer to Clause 6.2 of this document.

CLD Structural Cavity Battens less than 400mm in height must have fixings at maximum 150mm centres.

Battens must be fixed over studs.

ARCHITECTURAL DRAWINGS TO BE READ IN CONJUNCTION WITH ALL RELEVANT PRODUCER STATEMENTS AND MANUFACTURERS SPECIFICATIONS.

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PLAN NOTES

Scale:
Rev:
Sheet no: **1**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 22/10/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Bryan & Philippa Donnelly

Address:
153 Innes Road
Amberley

Job no: **CH1054**

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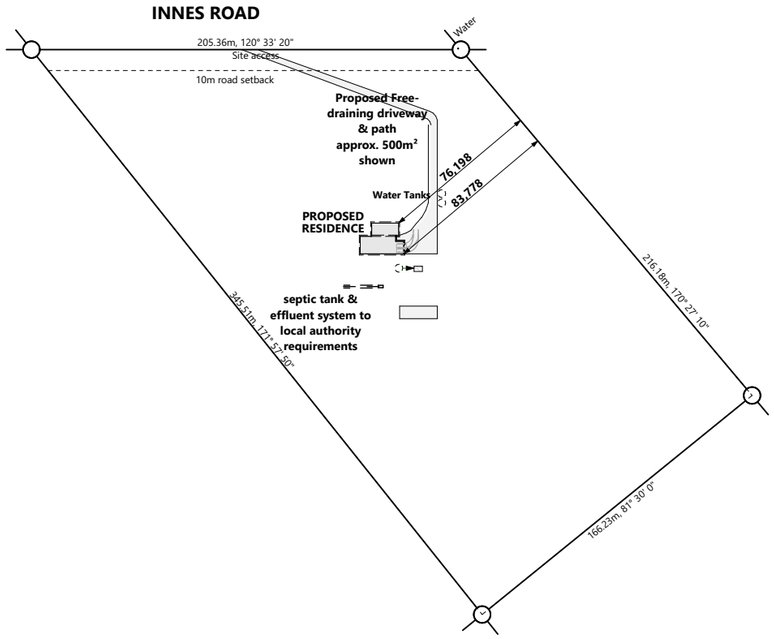


SITE LOCATION PLAN N.T.S

NZBC F5:
Construction and Demolition Hazards
Acceptable Solution F5/AS1

1.0 Work-Site Barriers

1.0.1 The necessity for barriers will depend mainly on the site location.
The need will be greater in areas with high levels of pedestrian traffic (i.e. in Central Business Districts), than in industrial or rural areas.
Barriers are not necessary for domestic dwellings up to 2 storeys above ground level unless specific hazards exist.

At all work-sites hazard evaluation will take account of:
1. Pedestrian counts adjacent to the site.
2. Car parking adjacent to the site.
3. Location of neighbouring buildings.
4. Presence of neighbouring work-sites or recreation areas.
5. Proximity to schools or early childhood centres.
6. Proximity to housing.
7. The depth of a water hazard.
8. The period of time for which ponded water will be present.
9. The accessibility and 'visibility' of the site.

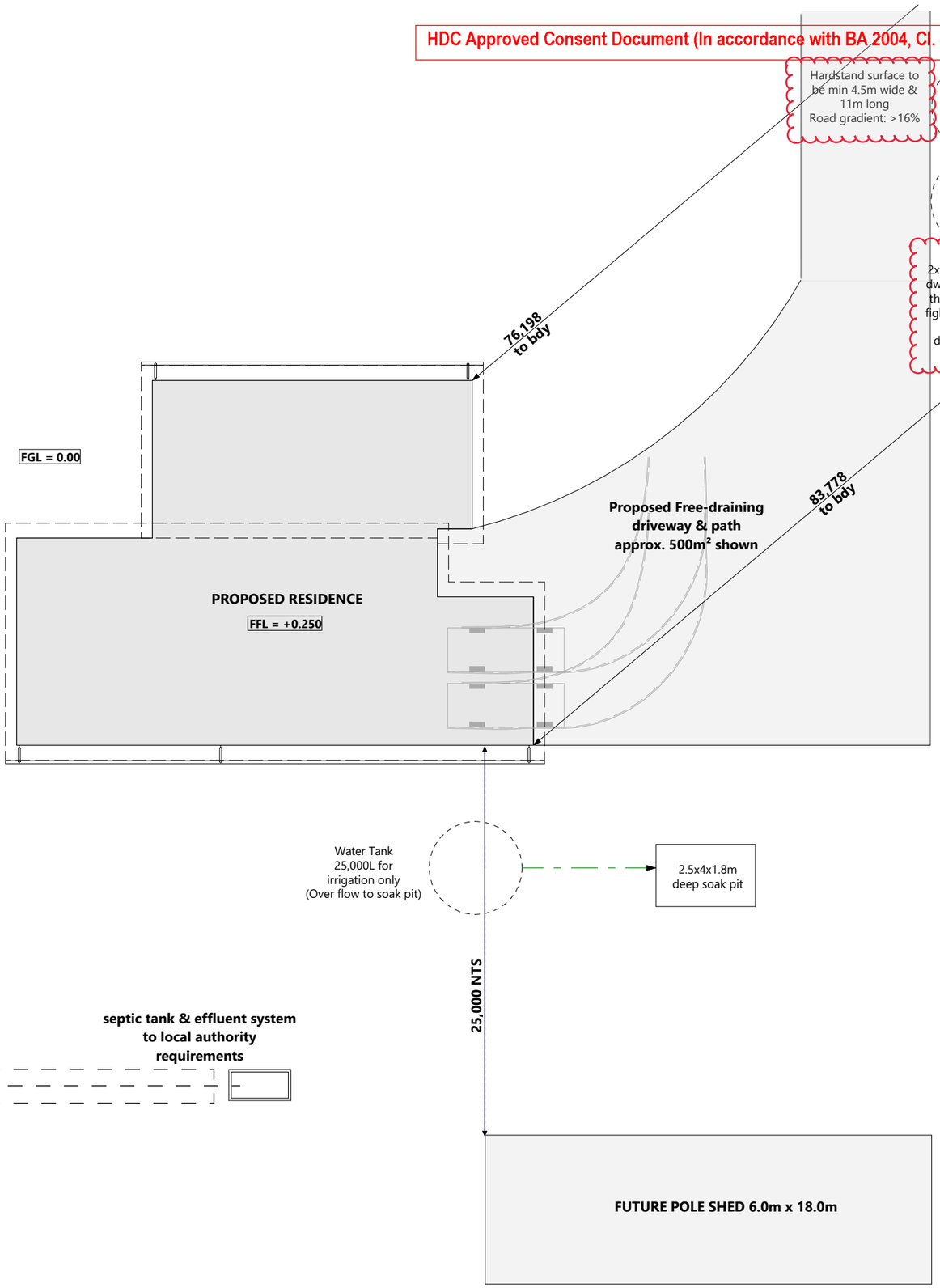
1.0.2 If a work-site is not completely enclosed, and unauthorised entry by children is likely, it
is acceptable for specific hazards to be fenced only when workers are absent from the
immediate vicinity.

1.1 Site fences and hoardings

1.1.1 Fences and hoardings shall extend at least 2.0 m in height from ground level on the
side accessible to the public.

1.1.2 An acceptable fence may be constructed with galvanised chainlink netting having a
maximum sized grid of 50 mm x 50 mm. Post spacing shall be a maximum of 2.5 m, and the
gap between the bottom of the fence and ground no greater than 100 mm.

Finished Floor Level (FFL) shall be:
a) For sites level with or above the road, no less than 150 mm above the road crown on at least one cross-section through the building and roadway
b) For sites below the road, no less than 150 mm above the lowest point on the site boundary



Cautionary Notes:
BUILDING CONTRACTOR TO ASSESS SITE TO ENSURE DAYLIGHTING & BUILDING RESTRICTIONS ARE COMPLIED WITH.
NO LIABILITY FOR ENCROACHMENT SHALL BE HELD BY DESIGNER IF SITE IS NOT SURVEYED BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF FOUNDATIONS.

Construction Notes:
Before building is erected on site, all rubbish, noxious matter and organic matter shall be removed from the area to be covered by the building.
Ensure final building platform & finished ground have an even fall away from building to ensure water not be allowed to accumulate in buildings subfloor.
Any fill to be dry & approved by engineer & compacted down in accordance with NZS.3604.2011

Contractor to
- confirm ground has adequate bearing to comply with NZS 3604: 2011, except in the case of SED design, or when using Firth RibRaft Floor System (refer Ribraft manual).
- locate all service connections points on site prior to commencement of works. Check invert levels or pipes and manholes.
- confirm plumbing route and fixture positions on site prior to commencement of works.
- locate all electrical and water services on site.
- confirm on site all boundary bearings, lengths & peg locations on site prior to commencement of works, to ensure house position is correct.

HIRB = Height in Relation to Boundary

Sediment Control:
- No building work will be started on this project until the construction
of an approved stormwater outfall has been completed for this proposed Lot
- All erosion and sediment control structures are to be inspected and maintained daily
- Prevent any backfill or debris from washing onto council or neighbouring properties
- All ground cover vegetation outside the immediate building area to be preserved during the building phase
- All erosion and sediment control measures are to be installed prior to commencement of earthworks
- Stockpiles of clay and materials are to be covered with impervious sheeting
- Roof water downpipes to be connected to the main stormwater system as soon as roof sheathing & spouting is installed

Lot: 4
DP: 502943
Site Area: 45694 m²
Gross Plan Area: 246.09 m²
Site Coverage: 0.5%
Maximum Building Ht: 10m
Territorial Authority: Hurunui District Council
Planning Zone: Rural

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SITE PLAN

Scale: 1:200
Rev:
Sheet no: **2**
Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 22/10/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Client Details:
Bryan & Philippa Donnelly

Address:
153 Innes Road
Amberley

Job no: **CH1054**
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NZBC: E1 Surface Water

3.7 Access for maintenance

3.7.1 Access for maintenance shall be provided on all drains. Access is to be achieved via an inspection point, rodding point, inspection chamber or access chamber, complying as appropriate with Figures 10, 11 or 12.

3.7.2 Points of access shall be spaced at no further than:
a) 50 m where rodding points are used.
b) 100 m where inspection points, inspection chambers or access chambers are used.

3.7.3 Points of access are required at:
a) Changes in direction of greater than 45°,
b) Changes in gradient of greater than 45°, and
c) Junctions of drains other than a drain, serving a single downpipe, that is less than 2.0 m long.

3.7.4 Inspection chambers or access chambers (see Figures 11 and 12) shall be provided where changes in both gradient and direction occur and where either is greater than 22.5°.

3.7.5 Where the depth to the invert of the drain exceeds 1.0 m, an inspection chamber is not acceptable and an access chamber shall be used.

Drains installed under buildings shall be:
a) Straight and of even gradient,
b) Separated from the building foundation by at least 25 mm, and
c) When passing through concrete, sleeved or wrapped in a durable and flexible material to allow for expansion and contraction.
Drains passing beneath buildings with a concrete slab on the ground floor shall have:
a) 50 mm clearance from the top of the pipe to the underside of the slab, and
b) Junctions beneath the building joining at an angle of not more than 45o

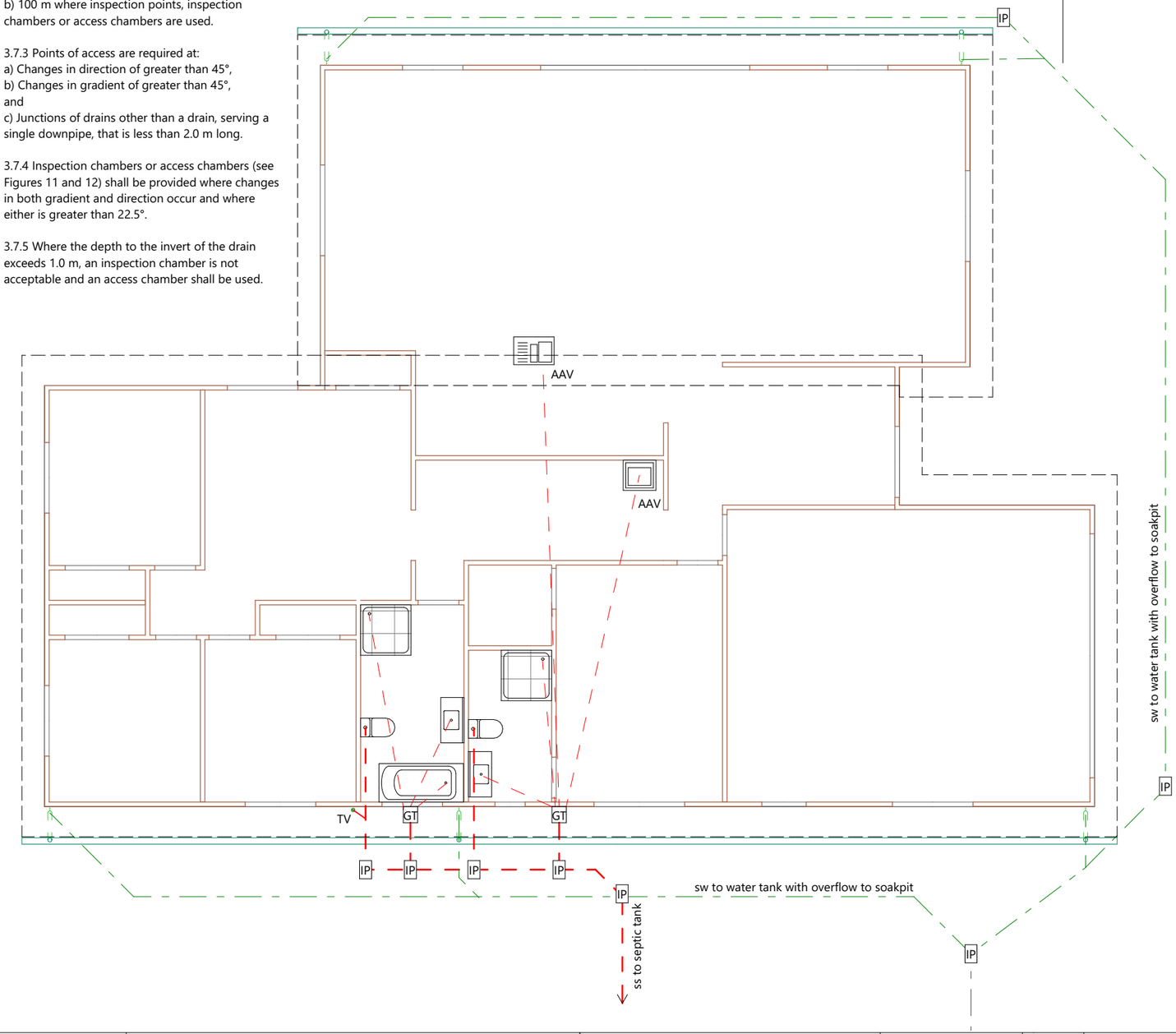
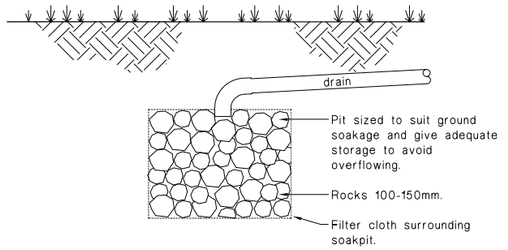


Figure 13: Soak Pit for Surface Water Disposal
Paragraph 9.0.4



(a) Rock soak pit

Soak Pit Calculation
Roof Area = 292.8m^2

RC = 10y x 22.8 mm (RFI) x 0.0292(catchement area)
RC = 6.65 m^3
6.65/0.38 (boulder capacity) = 17.52m^3 pit required

2.5 x 4x 1.8deep = 18m^3 pit

Construction Notes:

Plumbing to NZBC G13/AS1, AS2 by qualified tradesman.
Contractor to locate all service connections on site prior to earthworks confirm all boundary setbacks & restrictions comply with current regulations prior to commencement of foundations.
All waste pipes PVC. Sizes, fall, venting & discharge to be confirmed by NZ qualified plumber. Confirm positions of available services cabling etc on site prior to any excavation

Water Supply:

Internal water pipes to Polybutylene.
All pipework and pipes exposed to freezing to be lagged with closed cell foam - Closed cell foam polymer insulation or fibre glass insulation which is preformed to the shape of the pipe and not less than 13 mm thick, is acceptable material for preventing pipes less than or equal to 40 mm diameter from freezing. Any insulation material that absorbs moisture shall be protected in a waterproof membrane.

Fixture unit rating:

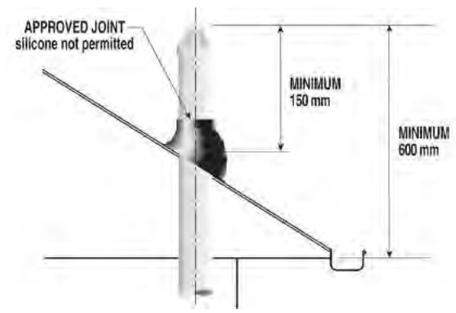
Bathroom Group - 6 (x2)
WC - 4
Laundry tub - 5
Kitchen sink - 3

Drain Ventilation requirements:
The drainage system shall be ventilated to allow a flow of air and to minimize the build up of foul air.
• Every main drain, and every branch drain longer than 10m, shall be ventilated in accordance with Table 3.
• Ventilation shall be provided by a drain vent pipe located so that the length of drain upstream of the drain vent connection is less than 10m.
• To allow for regular flushing of the drain vent connection, it shall be located downstream of, but not more than 10 m, from the discharge connection closest to the head of the drain.

Plumbing Legend as per G13

Symbol	Item	Symbol	Item
IP	Inspection point	— — —	DN100 uPVC SS pipe, min 1:100 gradient
	Downpipe	— · —	DN100 uPVC SW pipe, min 1:120 gradient
HT *	Hose Tap	— — —	min uPVC fixture waste pipe sizes: DN32 basins min 1:20 gradient DN40 showers, baths, sinks, dishwasher, min 1:40 gradient. DN50 sinks + dishwasher, ldy tub + washing machine (combined) min 1:40 gradient. DN80 min water closets (ref specs), min 1:60 gradient.
GT	Gully Trap		
oTV	Terminal vent Ø80		
AAV	Air admittance valve		

Water supply pipe (from council mains) = DN20



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DRAINAGE PLAN

Scale: 1:100 | Sheet no: 3
Rev:
Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 22/10/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	B	N4 1.0kPa	3

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Figure 2: Details of gully traps
Paragraph 3.3.1

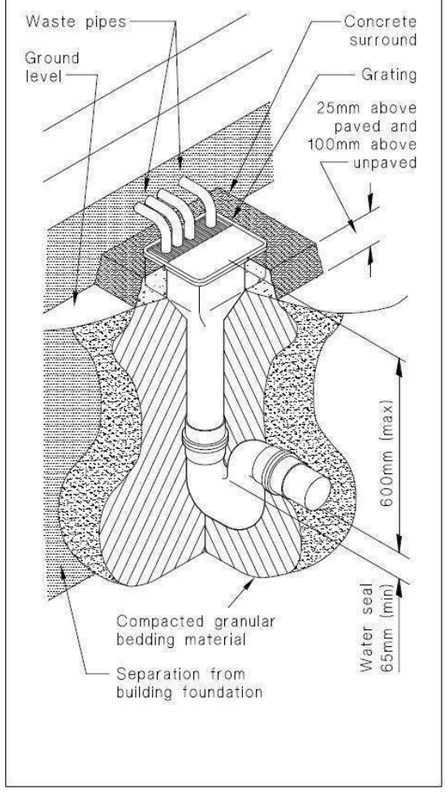
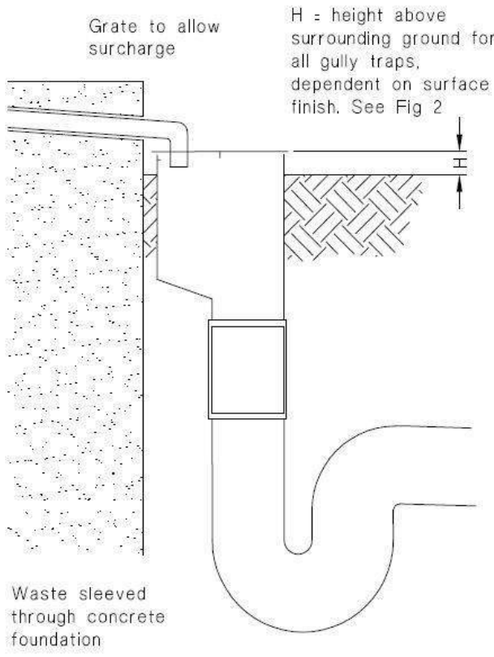
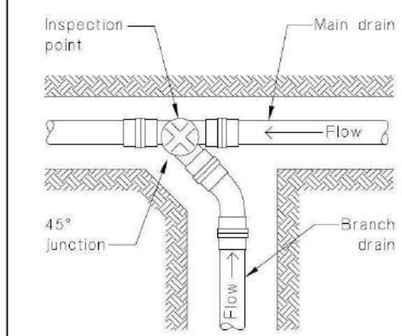


Figure 3: Methods of connecting to gully traps
Paragraph 3.3.1



b) Waste bend discharging over gully dish

Figure 9: Inspection points
Paragraph 5.7.3



Access points
All drains shall be laid to allow easy access for maintenance and the clearance of blockages.
Drains shall be provided with access points to facilitate cleaning and the clearance of blockages. Such access points shall be constructed to prevent the ingress of ground water and tree roots.
Access points may comprise access chambers, inspection chambers, rodding points or inspection points.

Access points shall be provided at the following locations:
a) Immediately prior to drain outfalls,
b) Immediately inside the boundary of the property served,
c) At the junction of every drain with another drain except that no access point is required where the branch drain is less than 2.0 m long and only serves a gully trap,
d) Every change in horizontal direction of greater than 45°,
e) Every change in gradient greater than 45°,
f) At intervals (on straight lines) of no less than:
i) 50 m where rodding points are used, or
ii) 100 m where access chambers, inspection chambers or inspection points are used, and
g) Within 2.0 m outside the building where a drain enters or exits from under a building.

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DRAINAGE G13

Scale:
Rev:
Sheet no: **4**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Roof gutter profile calculations:
Metacraft Quadline Gutter
Cross sectional area of gutter (CSAG) = 6200mm². 53m² of plan roof area (based on 100mm/hr.)

Rainfall intensity = 40mm/hr.

Plan Roof area 1= 198.35m²
Modified Plan Roof Area =198.35 x 40 / 100 = 79.34 m²
Number of downpipes required to accomodate Modified Roof Area:
79.34 / 53 = 1.49 (2 DP)

Plan Roof area 2= 94.49m²
Modified Plan Roof Area =94.49 x 40 / 100 = 37.79 m²
Number of downpipes required to accomodate Modified Roof Area:
39.79 / 53 = 0.7 (1 DP)

Therefore minimum number of downpipes required = 3
Number of DP's provided = 5

Downpipe calculations: NZBC:E1
Plan area of roof per single downpipe for roof pitch 0-25° = 85m² of roof area for DN74 downpipe. (based on 100mm/hr.)

Plan Roof area 1 =198.35m²
Calc. - Plan Roof area/area served by DP = DP's required
198.35/ 85 = 2.33= 3 DP

Plan Roof area 2 =94.49m²
Calc. - Plan Roof area/area served by DP = DP's required
94.49/ 85 = 1.11 = 2 DP

Therefore minimum number of downpipes required = 5
Number of DP's provided = 5

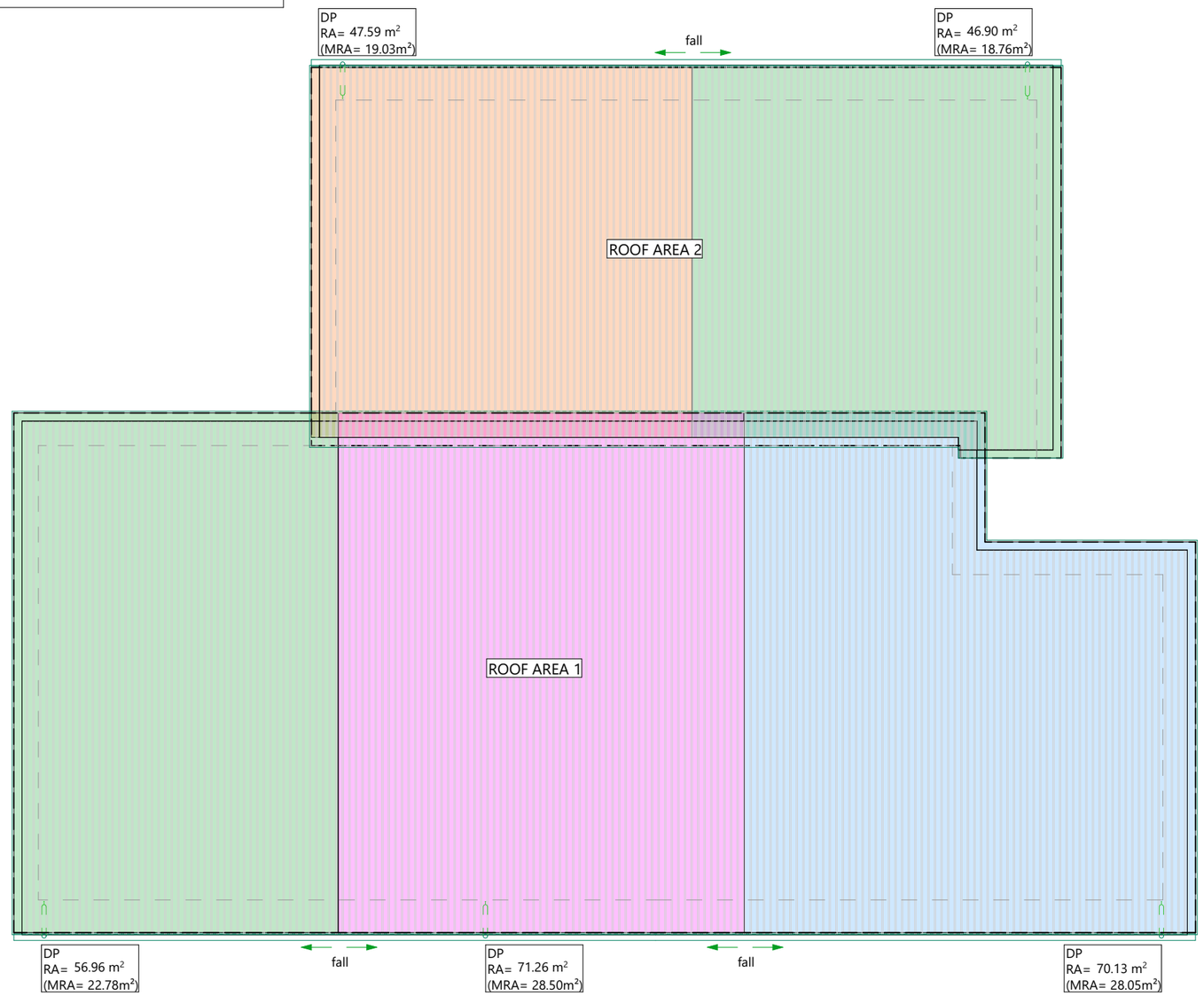


Table 5: Downpipe Sizes for Given Roof Pitch and Area
Paragraph 4.2.1

Downpipe size (mm) (minimum internal sizes)	Roof pitch 0-25°	25-35°	35-45°	45-55°
	Plan area of roof served by the downpipe (m²)			
63 mm diameter	60	50	40	35
74 mm diameter	85	70	60	50
100 mm diameter	155	130	110	90
150 mm diameter	350	290	250	200
65 x 50 rectangular	60	50	40	35
100 x 50 rectangular	100	90	70	60
75 x 75 rectangular	110	90	80	65

Figure 15: Cross-sectional Area of External Gutter
Paragraphs 5.1.2 and 5.1.3

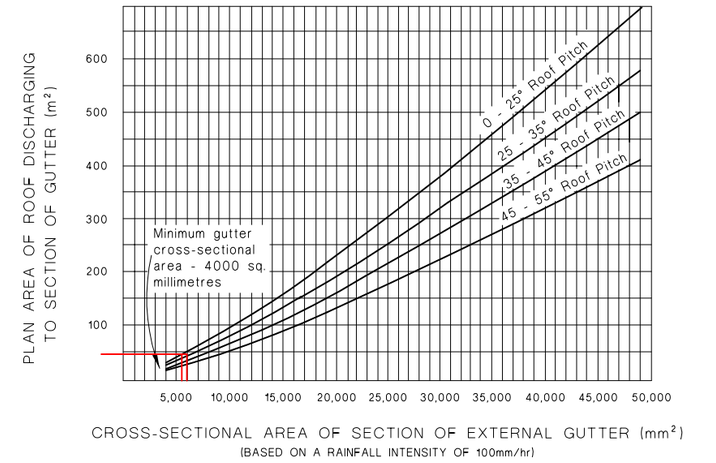
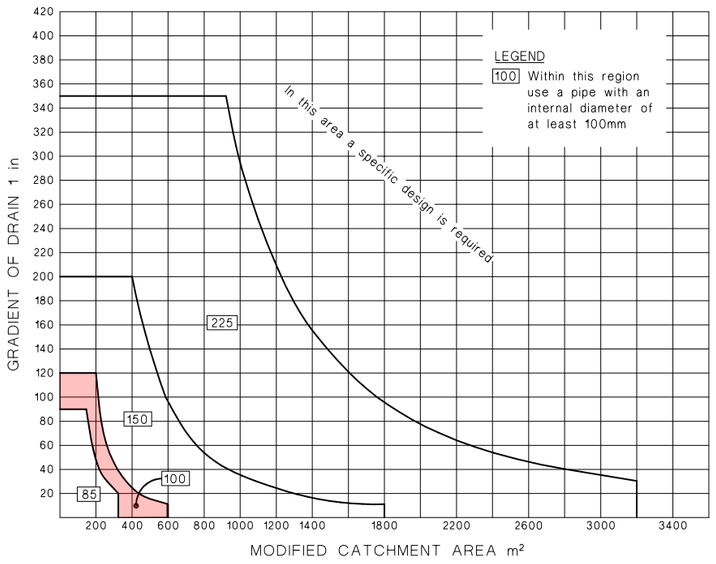


Figure 3: Sizing of Surface Water Drains
Paragraphs 3.2.2 and 3.2.3



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ROOF DRAINAGE PLAN

Scale: 1:100 | Sheet no: 5
Rev:
Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	B	N4 1.0kPa	3

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Address:
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Job no: **CH1054**

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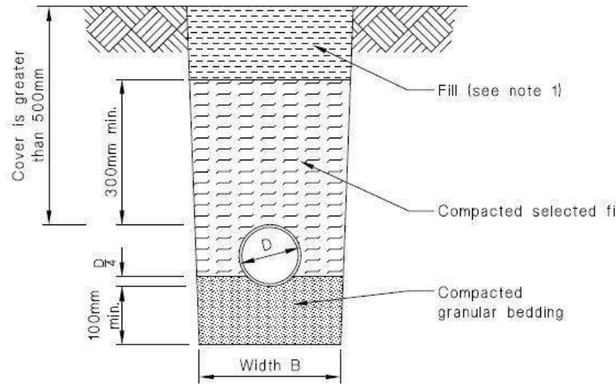
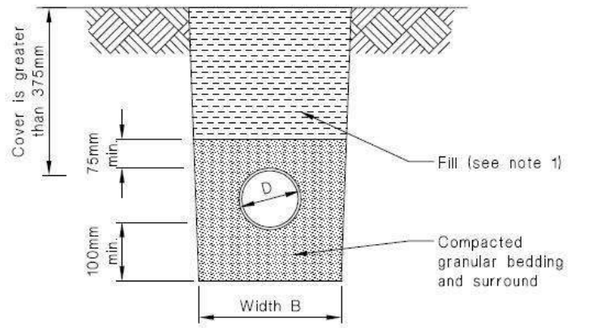
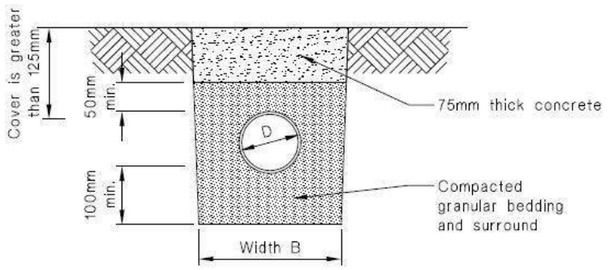
Figure 13: Bedding and Backfilling
Paragraphs 3.9.2, 3.9.4 and 3.9.5



(a) Cover greater than 500 mm
Bedding type 'B' of NZS 4452



(b) Cover greater than 375 mm
Bedding type 'D' of NZS 4452



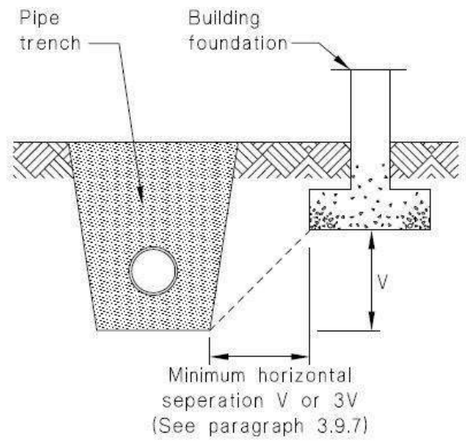
(c) Cover greater than 125 mm

NOTE:
1. Fill shall be:
-Ordinary fill where drains are located below gardens and open country.
-Compacted selected fill where the drains are located below residential driveways and similar areas subjected to light traffic.

Proximity of trench to building:

3.9.7 Proximity of trench to building
For light timber frame and concrete masonry buildings founded on good ground and constructed in accordance with NZS 3604 or NZS 4229, pipe trenches which are open for no longer than 48 hours shall be located no closer than distance 'V' (see Figure 14) to the underside of any building foundation. Where the trench is to remain open for periods longer than 48 hours, the minimum horizontal separation shall increase to 3V in all ground except rock.

Figure 14: Relationship of Pipe Trench to Building Foundation
Paragraph 3.9.7



NZBC: E1 Surface water:

3.9 Bedding and backfilling
3.9.1 General
NZBC B1 requires all drains be constructed to withstand the combination and frequency of loads likely to be placed upon them without collapse, undue damage, undue deflection or undue vibration.
In addition, adequate support needs to be provided to prevent gradients becoming less than those required as a result of:
a) Differential settlement, or
b) Deflection of an unsupported span.

3.9.2 Bedding and backfilling
Figure 13 gives acceptable solutions for the bedding and backfilling of the drainage pipes
except where:
a) The trench is located within or above peat, or
b) Scouring of the trench is likely due to unstable soils, or
c) The horizontal separation between any building foundation and the underside of the pipe trench is less than that required by Paragraph 3.9.7, or
d) The cover H to the pipe is more than 2.5 m.

3.9.3 Trench slope
Where the slope of the trench is 1 in 8 or greater, anti-scour blocks shall be provided.
These anti-scour blocks shall be:
a) Constructed from 150 mm thick concrete (17 MPa),
b) Keyed into the sides and floor of the trench by 150 mm,
c) Extended to 300 mm above the drain or to ground level where the drain cover is less than 300 mm, and
d) Spaced at:
i) 7.5m centres for trench slopes between 1 in 8 and 1 in 5, or
ii) 5.0m centres for trench slopes greater than 1 in 5.

3.9.4 Trench width
The width B of the trench shall be no less than the pipe diameter D plus 200 mm.
Trench width at the top of the pipe shall be no more than 600 mm unless the pipe(s)
in the trench are covered with concrete, as shown in Figure 13 (c).

3.9.5 Acceptable materials
Acceptable fill materials shown in Figure 13 are:
a) Bedding material of clean granular noncohesive material with a maximum particle size of 20 mm, or
b) Selected compacted fill of any fine-grained soil or granular material which is free from topsoil and rubbish and has a maximum particle size of 20 mm, or
c) Ordinary fill which may comprise any fill or excavated material.

3.9.6 Placing and compacting
a) Granular bedding and selected fill shall be placed in layers of no greater than 100 mm loose thickness and compacted.
b) Up to 300 mm above the pipe, compaction shall be by tamping by hand using a rod with a pad foot (having an area of 75 ± 25 mm by 75 ± 25 mm) over the entire surface of each layer to produce a compact
layer without obvious voids.
c) More than 300 mm above the pipe, compaction shall be by at least four passes of a mechanical tamping foot compactor (whacker type) with a minimum weight of 75 kg.

DO NOT scale off drawings. Cross reference all drawings. Any discrepancies MUST be clarified with the designer immediately before commencing works or ordering. NO construction or site works are to commence until Building Consent becomes unconditional.

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BEDDING AND BACKFILLING

Design: A1	Drawn: GW/CH		Check: AG/UP	LBP: UP	Scale:	Sheet no:	
					Rev:	6	
Wind:	Earthq:	Exposure:	Snow:	Climate:	Date: 3/09/2021		
HIGH	3	B	N4 1.0kPa	3			

Call 0800 A1homes 214663
www.A1homes.co.nz

Client Details:
Bryan & Philippa Donnelly

Address:
153 Innes Road
Amberley

Job no: **CH1054**

KH205 Alt.

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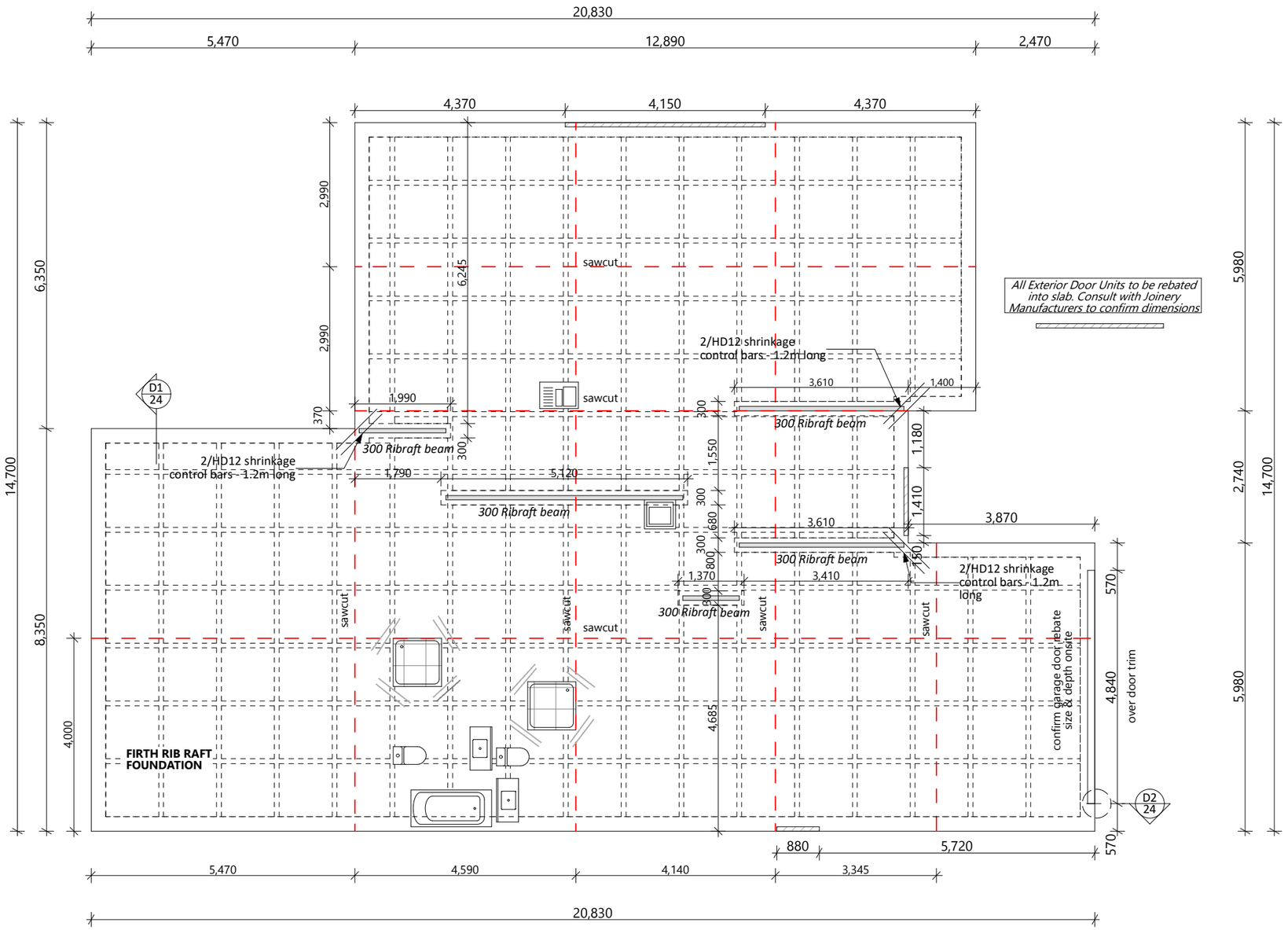
Firth RibRaft Floor System laid in strict accordance with the latest FIRTH specification
Design not requiring specific engineering input for the Firth RibRaft Floor System.

JH Axon Panel cladding (on CLD battens) - Frame to o/hang concrete foundation by 6mm - reduce slab by 6mm to achieve

Note:
TOTAL SLAB THICKNESS TO BE 100MM THICK TO ALLOW FOR POLISH CONCRETE AREAS



All Exterior Door Units to be rebated into slab. Consult with Joinery Manufacturers to confirm dimensions

Cautionary Notes:
Always cross reference the foundation plan with the framing plan prior to setting out

The contractor shall accurately locate the position of all public drains on site prior to starting work, If any discrepancies are found in these drawings then the contractor must contact A1 Homes before proceeding with any further works.

Construction Notes:
• The site requirements of NZS 3604: 2011 are concerned with soil conditions under or adjacent to the building.
If a site does not comply with the definition of good ground, the foundations shall be the subject of specific engineering design (SED) and investigation as appropriate. When using the Firth RibRaft Floor System, good ground may be established using Firth's approved Scala Penetrometer test (refer Ribraft Manual).
• All foundations shall bear upon solid bottom in undisturbed good ground material or upon firm fill for which a certificate of suitability has been issued under NZS 4431
Where good ground is at a depth greater than 0.6 m, the excavation between the good ground and the foundation base may be filled with mass concrete having a minimum strength of 10 MPa at 28 days.
• Granular fill material complying with 7.5.3.2 shall be placed and compacted in layers of 150 mm maximum thickness, over the area beneath the proposed ground slab, so that the total thickness of granular base is not less than 75 mm nor more than 600 mm. Compact each layer until the material is tightly bound together and does not visibly deform under the weight of a pressed adult heel. SED is required if filling is in excess of 600 mm.

7.5.3.2
Granular fill material shall be composed of rounded gravel, crushed rock, scoria or approved material.
(a) Not more than 5 % shall pass through a 2.2 mm sieve with the exception of the conditions in 7.5.3.3;
(b) 100 % shall pass either:
(i) A 19 mm sieve for any fill thickness; or
(ii) A 37.5 mm sieve for a fill thickness exceeding 100 mm.
Where it can be demonstrated that site conditions ensure that capillary water is unlikely to reach the underside of the slab, then the requirements of 7.5.3.2(a) can be waived.

• Min. 5mm - 25mm max. sand blinding to cover hardfill to ensure the vapour barrier is protected from any granular protrusions. Conc. floor to comply with NZS.3109, surface tolerances, & NZS.3114, maximum deviations of 3mm

FIRTH RibRaft® Manual Jan/2020
The bay dimensions formed by either construction or shrinkage control joints shall be limited to a maximum length:width ratio of 1.5:1. Maximum bay dimensions in exposed concrete, vinyl or tiled areas to be 5m x 5m.
Free Joint required in concrete slabs where exceeding 30m for Firth RibRaft

Minimum concrete strength after 28 days shall be:
20 MPa

Steel reinforcing within concrete floors and walls of rooms that contain a bath or shower must be bonded to the earth system as per AS/NZS 3000:2007 Electrical Installations. See clause 5.6.2.5

Confirm layout & fittings of kitchen & bathrooms etc before foundation commences

Note:
- Rebated Sills exterior door units, height and location to be confirmed onsite prior to ordering

Always cross reference the foundation plan with the floor plan prior to setting out. If any discrepancies occur contact: admin@idesignarchitecture.co.nz immediately.

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FOUNDATION PLAN

Scale: 1:100
Rev:
Sheet no: 7

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 22/10/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	B	N4 1.0kPa	3

Call 0800 A1homes 214663
www.A1homes.co.nz

Client Details:
Bryan & Philippa Donnelly

Address:
153 Innes Road
Amberley

Job no: **CH1054**

KH205 Alt.

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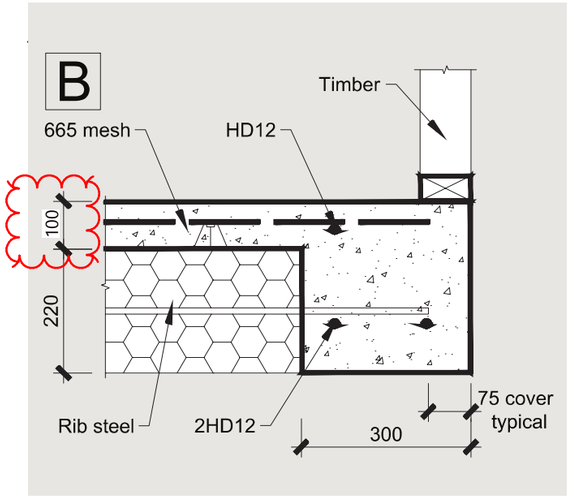
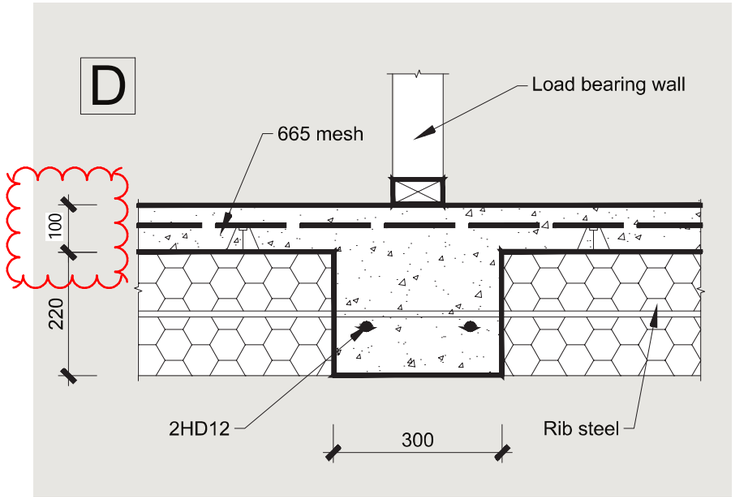
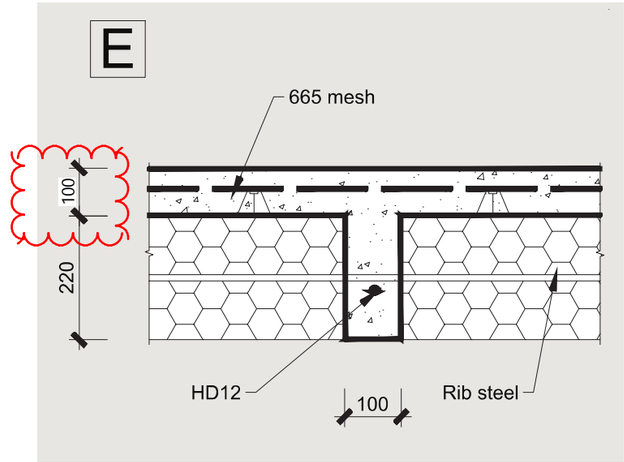


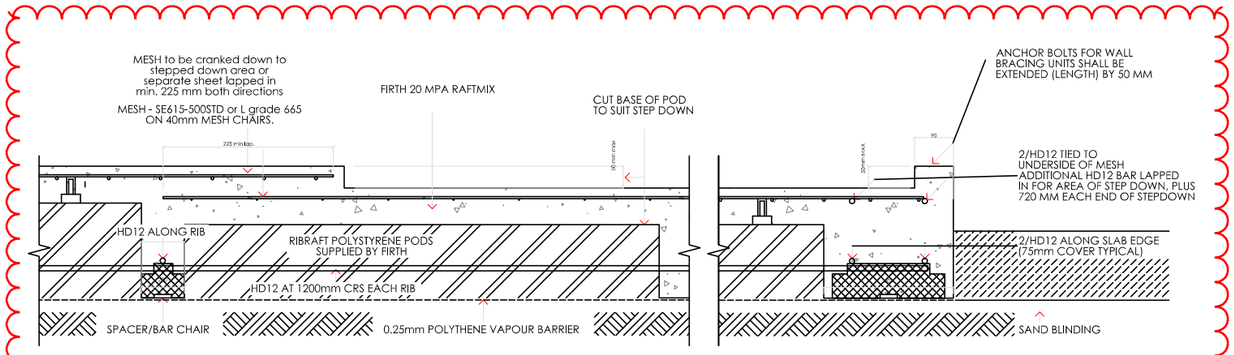
EDGE BEAM DETAIL



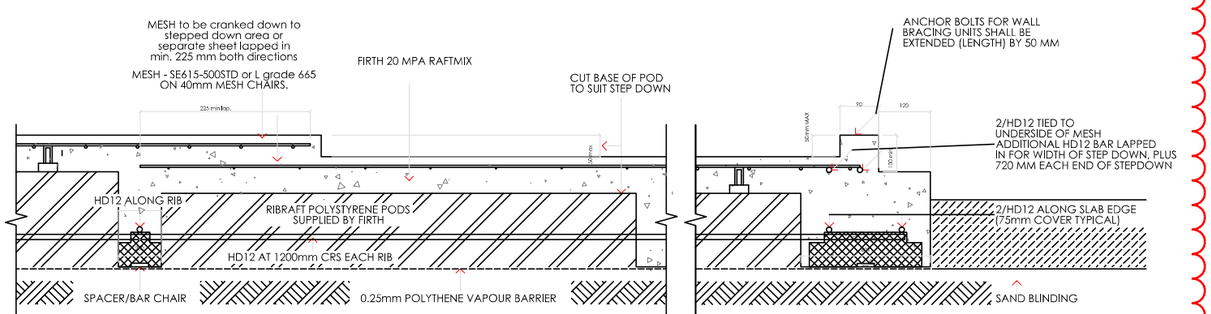
LOAD-BEARING WALL DETAIL



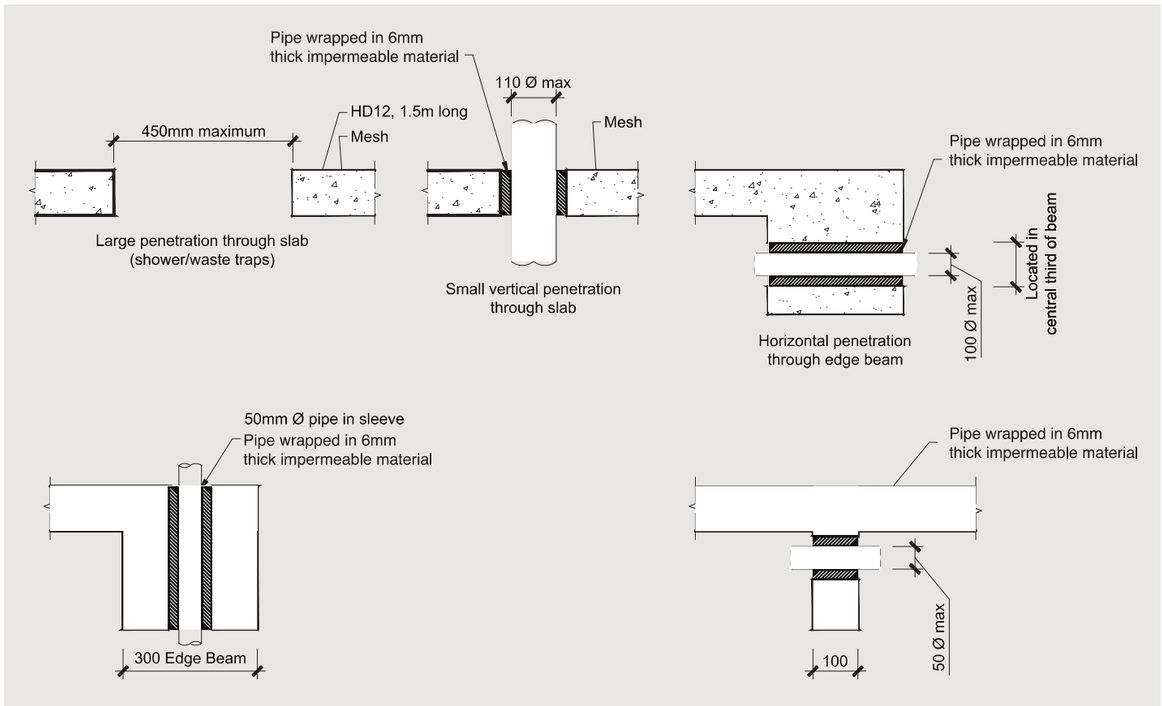
INTERNAL RIB DETAIL



RIB RAFT FLOOR - SET-DOWN DETAIL FOR MAX. 50mm REBATED SHOWER



RIB RAFT FLOOR - SET-DOWN DETAIL FOR MAX. 50mm REBATED SHOWER



PENETRATION DETAILS

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FIRTH RIBRAFT DETAILS

Scale: 1:1 | Sheet no: 8 | Rev:

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 22/10/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	B	N4 1.0kPa	3

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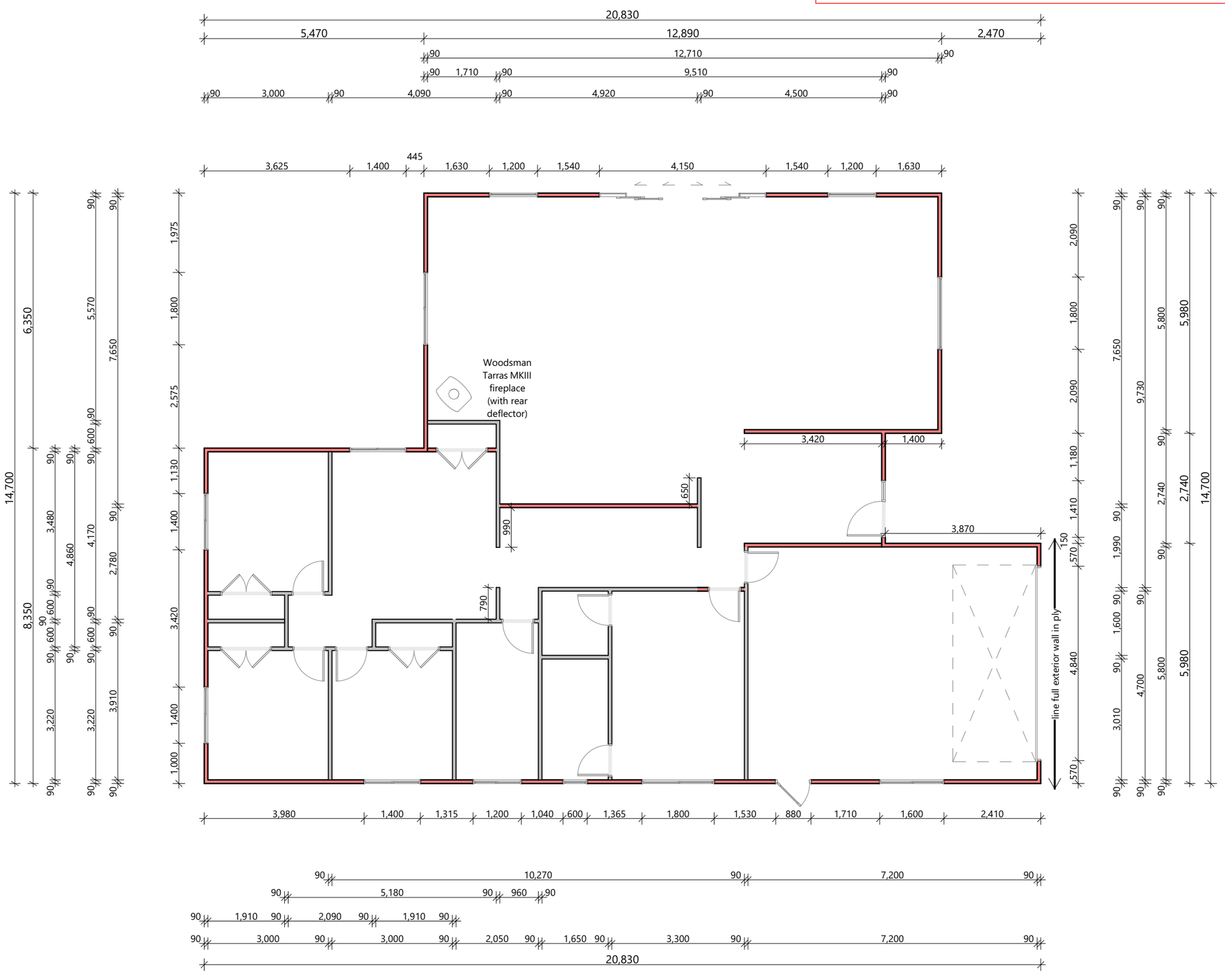

Cautionary Notes:
Always cross reference the foundation plan with the framing plan prior to setting out

Joinery sizes shown are box sizes & are preliminary only.
Site measure and confirm all joinery sizes, reporting to designer any changes, PRIOR to ordering joinery. No liability shall be held by designer for incorrect supply of joinery.

Refer to all written dimensions, DO NOT scale off drawings.

Always cross reference the foundation plan with the floor plan prior to setting out.
In the case of ANY discrepancies, call designer for clarification (07) 578 7345

Note:
2420 stud ht. throughout

James Hardie Axon panel - CLD battens

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FRAMING PLAN

Scale: 1:100 | Sheet no: 9 | Rev:

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	B	N4 1.0kPa	3

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Job no: **CH1054**

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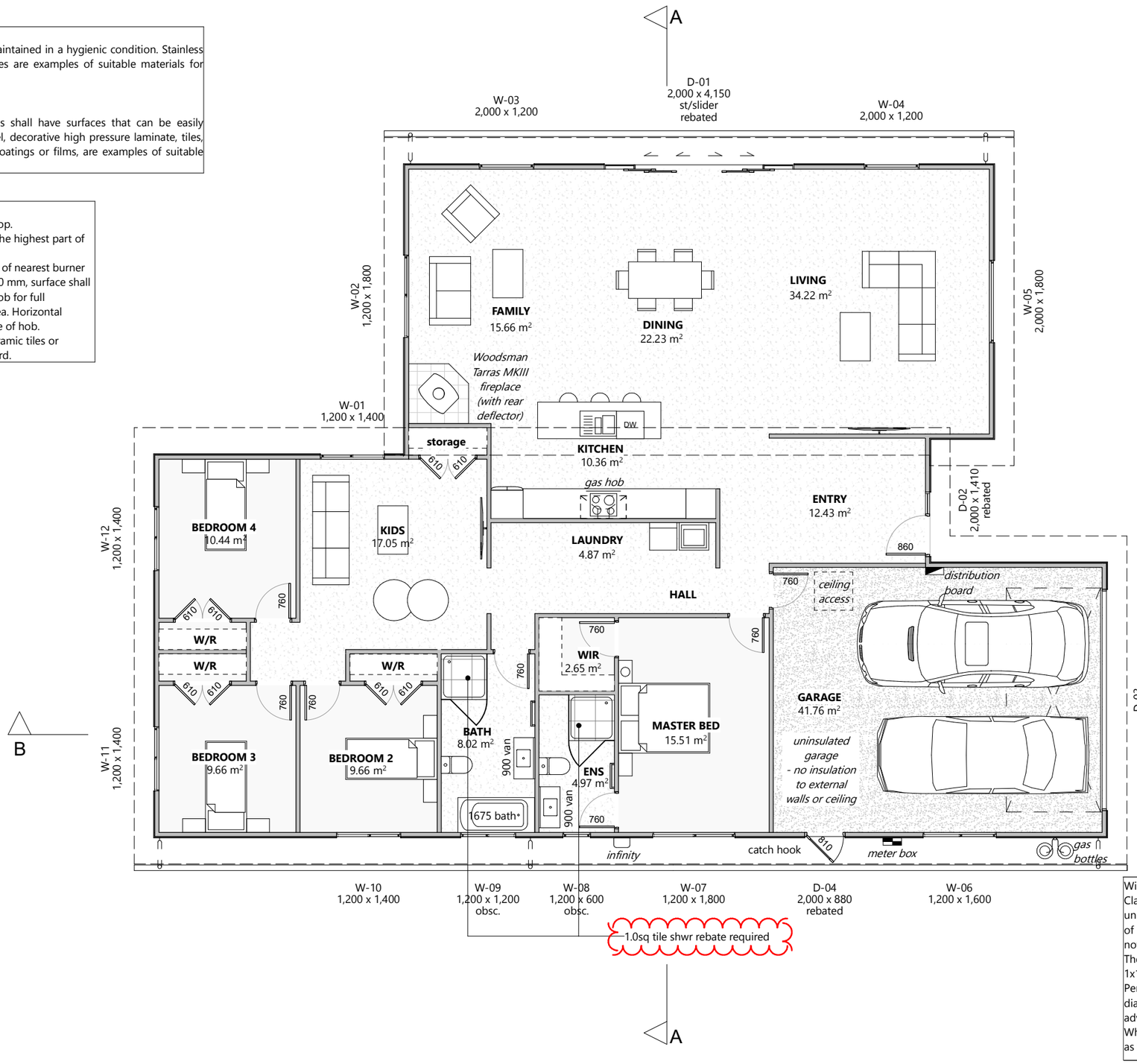
Note:
- Kitchen layout diagramatic and only to be used for drainage reference, refer to kitchen plans for exact design.

G3/AS1
1.1.3 Food preparation surfaces shall be easily maintained in a hygienic condition. Stainless steel, decorative high pressure laminate, and tiles are examples of suitable materials for these surfaces.

1.6 Wall linings
Wall linings adjacent to appliances and facilities shall have surfaces that can be easily maintained in a hygienic condition. Stainless steel, decorative high pressure laminate, tiles, wallboards with painted or applied impervious coatings or films, are examples of suitable materials for these surfaces.

NZS 5601.1:2013 Gas Hob Installation
Cut out for hob: min. 60mm from back of bench top.
Overhead clearances: not less than 600mm from the highest part of hob to range hood
Side clearances: Where dimension from periphery of nearest burner to any vertical combustible surface is less than 200 mm, surface shall be protected to a min. height of 150 mm above hob for full dimension (width or depth) of cooking surface area. Horizontal surface shall be greater than 10 mm below surface of hob.
Protection of combustible surfaces: 5mm thick ceramic tiles or graphic glass is suitable to protect 10mm Gib board.



FLOOR FINISHES:

Carpet
Master Bedroom
Bedroom 2
Bedroom 3
Bedroom 4
W/Rs

Concrete (polished)
Entry
Kitchen
Family
Dining
Living
Laundry
Hall
Kids
Bath
Ens
storage

Concrete (standard)
Garage

FLOOR AREAS:
o/frame area = 246.09 m²

CLADDING KEY:
JH Axon panel

Note:
2420 stud ht. throughout
Exterior doors to have rebated sills

Cautionary Notes:
Always cross reference the foundation plan with the framing plan prior to setting out

Joinery sizes shown are box sizes & are preliminary only.
Site measure and confirm all joinery sizes, reporting to designer any changes, PRIOR to ordering joinery. No liability shall be held by designer for incorrect supply of joinery.

Refer to all written dimensions, DO NOT scale off drawings.

Construction Notes:
Gas hotwater & cooking with vented r/hood.
Ensure gas appliance installation complies to AS/NZS 5601:2013.
Polybutylene water supply pipes.
Hot water supply pipes shall be thermally insulated to comply with H1/AS1 5.0
The delivered hot water temperature at any sanitary fixture used for personal hygiene shall not exceed 55°C

gas bottles: 2/1250high x 375ø bottles to be mounted on conc. base & secured with seismic restraints (chains or fixed brackets) 1000mm from door, drain or air vent, 1500mm from any point of ignition, min 150mm below an opening window.
(gas fitter to confirm)

gas water heater: 300mm from any opening door or window, 75mm from down pipes, 500mm fuse or electric box, 1500mm from gas bottles, 300mm from wall or corner, 1500mm from ground.
(gas fitter to confirm)

Tapered edge joints in ceilings
To reduce the risk of cracks caused by substrate movement, back-blocking of tapered edge joints is required in the following situations.
• When timber battens have been used:
Any area containing 3 or more tapered joints
• When steel battens have been used:
Any area containing 6 or more tapered joints

Please confirm layout & fittings of kitchen & bathrooms etc before foundation commences

Log Burner Fireplace:
Installed strictly to manufacturers specifications
Considerations:
- minimum clearance to walls from appliance
- minimum flue clearance
- minimum flue height
- non-combustable hearth dimensions & distance from front of appliance

Windows to bedrooms 3 and 4 are required to have a minimum STC (Sound Transmission Class) 34 in order to meet the internal noise level. This can be achieved by adouble glazed unit IGU (5mm / 14mm air space / 4mm). No minimum requirements apply to the windows of bedrooms 1 and 2. The window suites / frames are required to match the STC ratings noted above, complete with compressible weather seals.
The roof system will be complete with R3.6 thermal insulation blanket and internal lining of 1x13mm Gib Noiseline or equivalent plasterboard, whereby the STC rating will be above 40. Penetrations for light fittings in the ceiling are required to be restricted to 1x130mm diameter recessed light in the ceiling per 2m2 in order for sound insulation not to be adversely affected. The acoustic criterion requires all penetrations to be acoustically sealed. Where external doors to bedrooms consist of glazing, the glazing shall be rated the same as the windows noted in section 5.2. External doors to be complete with compression seals.

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GROUND FLOOR PLAN

Scale: 1:100
Rev:
Sheet no: **10**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 22/10/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	3	B	N4 1.0kPa	3

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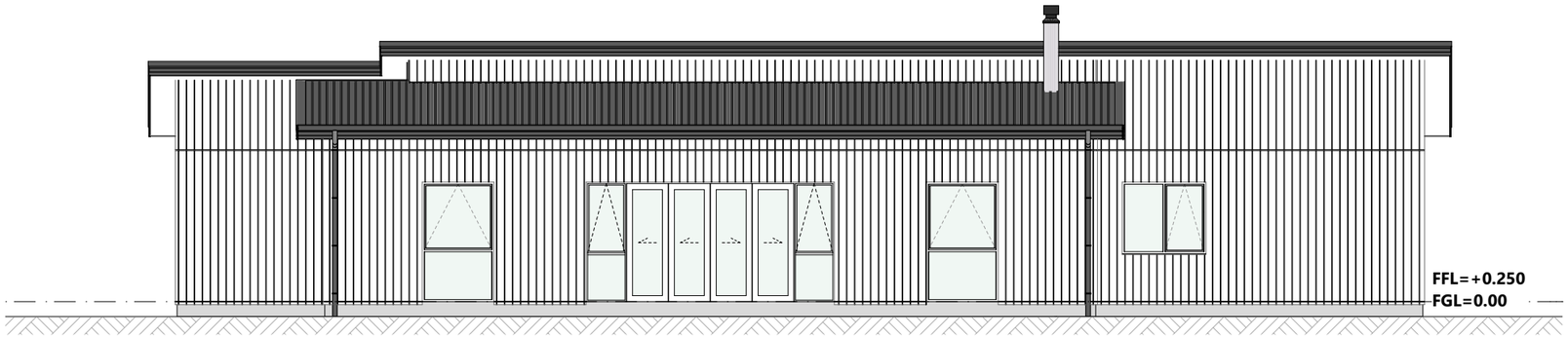
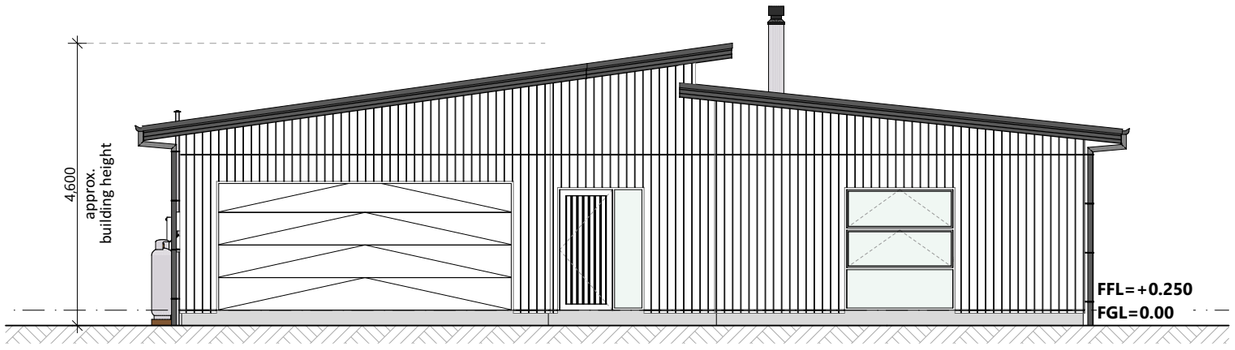


NORTH ELEVATION



EAST ELEVATION

General Notes:

Any encroachments shown are to be confirmed by a registered surveyor prior to commencement of foundations. No liability shall be held by designer with this confirmation.

Cautionary Notes:

BUILDING CONTRACTOR TO ASSESS SITE TO ENSURE DAYLIGHTING & BUILDING RESTRICTIONS ARE COMPLIED WITH.
NO LIABILITY FOR ENCROACHMENT SHALL BE HELD BY DESIGNER IF SITE IS NOT SURVEYED BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF FOUNDATIONS.

Construction Notes:

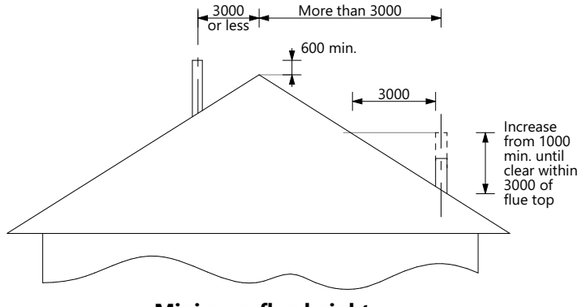
Glazing in accordance with NZS 4223:2008/2016 plus amendments
All glazing low-e clear float except for obscure glass to bathrooms & wc
Double glazing to all window and door joinery excluding garage

Aluminium joinery head heights to be 2.0m
Refer to floor plan for door & window sizes. Joinery schedule & sizes to be confirmed by pre-cut manufacturer & joinery fabricator PRIOR to manufacture by way of communication via e-mail, phone or other.

BUILDING ENVELOPE RISK MATRIX		
ALL ELEVATIONS		
Risk Factor	**Risk Severity**	**Risk Score**
Wind zone (per NZS 3604)	High risk	1
Number of storeys	Low risk	0
Roof/wall intersection design	Very high risk	5
Eaves width	High risk	2
Envelope complexity	Low risk	0
Deck design	Low risk	0
Total Risk Score:		**8**

NZBC D1/AS1 Access Routes:

Concrete (min 150mm below FFL) or H5 timber step to all access points (owners care)
Acceptable Slip Resistance for Walking Surfaces:
• Portland cement concrete
- Broomed (Class 5 or 6) or wood float finish (Class U2)
Concrete surface finishes complying with NZS 3114.
- Coated and sand/grit impregnated
The sand/grit, which is sprinkled over the complete surface of the final paint coating, should be a hard angular material such as silica sand or calcined bauxite. The particle size should not be less than 0.2 mm so that it is not submerged by the coating and not greater than about 2–3 mm so that it remains tightly bound to the surface.
- Exposed aggregate finish
crushed aggregate
• Asphaltic concrete
• Concrete pavers
- Dry press concrete
- Interlocking concrete block paving to NZS 3116.
• Anti-slip tapes
- will normally require regular replacement to remain effective. To ensure foot contact, tapes should be placed at right angles to the line of travel and be spaced at no more than 150 mm centres.



Minimum flue height

Foundation:

Firth Ribraft Foundation

Wall Cladding:

James Hardie Axon Panel - CLD Batten

Roof Cladding:

6 & 8° pitch. NZS Colorsteel Endura Trapezoidal profile

Fascia and Spouting:

Metalcraft 185 Colorsteel fascia
Metalcraft Quadline spouting
Marley PVC 80mmØ round downpipes

Joinery:

APL Residential suite Aluminium joinery

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ELEVATIONS

Scale: 1:100 | Rev: | Sheet no: **11**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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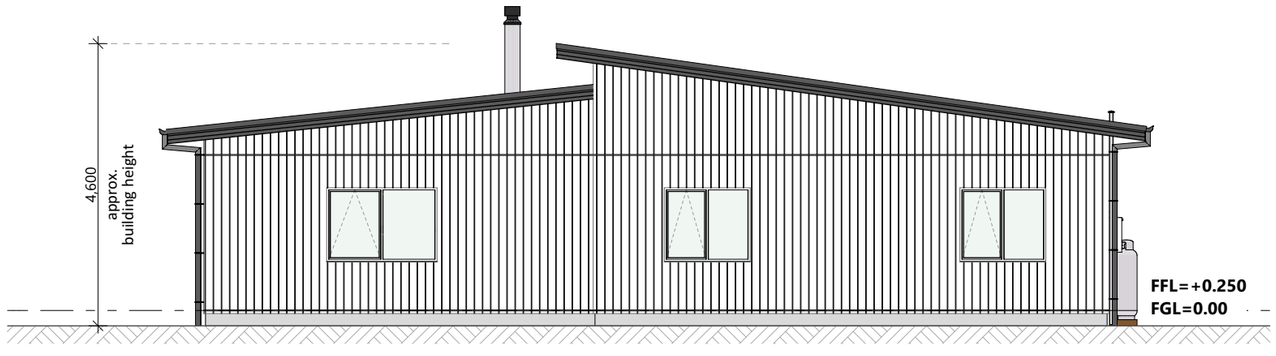
SOUTH ELEVATION



WEST ELEVATION

General Notes:

Any encroachments shown are to be confirmed by a registered surveyor prior to commencement of foundations. No liability shall be held by designer with this confirmation.

Cautionary Notes:

BUILDING CONTRACTOR TO ASSESS SITE TO ENSURE DAYLIGHTING & BUILDING RESTRICTIONS ARE COMPLIED WITH.
NO LIABILITY FOR ENCROACHMENT SHALL BE HELD BY DESIGNER IF SITE IS NOT SURVEYED BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF FOUNDATIONS.

Construction Notes:

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All glazing low-e clear float except for obscure glass to bathrooms & wc
Double glazing to all window and door joinery excluding garage

Aluminium joinery head heights to be 2.0m
Refer to floor plan for door & window sizes. Joinery schedule & sizes to be confirmed by pre-cut manufacturer & joinery fabricator PRIOR to manufacture by way of communication via e-mail, phone or other.

BUILDING ENVELOPE RISK MATRIX		
ALL ELEVATIONS		
Risk Factor	**Risk Severity**	**Risk Score**
Wind zone (per NZS 3604)	High risk	1
Number of storeys	Low risk	0
Roof/wall intersection design	Very high risk	5
Eaves width	High risk	2
Envelope complexity	Low risk	0
Deck design	Low risk	0
Total Risk Score:		**8**

NZBC D1/AS1 Access Routes:

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Acceptable Slip Resistance for Walking Surfaces:
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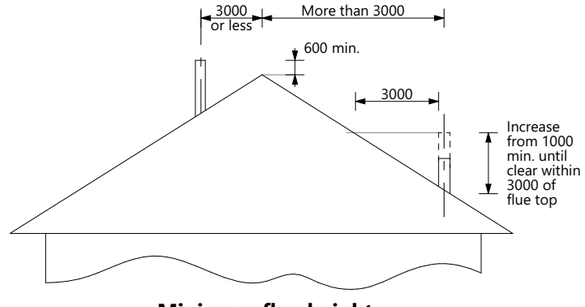
- Broomed (Class 5 or 6) or wood float finish (Class U2)
Concrete surface finishes complying with NZS 3114.
- Coated and sand/grit impregnated
The sand/grit, which is sprinkled over the complete surface of the final paint coating, should be a hard angular material such as silica sand or calcined bauxite. The particle size should not be less than 0.2 mm so that it is not submerged by the coating and not greater than about 2–3 mm so that it remains tightly bound to the surface.
- Exposed aggregate finish
crushed aggregate
• Asphaltic concrete
• Concrete pavers
- Dry press concrete
- Interlocking concrete block paving to NZS 3116.
• Anti-slip tapes
- will normally require regular replacement to remain effective. To ensure foot contact, tapes should be placed at right angles to the line of travel and be spaced at no more than 150 mm centres.



Minimum flue height

Foundation:

Firth Ribraft Foundation

Wall Cladding:

James Hardie Axon Panel - CLD Batten

Roof Cladding:

6 & 8° pitch. NZS Colorsteel Endura Trapezoidal profile

Fascia and Spouting:

Metalcraft 185 Colorsteel fascia
Metalcraft Quadline spouting
Marley PVC 80mmØ round downpipes

Joinery:

APL Residential suite Aluminium joinery

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ELEVATIONS

Scale: 1:100 | Sheet no: **12**
Rev:
Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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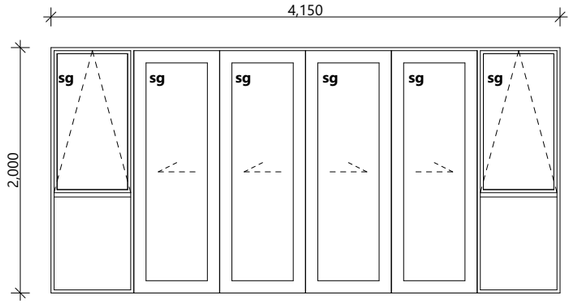
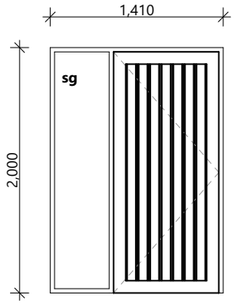


D-01



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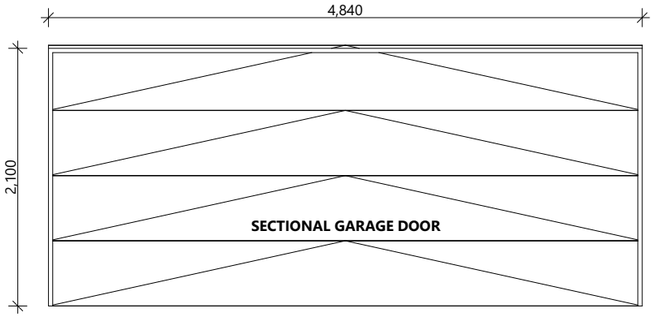

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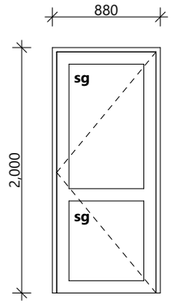

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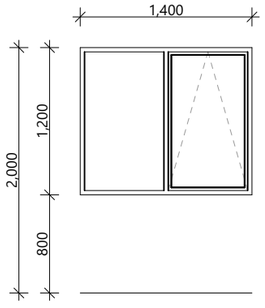

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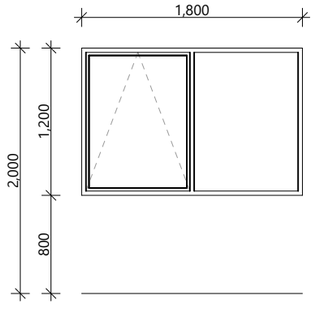

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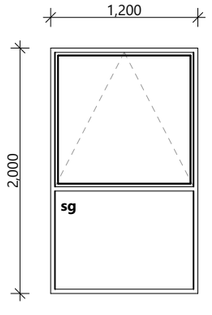

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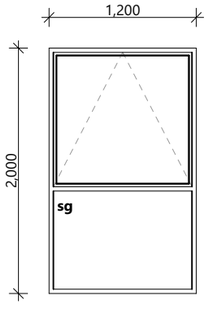

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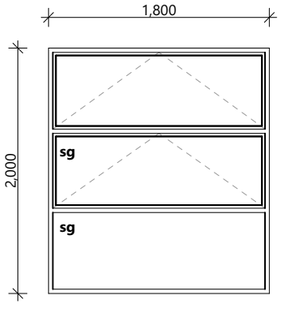

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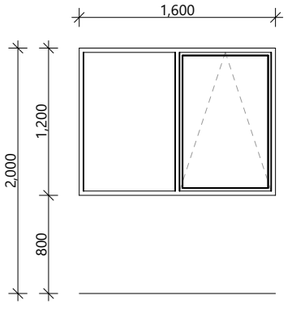

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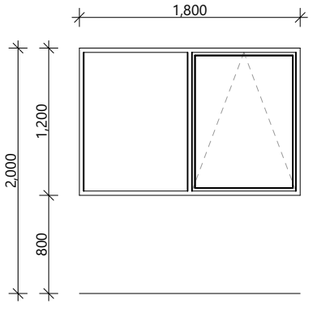

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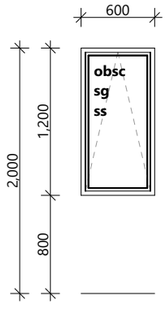

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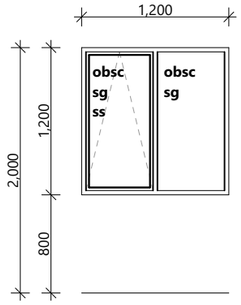

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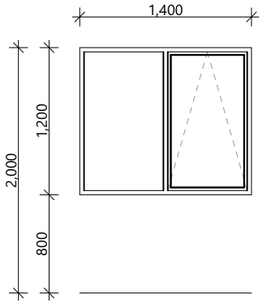

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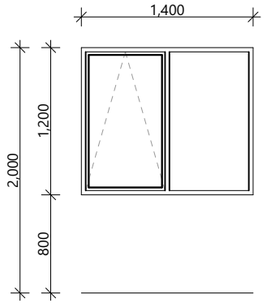

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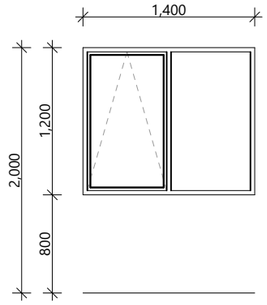

W-12

Safety restrictor stays:
ss = safety stays
- a restrictor fitted to limit the maximum opening so that a 100mmø sphere cannot pass through

Window restrictors are required to the following sized openings where the adjacent Ground Level is 1.0m below FFL or greater;
- openings less than 1.0m wide with sill ht within 760mm of FFL
- openings more than 1.0m wide with sill ht within 1000mm of FFL

Window restrictors are also required to outward opening windows that may protrude into walk paths
- Refer to Site plan for 'walk paths'

sg = safety glass

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JOINERY SCHEDULE

Scale: 1:50
Rev:
Sheet no: **13**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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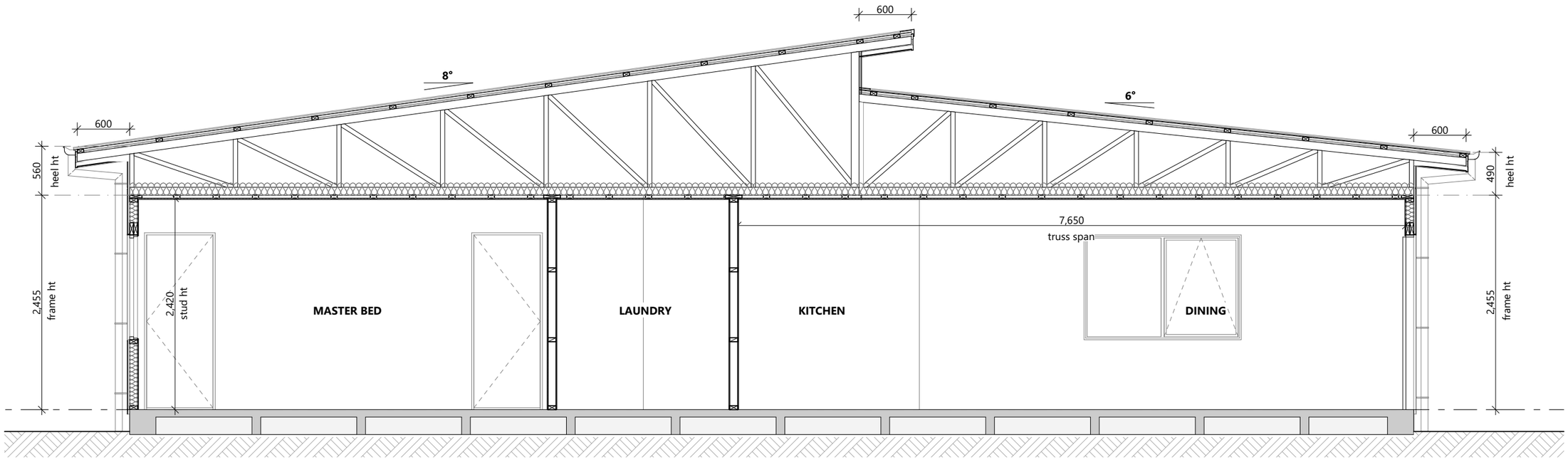

CROSS SECTION - AA
1:50

Table 4 – Allowable moisture content (%)(1) at time of installation or in the case of framing timber at time of enclosure

	Use category level of finish	Air-conditioned or centrally heated buildings	Intermittently heated buildings(2)	Unheated buildings
1	Timber to which linings are attached to achieve a "level of finish" 4 to 5	8 – 18	12 – 18	12 – 18
2	Enclosed framing (including roof trusses) to achieve a "level of finish" 0 to 3	12 – 18	12 – 24	12 – 24
3	Load-bearing lintels and beams	8 – 18	12 – 20	12 – 20
4	Weatherboards, exterior joinery and finishing timbers	14 – 18	14 – 18	14 – 18
5	Flooring exposed to ground atmosphere	10 – 14	12 – 16	14 – 18
6	Interior joinery and finish, furniture, corestock	8 – 12	10 – 14	12 – 16
7	Flooring not exposed to ground atmosphere	8 – 12	10 – 14	12 – 16

NOTE –
(1) Allowable ranges of moisture content are specified on the basis that 90 % of pieces shall be within the specified range, the remainder shall be within a further 2 % moisture content above or below. The moisture content of individual boards shall be normally distributed within the range allowed. In special circumstances, e.g. flooring exposed in rooms with large window area, the upper limits may be reduced.

(2) Buildings periodically heated by open fires, electric heaters, etc., such as most domestic buildings.

Firth RibRaft Floor System laid in strict accordance with the latest FIRTH specification
Design not requiring specific engineering input for the Firth RibRaft Floor System.

Acceptable Solution E2/AS1
10.0 Construction Moisture

10.1 Moisture in materials
Moisture contained in the building structure at completion of construction shall not be permitted to damage the building elements. Construction moisture includes the moisture contained in:
a) Timber products as a result of a treatment or manufacturing process,
b) Green timber, and timber or other materials that have been exposed to the weather, and
c) Concrete, mortar or plaster that is not completely cured.

10.2 Maximum acceptable moisture contents
The maximum moisture contents shall be:
a) For timber framing at the time of installing interior linings, the maximum acceptable moisture content shall be the lesser of:
i) 20% for insulated buildings, 24% for non-insulated buildings, or
ii) as specified in NZS 3602,
b) For timber weatherboards and exterior joinery, 20% at the time of painting,
c) For reconstituted wood products, 18% at all times, and
d) For concrete floors, sufficiently dry to give a relative humidity reading of less than 75%
at the time of laying fixed floor coverings.

- Where nail popping, joint peaking and ridges formed by stud warping and twisting are undesirable on the finished surfaces within 12 months of installation of wall linings, kiln dried timber shall be used, or alternatively the timber framing shall be dried to less than 18 % moisture content before wall linings are installed.

- Where timber framing is installed green or kiln dried timber that is wetted and allowed to dry, those members which are likely to deflect under their own weight shall be propped until they dry below a moisture content of 20 %.

Microclimatic Considerations:
In addition to exposure zones, evidence of local environmental effects (microclimates), and those produced by the erection of a structure or installation of equipment, shall be considered.

Significant acceleration of the corrosion of structural fasteners and fixings beyond what could be expected from the geographical location can occur in the following circumstances:

(a) Industrial contamination & corrosion atmospheres;

(b) Contamination from agricultural chemicals or fertilisers; and

(c) Geothermal hot spots. Hot spots are defined as being within 50m of a bore, mud pool, steam vent, or other souce.

Microclimatic conditions (a) to (c) require specific engineer design.

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CROSS SECTION AA

Scale: 1:50 | Rev: | Sheet no: **14**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Job no: **CH1054**

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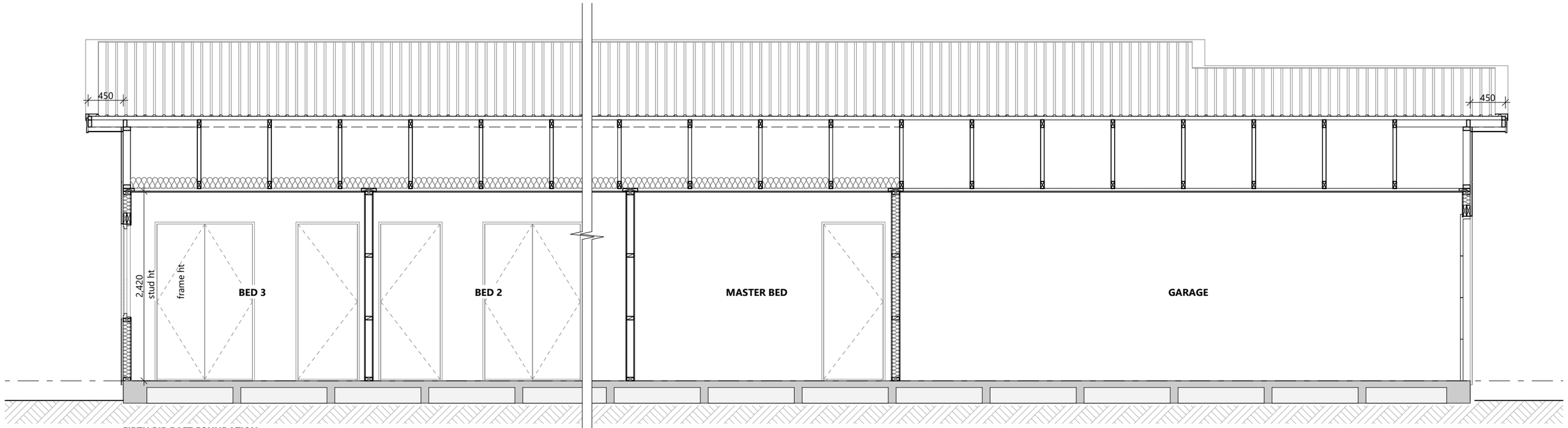

CROSS SECTION - BB
1:50

Note: Exposure Zone B
(exposure environments as defined by NZS 3604 : fig 4.2 & table 4.1)

Fixings & Fastenings (excludes nails and screws):
Nail Plates - In 'closed' & 'roof space' environments = continuously coated galv. steel
Wire Dogs & Bolts - In 'closed' & 'roof space' environments = hot-dip galv. steel
All other structural fixings - In 'closed' environments = mild steel (uncoated, non-galvanized)

All other structural fixings (except fabricated brackets (1))
- In sheltered environments = hot-dip galv. steel
- In exposed environments = type 304 stainless steel

Nails & screws used for framing & cladding:
Non-structural cladding (15 year durability) = galv. steel
Framing in 'closed' areas including roof spaces = mild steel (3)
Framing in 'exposed or sheltered' areas = galv. steel (3)

*1. - "fabricated brackets" shall be made from 5mm (minimum thickness) mild steel and shall be hot-dip galv.
*3. - steel fixings and fastenings in contacts with timber treated with copper-based timber preservatives (H3.2 or higher) shall be minimum of type 304 stainless steel (exposed and Sheltered environments), and hot-dip galv. steel (all other locations)

Minimum concrete strength after 28 days shall be:
20 MPa (Ribraft Foundation)

Fixing Materials: (as per Acceptable Solution E2/AS1) - for definitions refer to E2/AS1
Hidden/Exposed/Sheltered:
Aluminium , or Bronze, or type 304 stainless steel
Nails = galv. steel
Screws = galv. steel, Painted or unpainted to AS 3566: Part 2

* The use of stainless steel fixings is not recommended by steel manufacturers for use with coated steel in severe marine and industrial environments, as they are considered to cause deterioration

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CROSS SECTION BB

Scale:
Rev:
Sheet no: **15**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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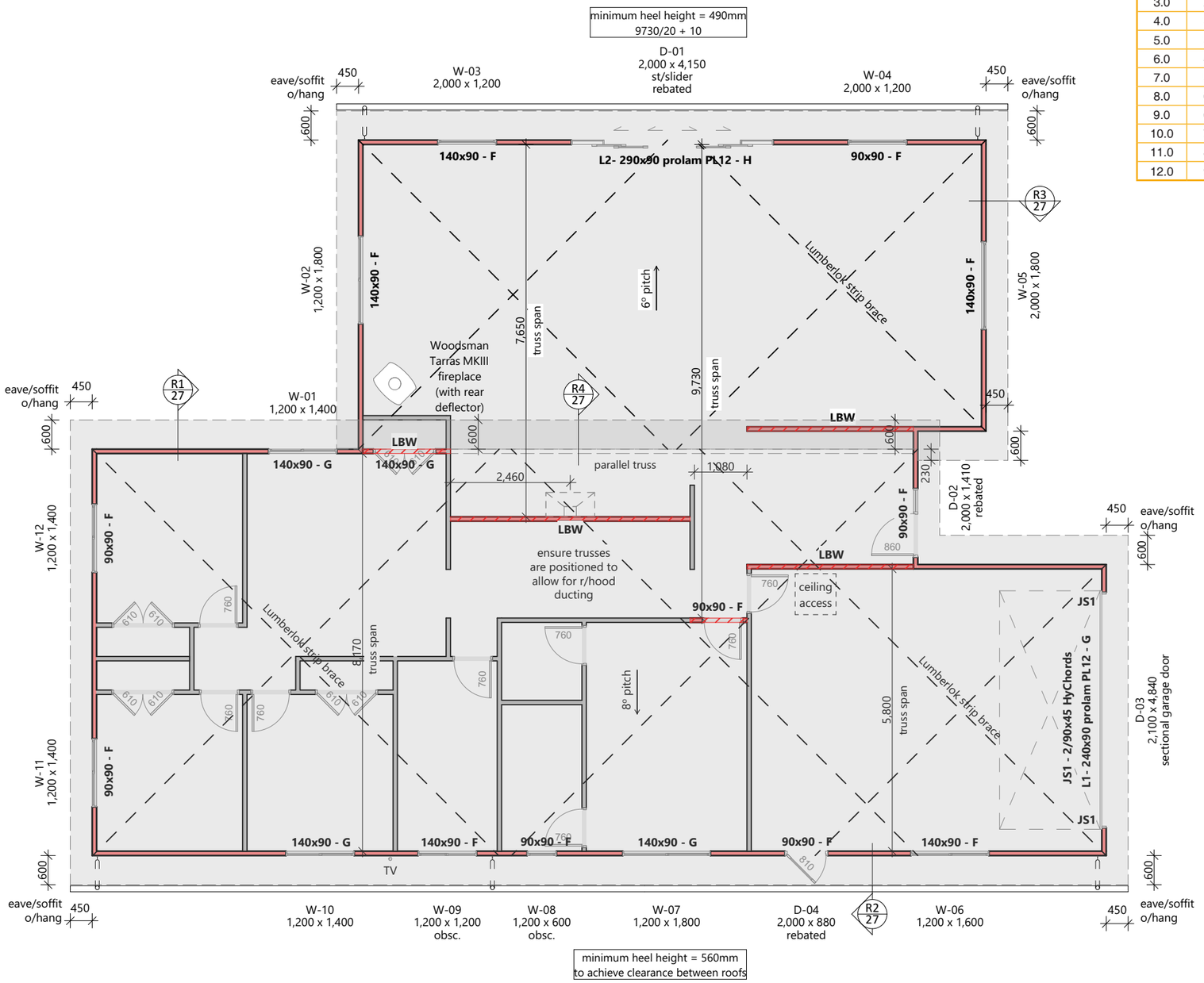


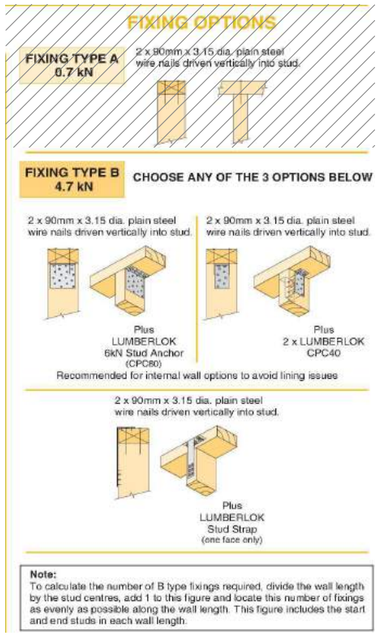
FIXING SELECTION CHART

(Suitable for walls supporting roof members at 600, 900 or 1200mm crs.)
Wind Zones L, M, H, VH, EH, as per NZS 3604:2011

Loaded Dimension (m) Stud Centres			Light Roof Wind Zone					Heavy Roof Wind Zone				
300mm	400mm	600mm	L	M	H	VH	EH	L	M	H	VH	EH
3.0	2.3	1.5	A	A	B	B	B	A	A	B	B	B
4.0	3.0	2.0	A	A	B	B	B	A	A	B	B	B
5.0	3.8	2.5	A	B	B	B	B	A	A	B	B	B
6.0	4.5	3.0	A	B	B	B	B	A	A	B	B	B
7.0	5.3	3.5	A	B	B	B	B	A	A	B	B	B
8.0	6.0	4.0	A	B	B	B	B	A	A	B	B	B
9.0	6.8	4.5	B	B	B	B	B	A	A	B	B	B
10.0	7.5	5.0	B	B	B	B	B	A	A	B	B	B
11.0	8.3	5.5	B	B	B	B	B	A	A	B	B	B
12.0	9.0	6.0	B	B	B	B	B	A	A	B	B	B

Stud to Top Plate Fixings:
- refer to Lumberlok manual

Stud to top plate:
Type B As per Truss Design



Cautionary Notes:
This layout is preliminary. Read in conjunction with final PS1 & pre-cut design & documents. Truss manufacturer to inform designer of any further load bearing footing / slab thickenings (piles or bearer lines) that are required to support roof loads. If a discrepancy occurs contact I Design Architecture immediately on 07 578 7345

Construction Notes:
Ensure that all downpipes are positioned clear of Joinery units

Fixings:
- refer to Lumberlok manual

Lintel Key:
190x90 - G ← Fixing
↑ Size

Trimming Studs:
JS1 = Jamb studs
- refer to CHH Design IT calcs
Refer to following page for trimming stud requirements
All Lintels GREATER than 1.8m span require an additional trimming stud

All Lintels and beams have been specified by the designer in accordance with NZS3604 Tables 8.9-8.13

L1 & L2 have been specified by Placemakers - refer to documentation

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ROOF PLAN

Scale: 1:100 | Sheet no: **16**
Rev:
Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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NZS 3604:2011 8.5.2 Trimming studs
A trimming stud shall be provided to each side of any opening as follows;
• must be the same width as the studs in the wall
• whether single or double, shall not contain holes, notches, checks, or cuts in the middle third of their length.
• Where a doubling stud which provides support for a lintel is shorter by 400 mm or more than the full stud height, its thickness shall not be included as contributing to the thickness of trimming studs from table 8.5

Table 8.5 – Trimming studs (see 8.5.2.1)

Maximum clear width of opening (span of lintel)	Stud thickness required for 600 mm spaced studs	Thickness of trimming studs*
(a) Single storey, top storey or non-loadbearing walls		
(m)	(mm)	(mm)
1.8	35	45
	45	45
	70	90
	90	115
3.0	35	45
	45	70
	70	90
	90	135
3.6	35	70
	45	90
	70	140
	90	180
4.2	35	105
	45	135
	70	210
	90	270
(b) Any other location		
0.9	35	45
	45	70
	70	90
	90	135
1.8	35	70
	45	70
	70	115
	90	135
3.0	35	70
	45	90
	70	140
	90	180

* For brick veneer openings add extra stud for fixing veneer ties.
NOTE – To use this table:
(1) Enter the row corresponding to the lintel span being considered.
(2) From the second column, select the thickness of the studs required for the body of the wall, assuming that they are spaced at 600 mm.
(3) Read the trimming stud thickness from the right side column.

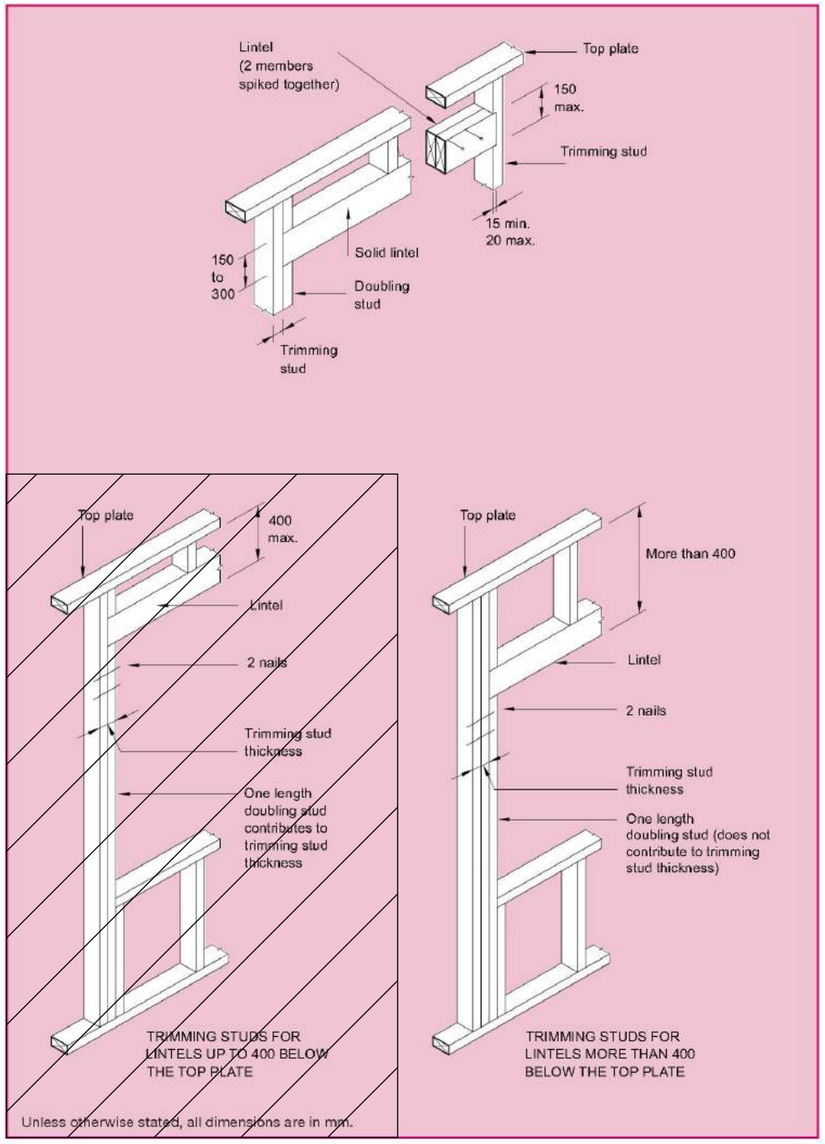

Figure 8.5 – Trimming studs and lintels (see 8.5.2.1)

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TRIMMING STUDS

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Rev:
Sheet no: **17**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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214663
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Client Details:
Bryan & Philippa Donnelly

Address:
153 Innes Road
Amberley

Job no: **CH1054**

KH205 Alt.

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LUMBERLOK®

01/2017

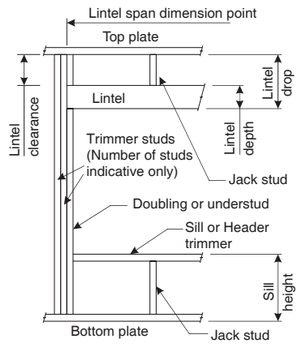
LINTEL FIXING SCHEDULE

ALTERNATIVE TO TABLE 8.14 & FIGURE 8.12
NZS 3604:2011

NOTE:

- ★ All fixings are designed for vertical loads only. Dead loads include the roof weight and standard ceiling weight of 0.20kPa.
- ★ Refer to Table 8.19 NZS 3604:2011 for nailing schedule to resist horizontal loads.
- ★ These fixings assume the correct choice of rafter/truss to top plate connections have been made.
- ★ All fixings assume bottom plate thickness of 45mm maximum. Note: TYLOK options on timber species.
- ★ Wall framing arrangements under girder trusses are not covered in this schedule.
- ★ All timber selections are as per NZS 3604:2011.

DEFINITIONS



Lintel Supporting Girder Trusses

Roof Tributary Area	Light Roof Wind Zone			Heavy Roof Wind Zone		
	L, M, H	VH	EH	L, M, H	VH	EH
8.6m²	G	G	H	G	G	H
11.6m²	G	H	H	G	G	H
12.1m²	G	H	H	G	H	H
15.3m²	H	H	-	G	H	H
19.1m²	H	-	-	G	H	-
20.9m²	H	-	-	H	H	-
21.8m²	H	-	-	H	-	-
34.3m²	-	-	-	H	-	-

NOTES:

1. Roof Tributary Area = approx. 1/2 x (Total roof area on girder and rafter trusses supported by lintel)
2. Assumed girder truss is at mid-span or middle third span of lintel
3. Use similar fixings for both ends of lintel
4. All other cases require specific engineering design

Lintel Span (m)	Loaded Dimension (m) (See Fig. 1.3 NZS 3604:2011)	Light Roof Wind Zone					Heavy Roof Wind Zone				
		L	M	H	VH	EH	L	M	H	VH	EH
1.0	2.0	E	E	E	F	F	E	E	E	E	F
	3.0	E	E	F	F	F	E	E	E	F	F
	4.0	E	F	F	F	G	E	E	F	F	F
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	E	F	F	G	G	E	E	F	F	G
1.2	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	E	F	F	F	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	F	F	G	G	H	E	E	F	G	G
1.5	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	F	F	F	G	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	F	F	G	G	H	E	E	F	G	G
	6.0	F	F	G	H	H	E	E	F	G	H
2.0	2.0	E	F	F	F	G	E	E	F	F	F
	3.0	E	F	F	G	G	E	E	F	F	G
	4.0	F	F	G	G	H	E	E	F	G	G
	5.0	F	F	G	H	H	E	E	F	G	H
	6.0	F	G	G	H	H	E	F	G	H	H
2.4	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	G	H	E	E	F	G	G
	4.0	F	F	G	H	H	E	E	F	G	H
	5.0	F	G	G	H	H	E	F	G	H	H
	6.0	F	G	H	H	-	E	F	G	H	H
3.0	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	H	H	E	E	F	G	H
	4.0	F	G	G	H	H	E	F	G	H	H
	5.0	F	G	H	H	-	E	F	G	H	H
	6.0	F	G	H	-	-	E	F	G	H	-
3.6	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	F	G	H	H	E	F	G	G	H
	4.0	F	G	H	H	-	E	F	G	H	H
	5.0	F	G	H	-	-	E	F	G	H	-
	6.0	G	H	H	-	-	E	F	H	-	-
4.2	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	H	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.5	2.0	F	F	G	H	H	E	E	F	G	H
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	3.4	F	G	H	H	-	E	F	G	H	H
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	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.8	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.2	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
5.1	2.0	F	F	G	H	H	E	F	G	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.5	F	G	H	-	-	E	F	G	H	-
	4.0	G	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-
5.4	2.0	F	F	G	H	H	E	F	G	G	H
	2.8	F	G	H	H	-	E	F	G	H	H
	3.0	F	G	H	-	-	E	F	G	H	-
	4.0	G	H	H	-	-	E	F	H	-	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-

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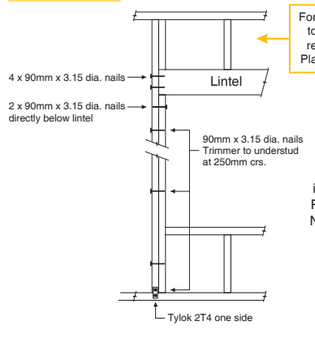
LINTEL FIXING OPTIONS

LUMBERLOK®

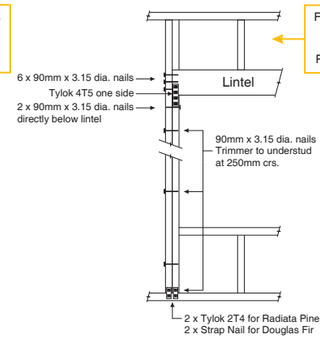
TYPE E 1.4kN



For fixing of jack studs to lintel & top plate, refer to Stud to Top Plate Fixing Schedule

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

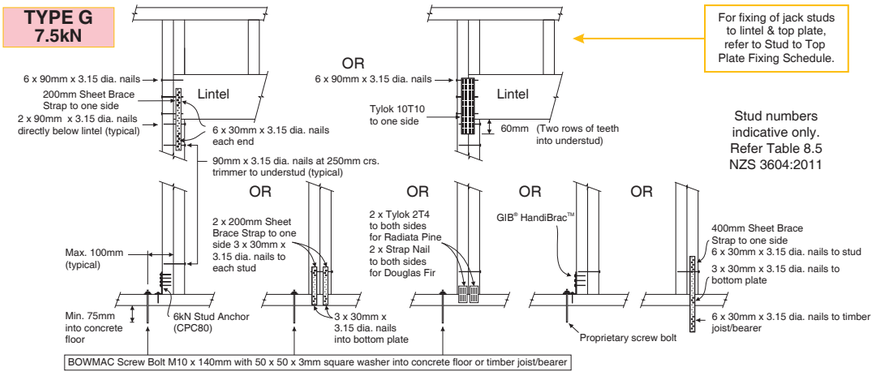
TYPE F 4.0kN



For fixing of jack studs to lintel & top plate, refer to Stud to Top Plate Fixing Schedule

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

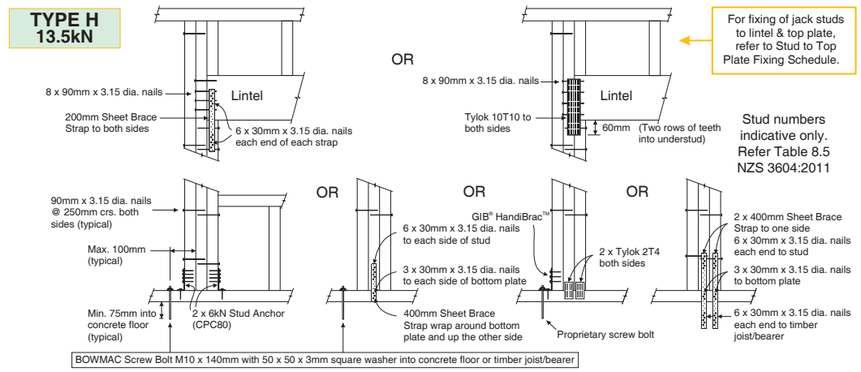
TYPE G 7.5kN



For fixing of jack studs to lintel & top plate, refer to Stud to Top Plate Fixing Schedule.

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE H 13.5kN



MiTek New Zealand Limited

AUCKLAND
PO Box 58-014, Botany 2163
Phone: 09-274 7109
Fax: 09-274 7100

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

www.miteknz.co.nz

MITEK® LUMBERLOK® BOWMAC®

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FIXING CHARTS

Scale:
Rev:
Sheet no: **18**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Bryan & Philippa Donnelly

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Amberley

Job no: **CH1054**

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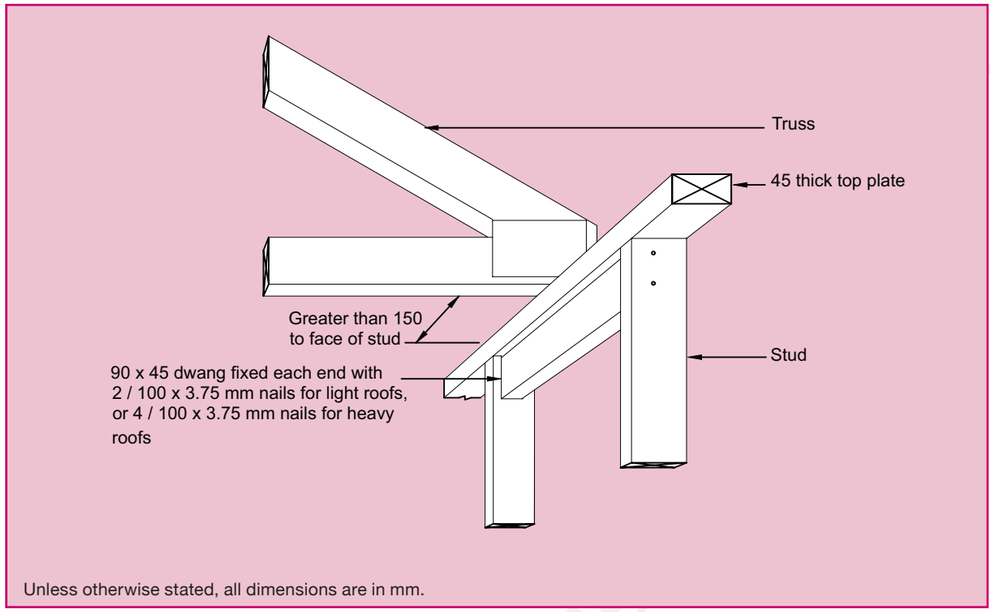
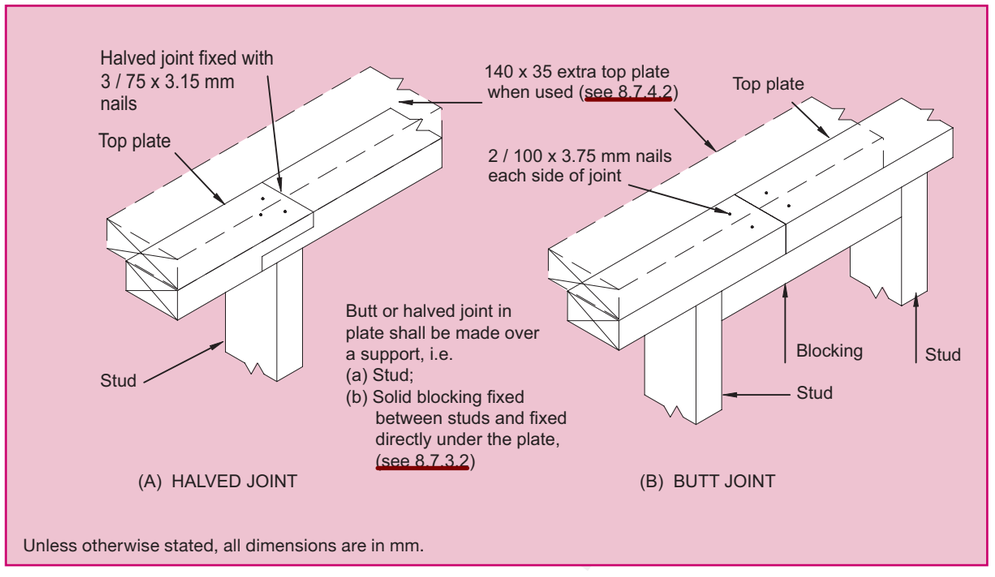


Figure 8.13 – Strengthening top plate (see 8.7.1.1 and table 8.16)



Joints in plates:

Joints in top plates shall be made only over supports being either a stud or blocking.
Joints in the top plate of a wall that does not contain any wall bracing elements (either in line or at wall intersections), shall be halved and nailed at the joints, see figure 8.14 (A), or be butted over blocking and nailed, see figure 8.14 (B), or be provided with an alternative fixing, having a capacity in tension or compression of 3 kN.

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TOP PLATE JOINTING

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Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Job no: **CH1054**

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LUMBERLOK®

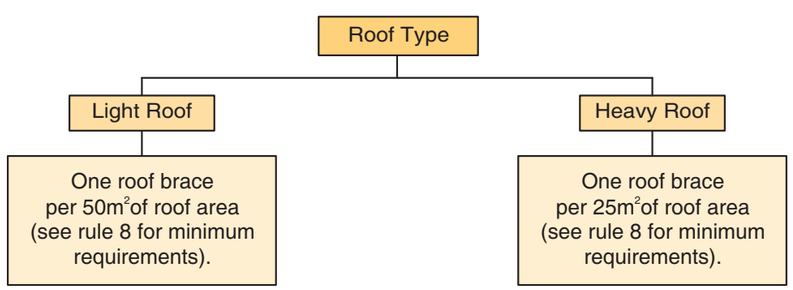
10/2011

ROOF BRACING SPECIFICATION
AS PER NZS 3604:2011

★ Covers roof bracing requirements to resist horizontal loads as set out in NZS 3604:2011 Section 10.

★ A definitive guide to the description and installation of Roof Plane Braces and Roof Space Braces.

Roof Bracing Requirements



Roof Bracing - Rules & Definitions

1. The bracing described in this brochure covers both framed roofs and fully trussed roofs.
2. Roof planes less than 6m² (e.g. dormers & porches) do not require bracing.
3. Roof braces can consist of either i) Roof Plane Brace or ii) Roof Space Brace or combination of the two.
4. Roof braces are not required on roofs where sarking is installed as per NZS 3604:2011 Clause 10.4.4 or where a ceiling diaphragm is installed and is attached to the rafters.
5. Roof area is the actual plan area of the roof and includes overhangs.
6. A hip or valley rafter running continuously from ridge to top plate can be classed as one roof plane brace.
7. A pair of crossed LUMBERLOK Strip Brace (preferred for ease of installation) can be classed as one roof plane brace and shall be installed as detailed in this brochure.
8. There must be at least one roof plane brace in each roof plane. Each ridge line shall have a minimum of two roof braces.
9. Every design effort should be made to distribute the roof braces as evenly as possible over the entire roof area and run alternately in opposite directions.

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Roof Bracing Options

LUMBERLOK®

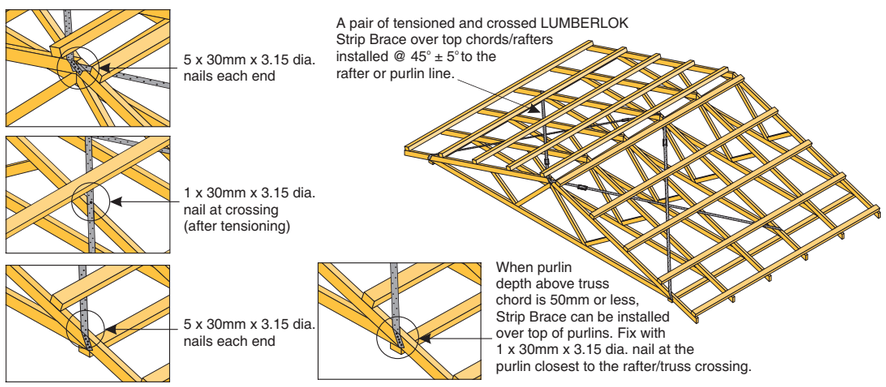
i) ROOF PLANE BRACE

Each roof plane brace can be:

- A hip or valley rafter running continuously from ridge to the top plate in accordance with NZS 3604:2011 Clauses 10.2.1.3.2 or 10.2.1.3.3

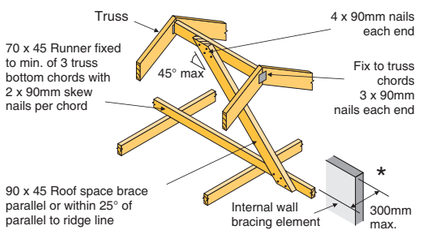
OR

- A pair of tensioned and crossed LUMBERLOK Strip Brace running continuously from ridge to top plate installed as detailed below.

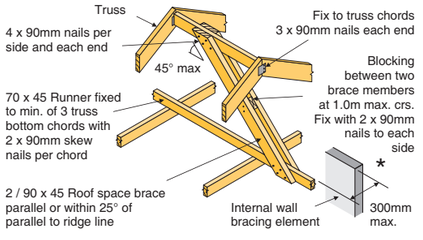


ii) ROOF SPACE BRACE

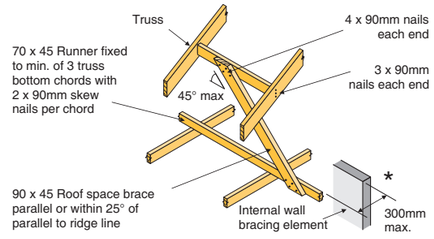
(A) Less than 2m long.



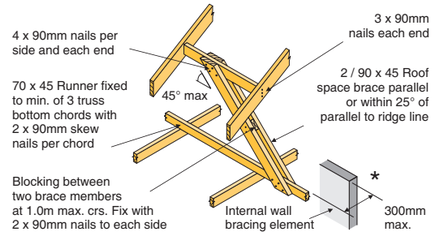
(B) More than 2m long (Max. 4.8m).



(C) Not directly under the ridge - less than 2m long.



(D) Not directly under the ridge - more than 2m long.



* Not required when a ceiling diaphragm complying with Clause 13.5 of NZS 3604:2011 is used.

MiTek New Zealand Limited

AUCKLAND
PO Box 58-014, Botany 2163
Phone: 09-274 7109
Fax: 09-274 7100

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

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ROOF BRACING						Scale:	Sheet no: **20**
						Rev:	
Design: A1	Drawn: GW/CH		Check: AG/UP	LBP: UP		Date: 3/09/2021	
Wind: **HIGH**	Earthq: **3**	Exposure: **B**	Snow: **N4 1.0kPa**	Climate: **3**	**Call 0800 A1homes** 214663 **www.A1homes.co.nz**		

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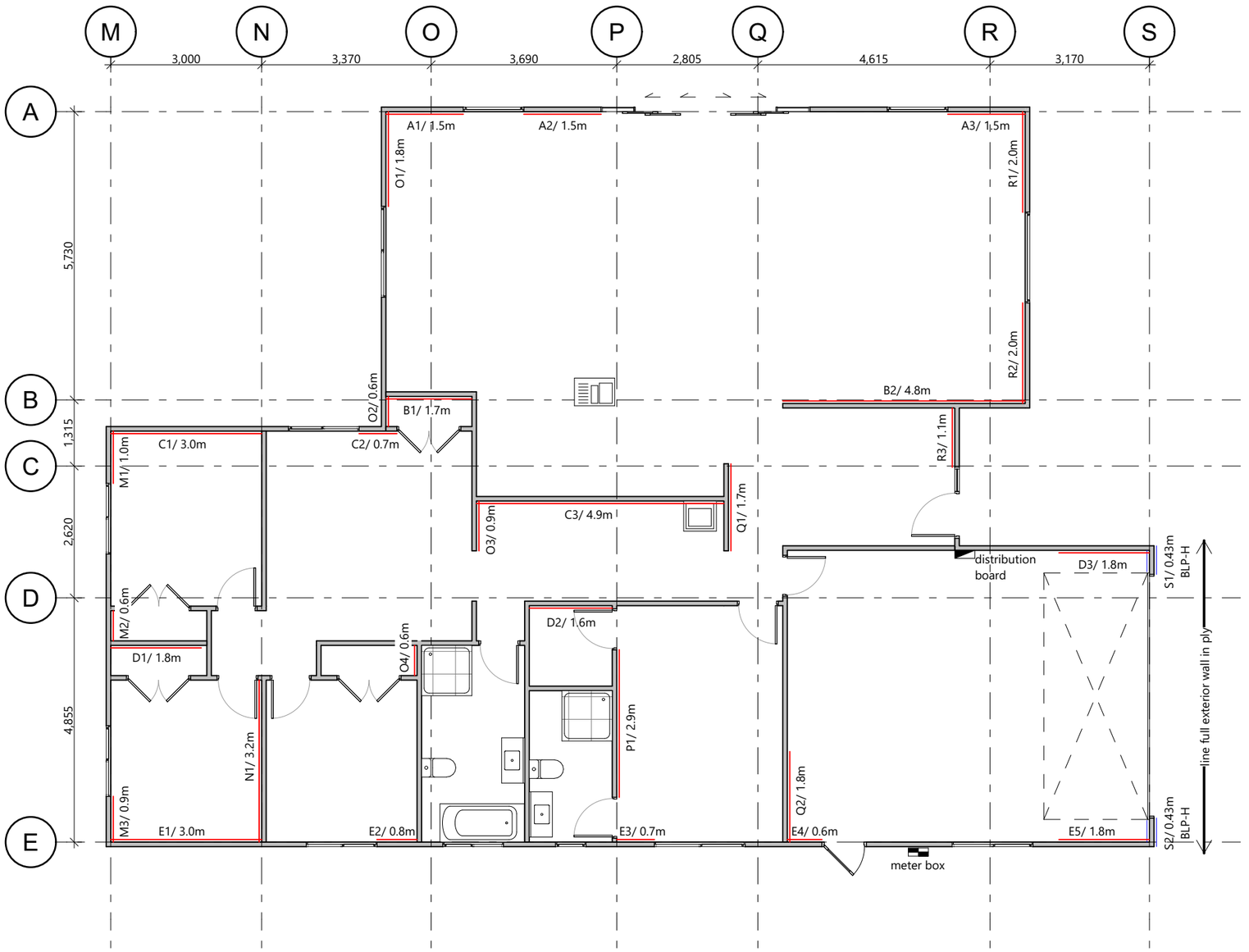
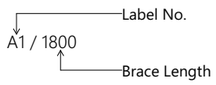
All bracing elements are GS1-N unless otherwise stated



Cautionary Notes:
ALL GIB BRACES FIXED IN ACCORDANCE WITH THE LATEST WINSTONES GIB BRACING MANUAL & GIB SITE GUIDE

Bracing Element Table	
Brace Type	
GS1-N	10mm GIB std plasterboard on one side, min. length 0.4m
BLP-H	10mm GIB BRACELINE on one side Structural Plywood the other, min. length 0.4m + GIB Handibrac hold down ea. end
All braces are GS1-N, unless otherwise stated	



Openings in Bracing Elements
(as per GIB Ezybrace System)
SMALL OPENINGS
Small openings (e.g. power outlets) of 90 x 90mm or less maybe placed no closer than 90mm to the edge of the braced element. A block may need to be provided alongside the perimeter stud as shown below.
LARGE OPENINGS
Openings above 90 x 90mm such as switch boards, recessed cabinets and TV's etc. should be placed outside of the bracing element or locate bracing on the other side of the wall framing.

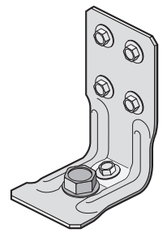
Connecting top plates to external walls:
Each wall that contains one or more wall bracing elements shall be connected at the top plate level, either directly, or through a framing member in the line of the wall, to external walls at right angles to it. - Refer to following page.

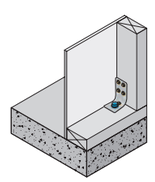
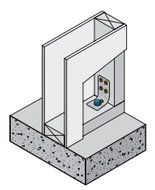
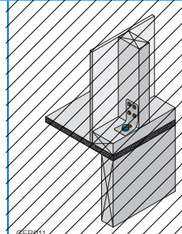
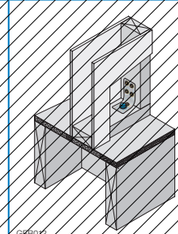
GIB HandiBrac® installation

Developed in conjunction with MiTek™, the GIB HandiBrac® has been designed and tested by Winstone Wallboards for use in GIB EzyBrace® elements that require hold-downs. The GIB HandiBrac® is a substitute for bottom plate hold-down straps.

- Quick and easy to fit.
- May be fitted at any stage before lining.
- Framing face is clear to allow flush lining.
- Easily inspected.

The GIB HandiBrac® with BOWMAC® blue head screw bolt is suitable for timber and concrete floors constructed in accordance with NZS 3604:2011.



Concrete floor		**Timber floor**	
External walls	Internal walls	External walls	Internal walls
 GEB009	 GEB010	 GEB011	 GEB012
Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.	Position GIB HandiBrac® at the stud/plate junction and at mid-width of plate.	Position GIB HandiBrac® flush with the outside stud face, as close as practicable to the centre of the boundary joist.	Position GIB HandiBrac® in the centre of floor joist or full depth solid block.
Hold-down fastener requirements			
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.		12 x 150mm galvanised coach screw or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.	

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BRACING PLAN

Scale: 1:100 | Sheet no: **21** | Rev:

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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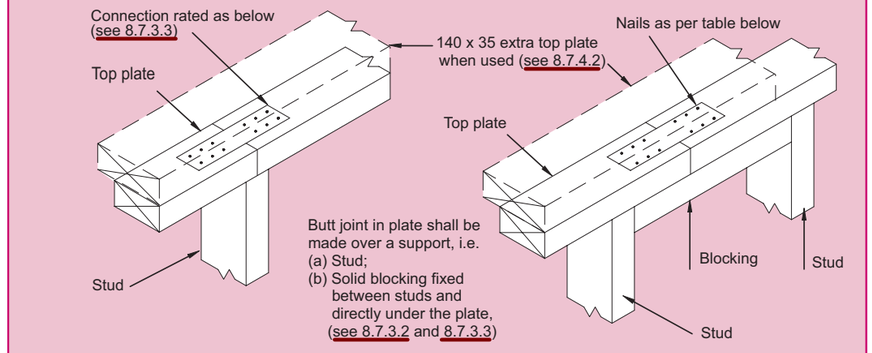
Connecting top plates to external walls:

For single-storey buildings the connection in line of the top plate of a wall that contains one or more wall bracing elements shall be jointed according to the bracing capacity of the highest-rated individual wall bracing elements as follows:
(a) Bracing capacity not exceeding 100 bracing units: A 3 kN connection as shown in figure 8.15;
(b) Bracing capacity exceeding 100 bracing units: A 6 kN connection as shown in figure 8.15.
(c) Wall top plates to which ceiling diaphragms are attached:
A 6 kN connection as shown in figure 8.15

Each wall that contains one or more wall bracing elements shall be connected at the top plate level, either directly, or through a framing member in the line of the wall, to external walls at right angles to it. Top plate fixing(s) of the capacity in tension or compression along the line of the wall bracing element are given as follows:
(a) For each wall containing wall bracing elements with a total bracing capacity of not more than 125 bracing units: to at least one such external wall by a fixing as shown in figure 8.16 of 6 kN capacity;
(b) For each wall containing wall bracing elements with a total bracing capacity of not more than 250 bracing units: to at least 2 external walls by fixings as shown in figure 8.16 each of 6 kN capacity;
(c) For each wall containing wall bracing elements with a total bracing capacity of more than 250 bracing units: to at least 2 external walls by fixings as shown in figure 8.16 each having a rating of not less than 2.4 kN per 100 bracing units.



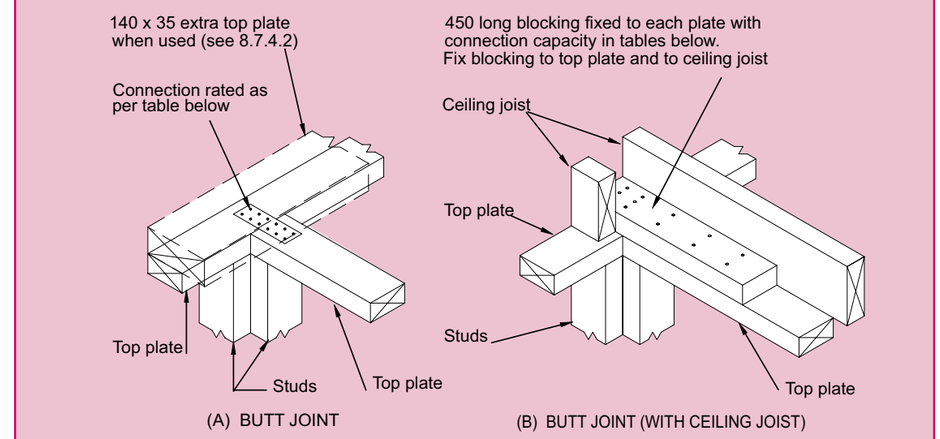
Capacities of metal plate joints(2)	
Up to 3 kN Up to 6 kN	3 / 30 x 3.15 mm nails per side 6 / 30 x 3.15 mm nails per side

Capacities of nailed joints(2)	
Up to 3 kN Up to 6 kN	3 / 100 x 3.75 mm nails per side 6 / 100 x 3.75 mm nails per side

NOTE –
(1) See section 4 for durability requirements.
(2) Not required when extra top plate is used.

Unless otherwise stated, all dimensions are in mm.

Figure 8.15 – Connecting top plates in line – Walls containing bracing (see 8.7.3.3)



Capacities of metal plate joints	
Up to 3 kN Up to 6 kN	3 / 30 x 3.15 mm nails per side 6 / 30 x 3.15 mm nails per side

Capacities of nailed joints	
Up to 3 kN Up to 6 kN	3 / 100 x 3.75 mm nails per side 6 / 100 x 3.75 mm nails per side

NOTE – See section 4 for durability requirements.

Unless otherwise stated, all dimensions are in mm.

Figure 8.16 – Connecting top plates to external walls at right angles – Walls containing bracing (see 8.7.3.4)

LUMBERLOK®

TOP PLATE JOINTING

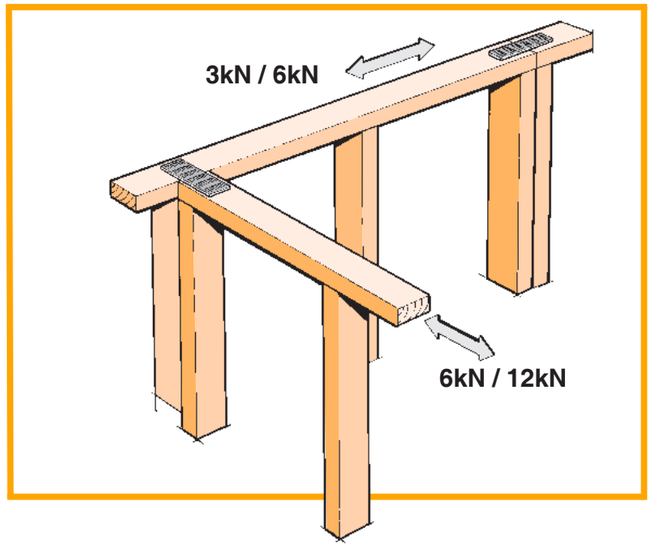
AS PER CLAUSE 8.7.3 NZS 3604:2011

Top Plates at Right Angles

Connection capacity	LUMBERLOK Connector
6kN	Tylok 6T10 **OR** PLATE-LOK
12kN	2 x Sheet Brace Straps fixed with 6 x LUMBERLOK Product Nails 30mm x 3.15 dia. per end per strap (24 nails total)

Top Plates in Line

Connection capacity	LUMBERLOK Connector
3kN	Tylok 6T5 **OR** Strap Nail
6kN	Tylok 6T10 **OR** PLATE-LOK



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TOP PLATE CONNECTIONS

Scale:
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Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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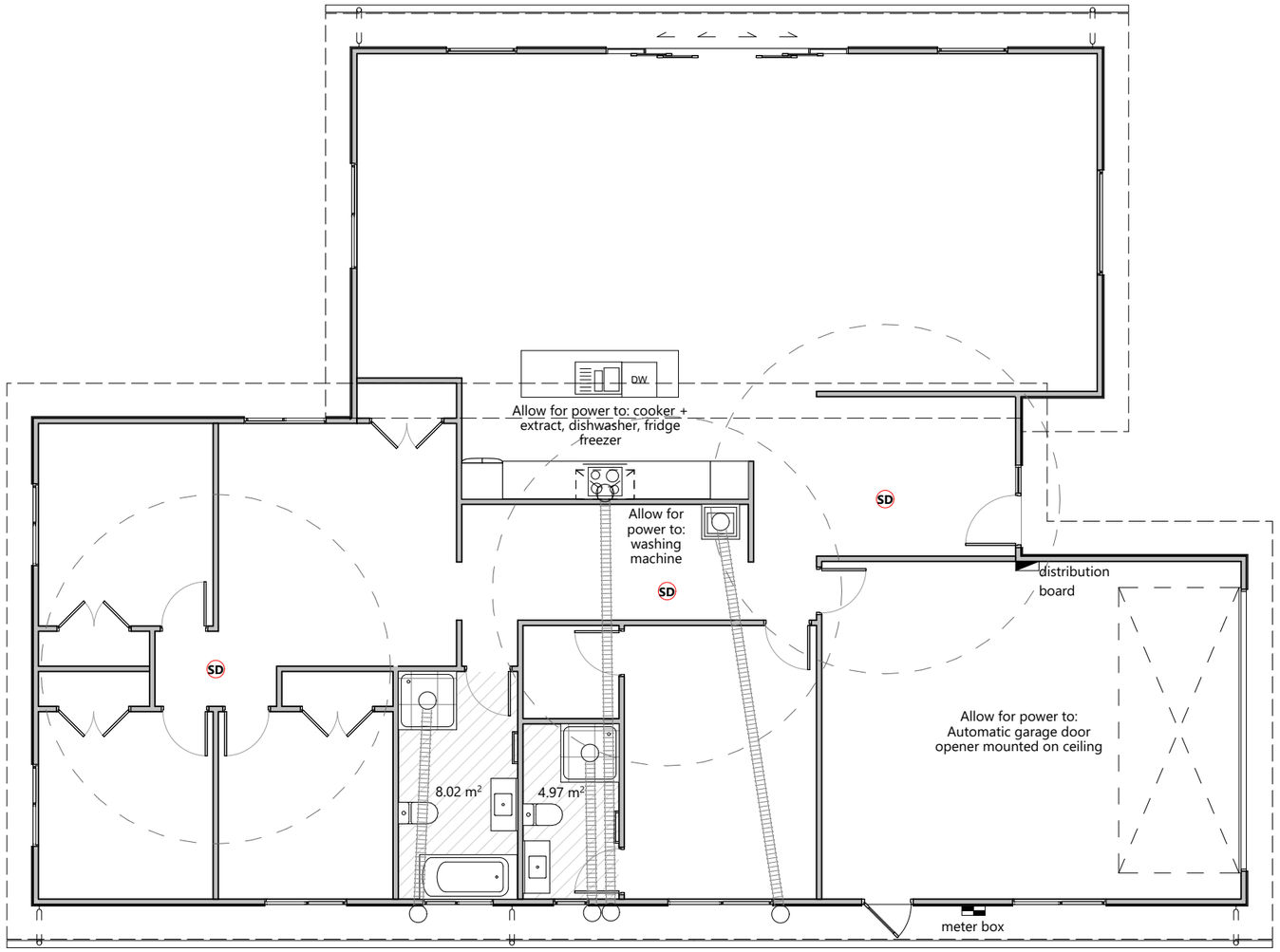


BATH & ENSUITE
Extractor fan system vented out through wall to manufacturers specifications

Rangehood extract vented out through wall to manufacturers specifications

Notes:
All electrical work & items to comply with;
NZBC F7/AS1, AS/NZS 3000, AS/NZS 3008,
AS 3786, AS/NZS 5000.2: 2006

SD - Approved smoke detectors required within 3.0m of any sleeping space
- first alert/Orca or similar. smoke alarms to have both a test & hush button

SD Position of Smoke detectors:
- Not less than 200mm from a wall
- Idealy in the centre of ceiling where possible (hallways)

Down lights to be CA 80 or CA 135 Rated (max 1 per 5m²).

Ventilation system to vent ducts & r/hood to wall outlet
Ventilation system to have mechanical exhaust rates in accordance with NZBC G4/AS1

Ventilation of Sanitary rooms
Percentage of ventilated opening to be minimum 5% of room floor area

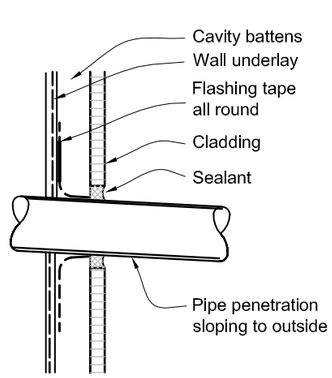
Room	Floor Area	Window Opening	Percentage
Bath	8.02m²	1200x600 = 0.72m²	9.0%
Ensuite	4.97m²	1200x600 = 0.72m²	14.5%

Lighting & Electrical
NZBC: Clause G8 Artifical Light
Requirement applys to: All access routes
Spaces within buildings used by people, shall be provided with adequate artificial lighting which, when activated in the absence of sufficient natural light
•Illuminance at floor level shall be no less than 20 lux. will allow safe movement

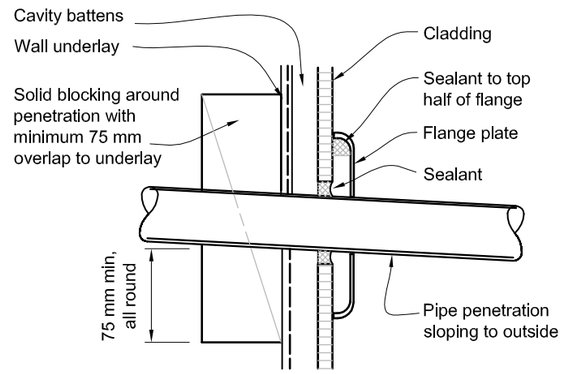
Mechanical Ventilation Calc:
Laundry: 4.92 x 0.99 x 2.42 = 11.79m³
Recommended air changes for a laundry: 10 - 30
30 x 11.79 = 353.62m³/hr
add 20% = 424.34 / 3.6 = 117.87l/s

Typical Pipe Penetration

Figure 68: General pipe penetration
Paragraph 9.1.9.3, Figure 126



(a) **CAVITY WITH FLASHING TAPE**



(b) **CAVITY WITH FLANGE PLATE**

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ELECTRICAL PLAN

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Rev:
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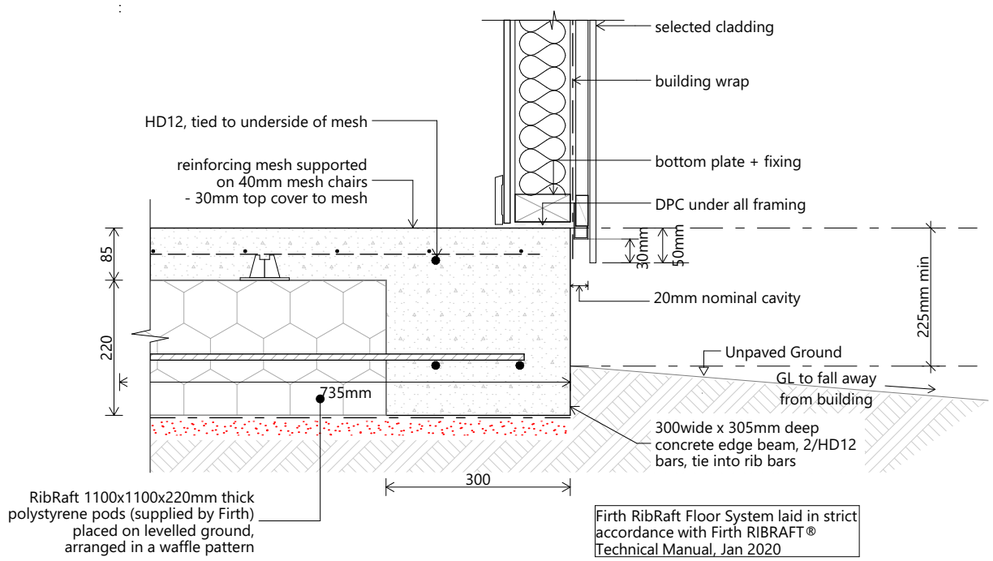
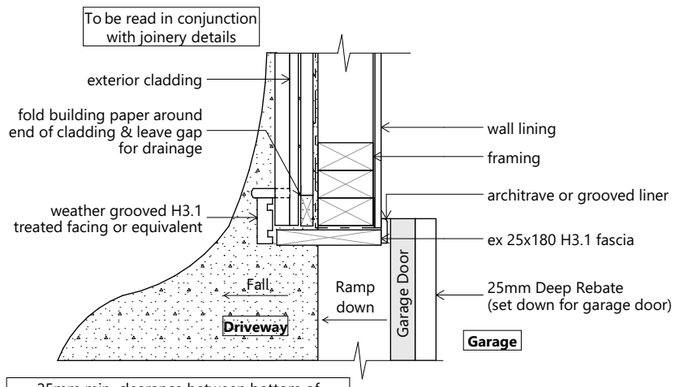
Firth RibRaft Floor System laid in strict accordance with the latest FIRTH specification
Design not requiring specific engineering input for the Firth RibRaft Floor System.

:



D1 FOUNDATION EDGE



D2 GARAGE DOOR REBATE

Ramset™
BOTTOM PLATE FIXING SOLUTIONS 2013

| Meets NZS 3604:2011 Requirements| 90 x 45 Bottom Plate |

Bottom Plate Durability

Fixing Requirements				Installation		
Bottom Plate Location	Bottom Plate Fixing Requirement	Concrete Strength (min.)	Floor Edge Type	Max Spacing	Fastener	Min Edge Distance (FROM OUTERFACE)
External Wall	NZS3604:2011	17.5 MPa	Concrete	900 mm	12120BPAG*1 OR T12140GH*1	55 mm
			Masonry Block	600 mm		
	Proprietary Bracing Systems (15 kN)	17.5 MPa	Concrete	900 mm	AS12150GH + RPBA	
			Masonry Block	600 mm		
Internal Wall	NZS3604:2011	17.5 MPa	N/A	900 mm	12120BPAG*1 OR T12140GH*1	N/A
				600 mm	8x75 Drive Pin & Washer	N/A
	Proprietary Bracing Systems (15 kN)	17.5 MPa	N/A	900 mm	12120BPAG*1 + RPBA OR T12140GH*1 + RPBA	N/A

Figure 65: Levels and garage openings
Paragraphs 9.1.3, 9.1.3.4, 9.2.5, Table 18

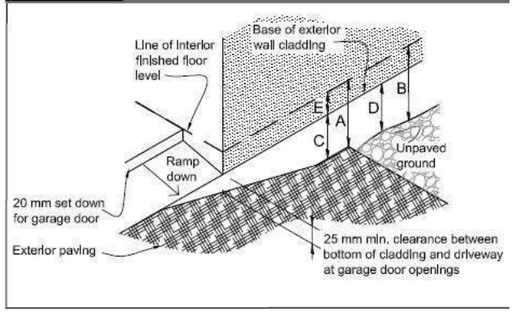


Table 18: Minimum clearances
Paragraphs 9.1.3, 9.1.3.1, 9.1.3.2, 9.1.3.3, 9.1.3.4, 9.1.3.5 and 9.2.7

Minimum clearances (mm)	Masonry veneer		Other claddings				
	A	B	A	B	C	D	E
Concrete slab	100	150	150	225	100	175	50
Timber floor Refer Note 1)					100	175	502)

NOTE: 1) Refer to NZS 3604 for requirements.
2) Cladding to extend minimum 50 mm below bearer or lowest part of timber floor framing.

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FOUNDATION DETAILS

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HIGH	3	B	N4 1.0kPa	3

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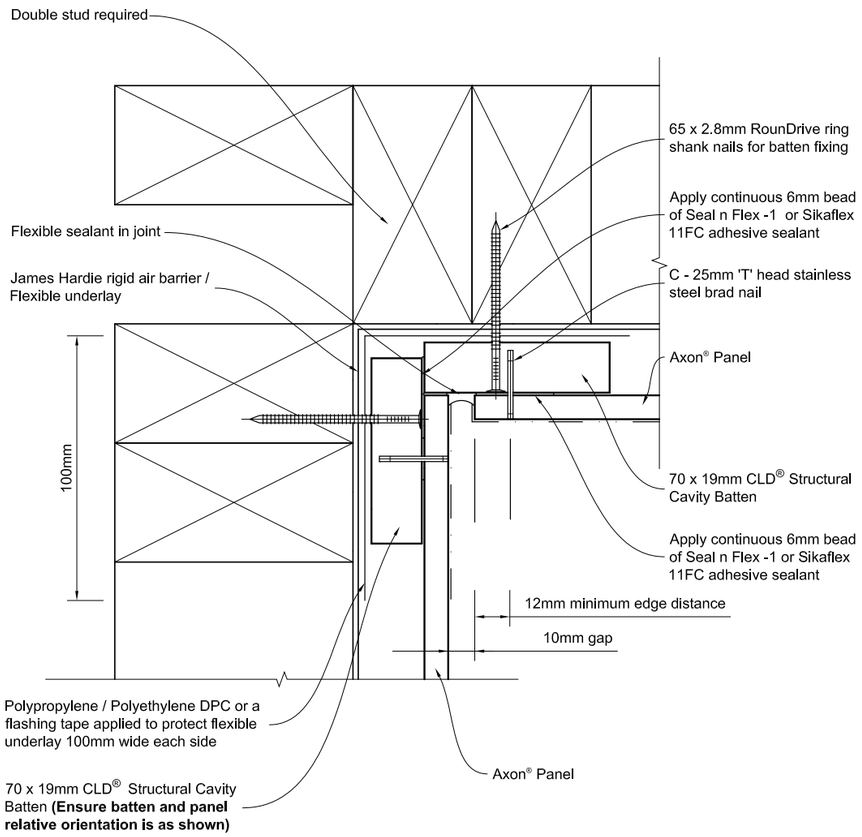
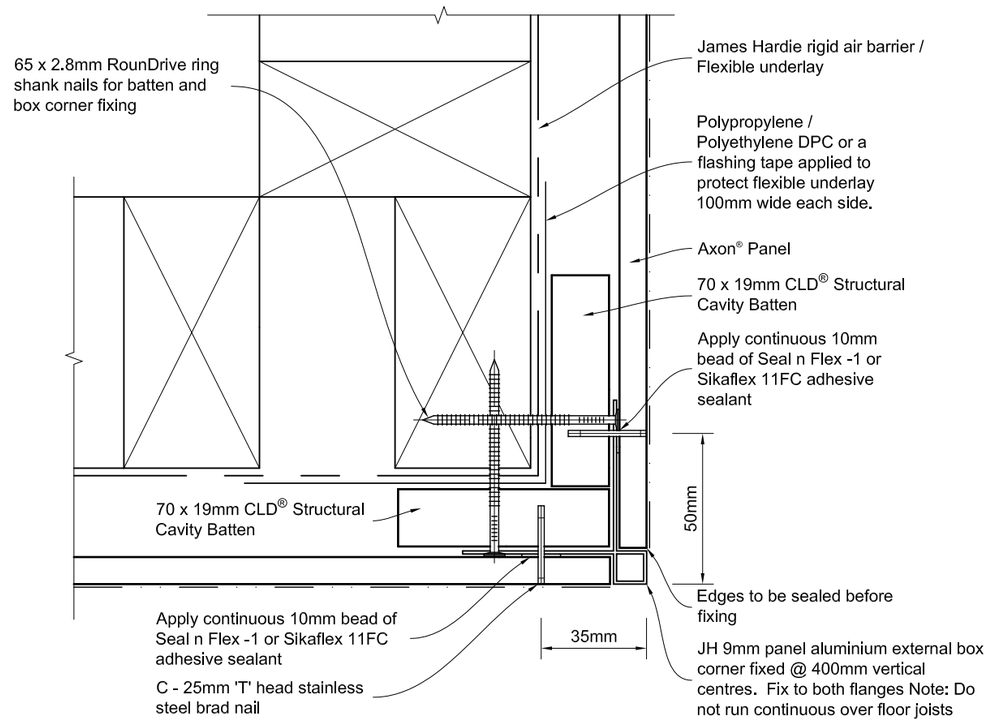
AXON - CLD BATTEN INTERNAL CORNER



AXON - CLD BATTEN EXTERNAL CORNER



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CLADDING DETAILS

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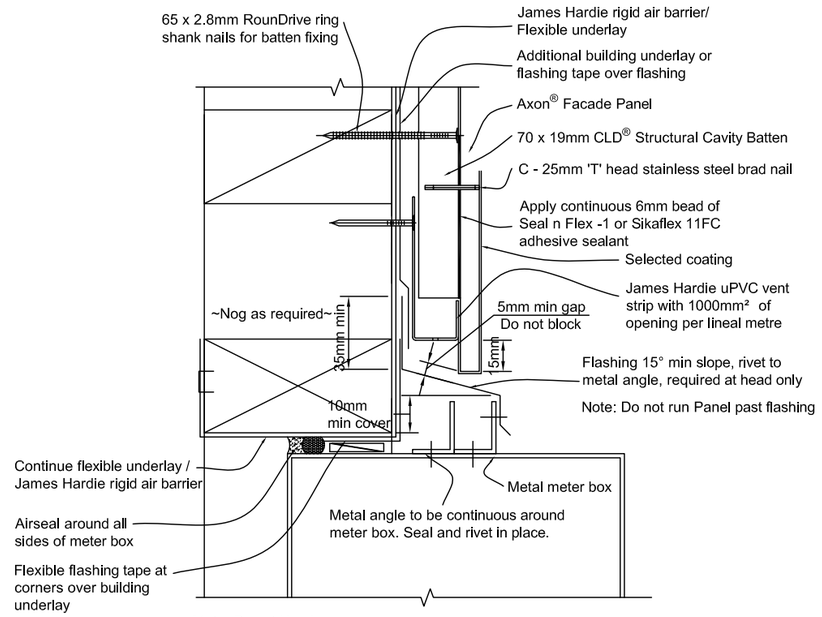
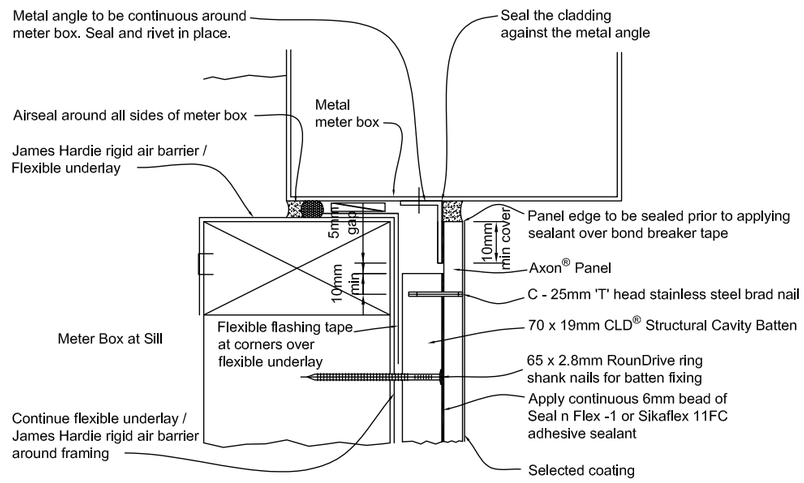
AXON -CLD BATTEN METER BOX HEAD



Meter Box at Head

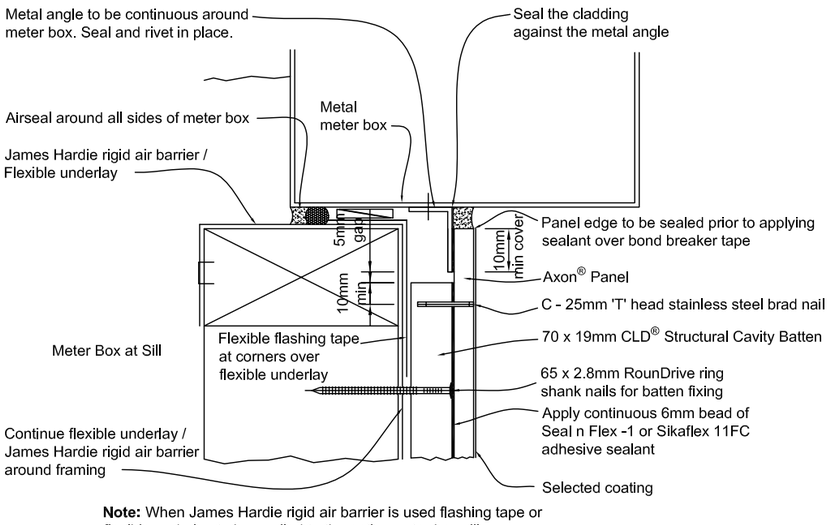
Note: When James Hardie rigid air barrier is used flashing tape or flexible underlay to be applied to the entire meter box head.

AXON -CLD BATTEN METER BOX FLASHING AT JAMB



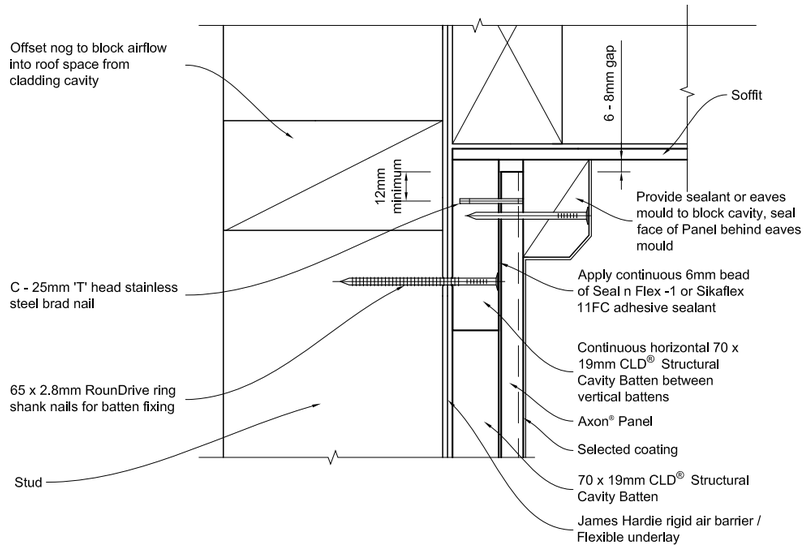
Note: When James Hardie rigid air barrier is used flashing tape or flexible underlay to be applied to the entire meter box sill.

AXON -CLD BATTEN METER BOX SILL



Note: When James Hardie rigid air barrier is used flashing tape or flexible underlay to be applied to the entire meter box sill.

AXON -CLD BATTEN SOFFIT DETAIL



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Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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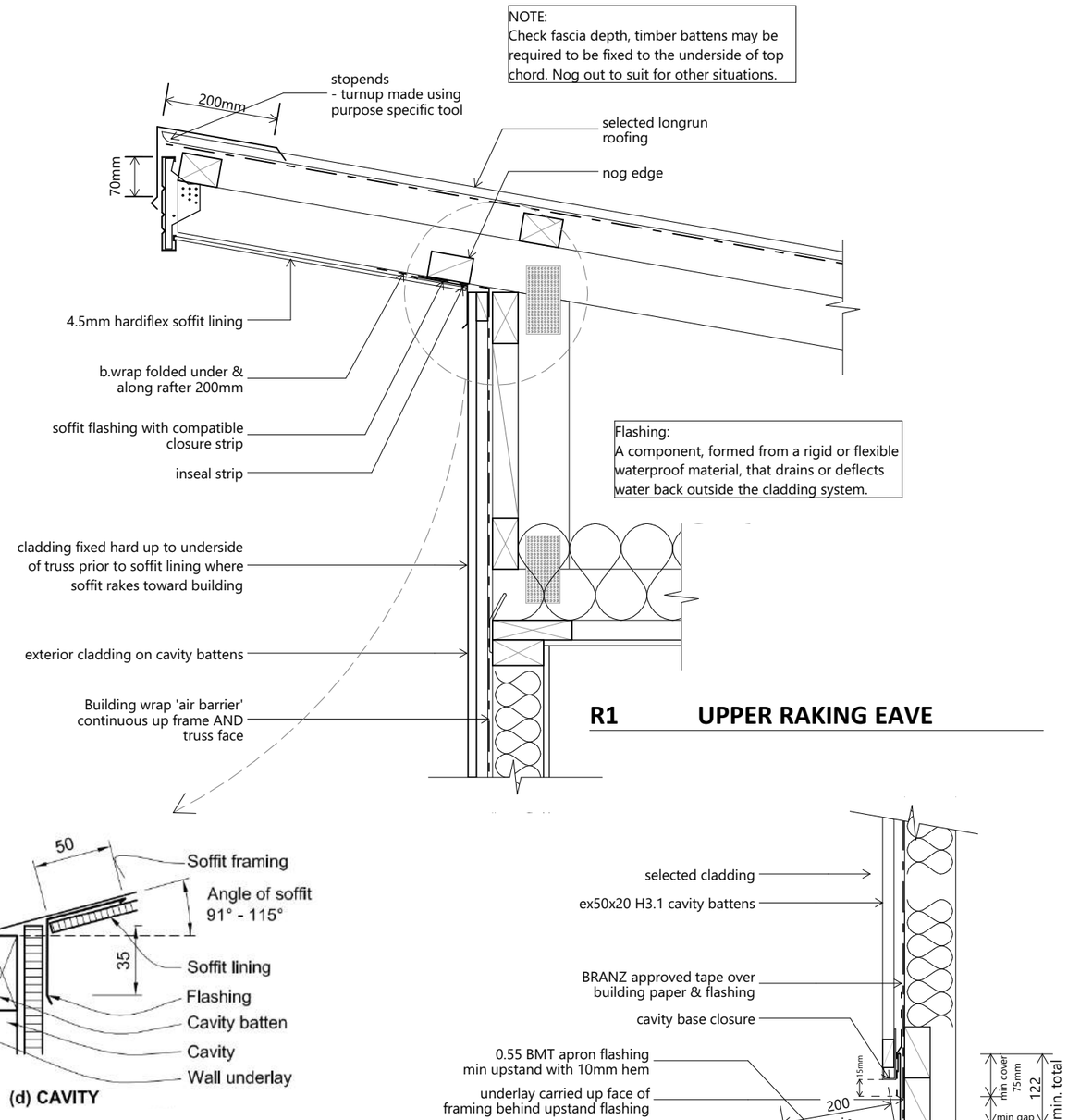
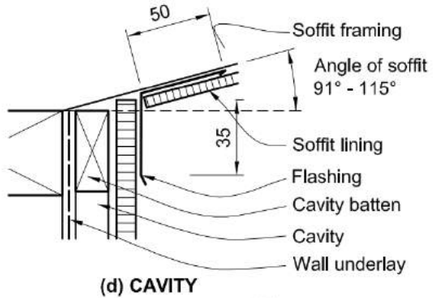
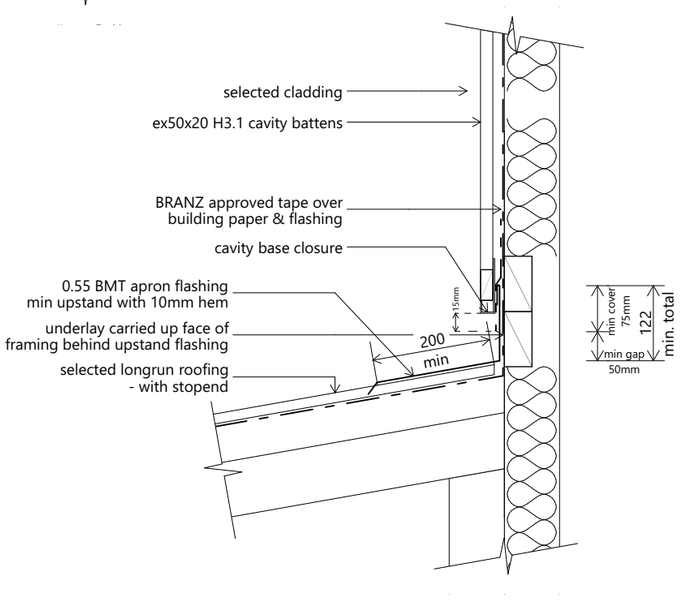
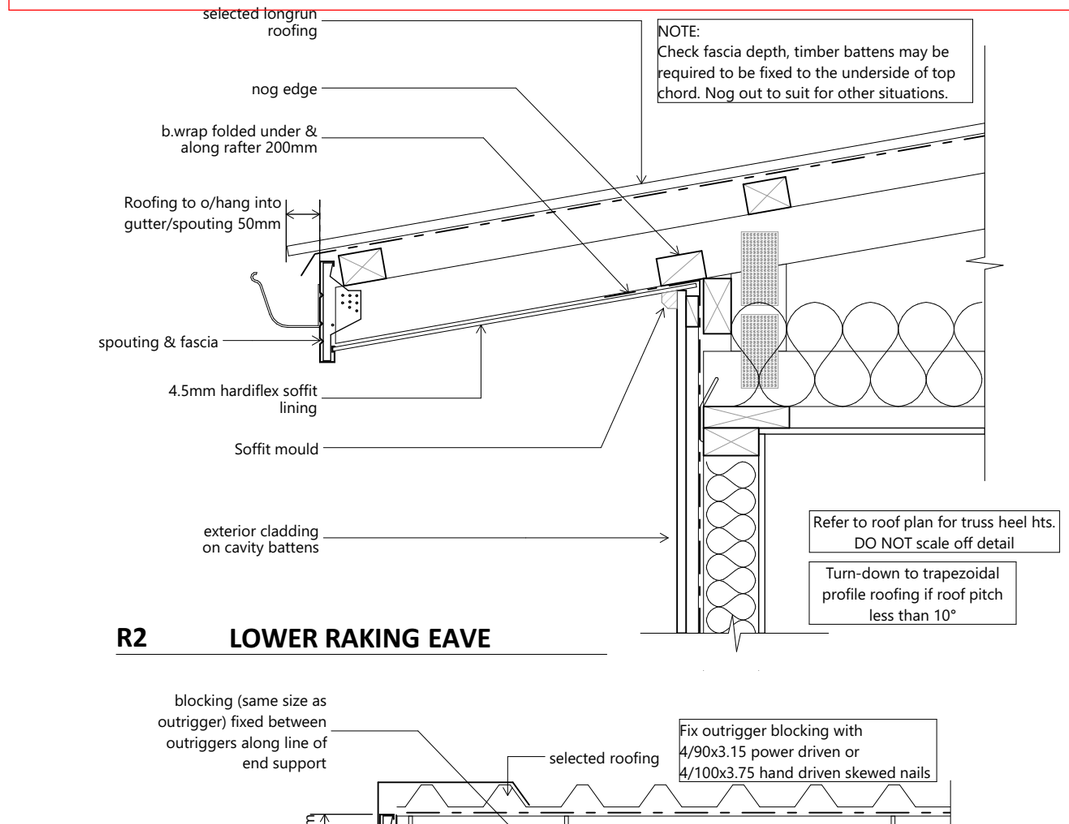


R1 UPPER RAKING EAVE

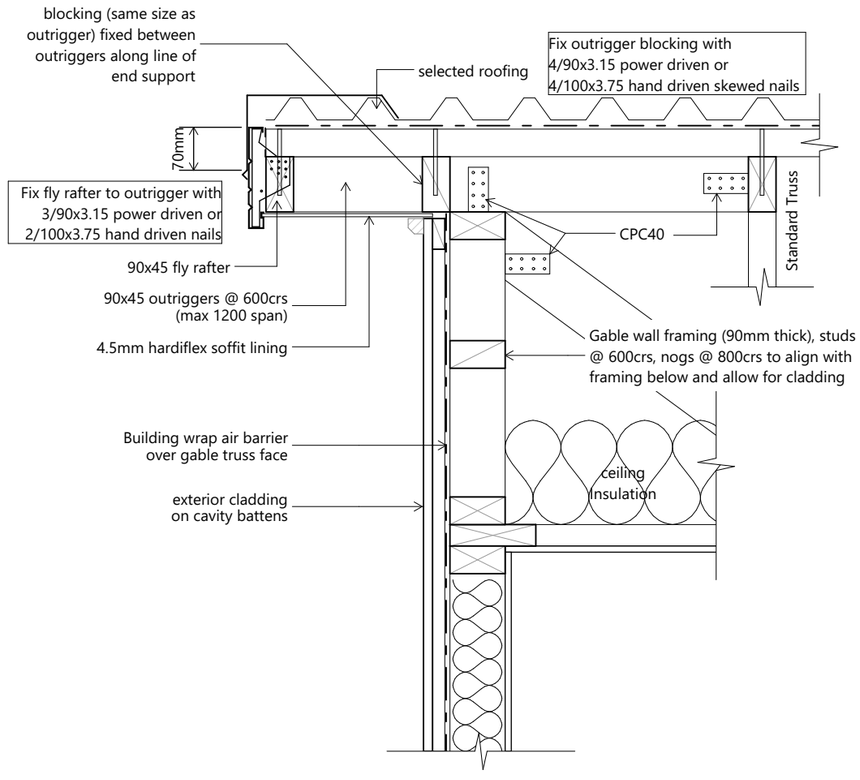




R4 APRON FLASHING - RAKING



R2 LOWER RAKING EAVE



R3 GABLE EAVE

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ROOF DETAILS

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HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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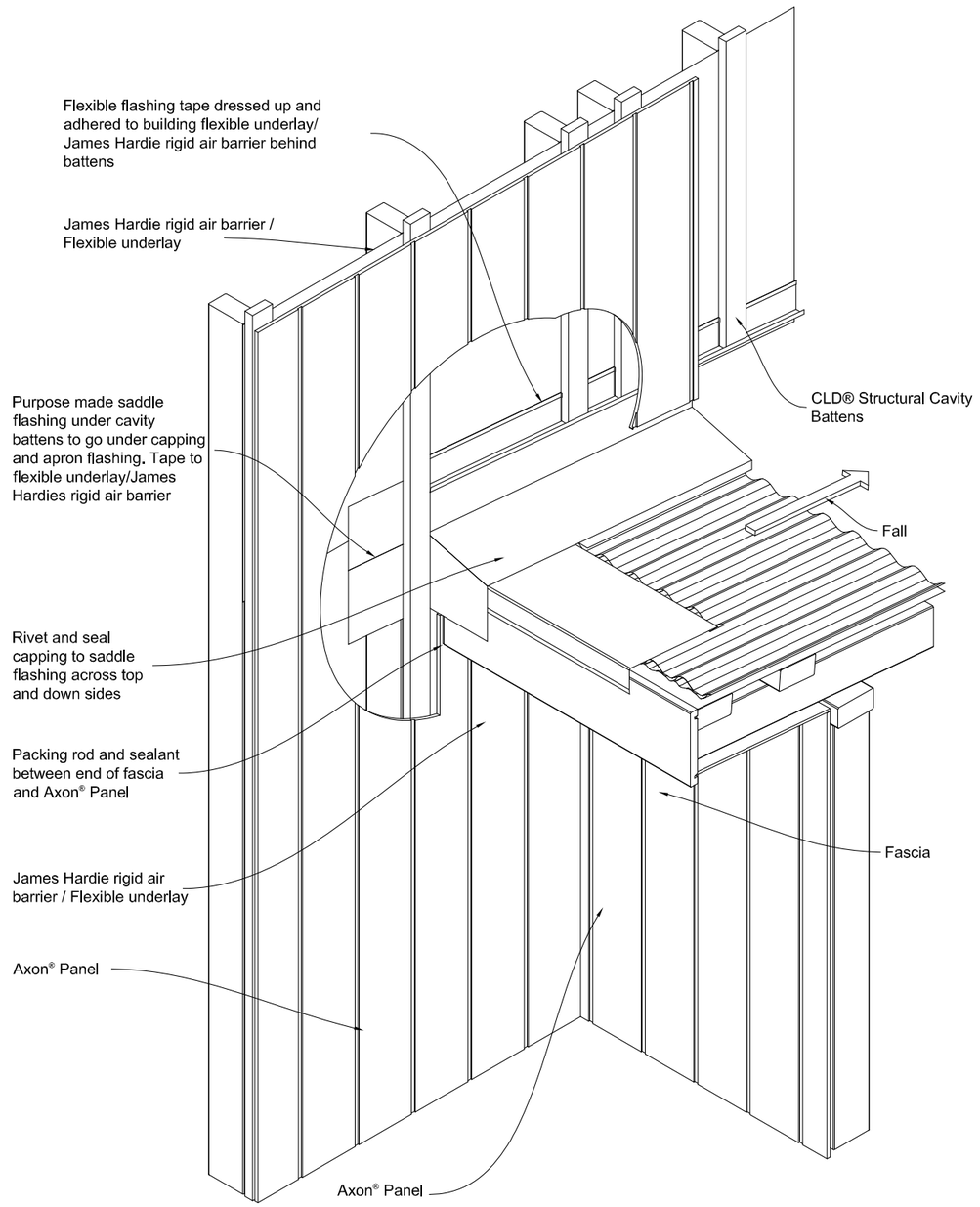
Figure 45: Enclosed roof to wall intersection



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ROOF DETAILS

Scale:
Rev:
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Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
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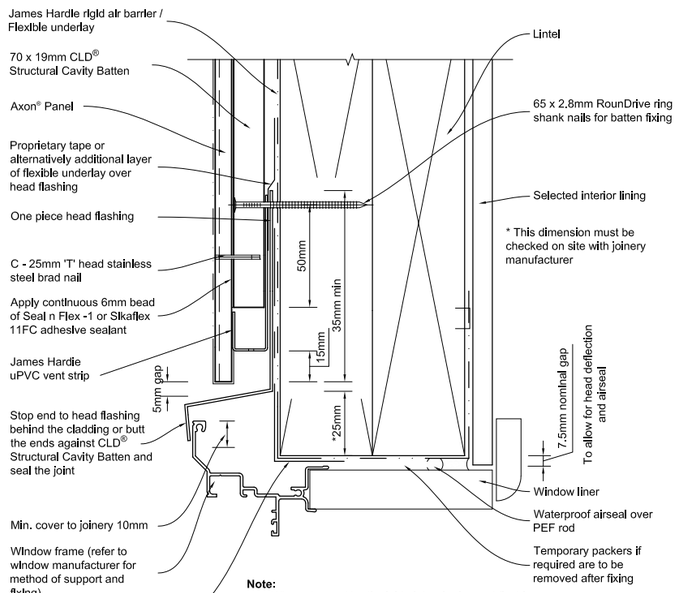
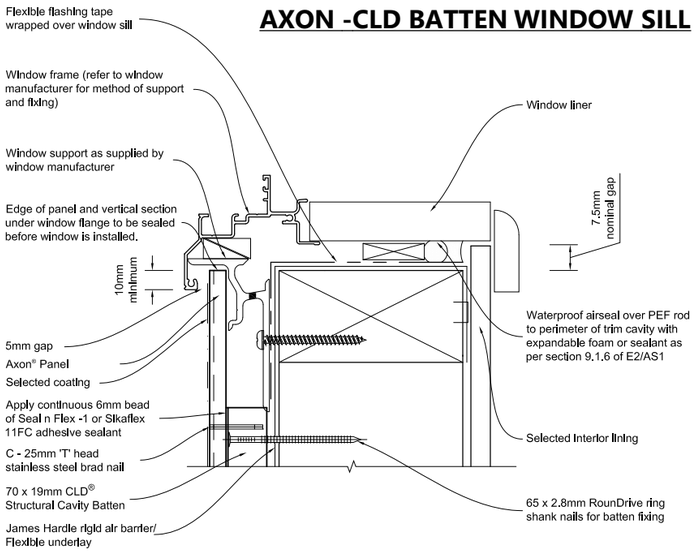
AXON -CLD BATTEN WINDOW & DOOR HEAD



Note:
- When James Hardie rigid air barrier is used flashing tape or flexible underlay to be applied to the entire window opening.
- Also refer to Figure 116 NZBC clause E2/AS1 for head and jamb details
- Sealant must be applied between head flashing and window flange VH and EH wind zones and SED wind pressures

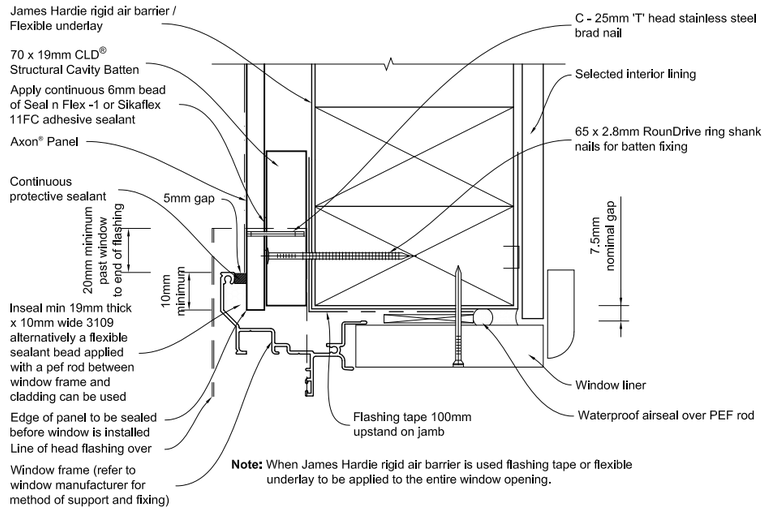
AXON -CLD BATTEN WINDOW SILL



General notes for materials selection
1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of NZBC E2/AS1.
2. Flexible underlay must comply with acceptable solution E2/AS.
3. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact.

Refer to the manufacturer or supplier for technical information for these materials.

AXON -CLD BATTEN DOOR & WINDOW JAMB



Note: When James Hardie rigid air barrier is used flashing tape or flexible underlay to be applied to the entire window opening.

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JOINERY DETAILS

Scale:
Rev:
Sheet no: **29**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Client Details:
Bryan & Philippa Donnelly

Address:
153 Innes Road
Amberley

Job no: **CH1054**
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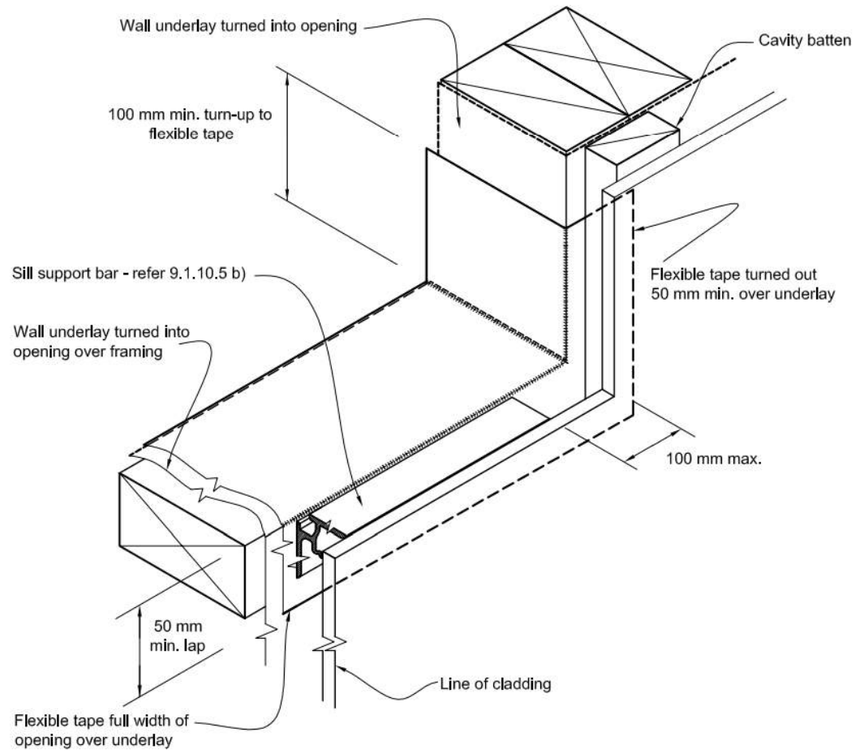
Figure 72B: **General window and door opening with drainage cavity**
Paragraphs 9.1.5, 9.1.9.3, 9.1.10.2, Figures 73C, 76, 85, 86, 91, 99, 116 and 128

NOTE:
(1) Detailed *cladding* omitted for clarity, refer to specific *claddings*.
(2) Head to be treated similarly with continuous *wall underlay* and *flexible tape* at corners.
(3) Refer individual cladding details for jamb flashings.

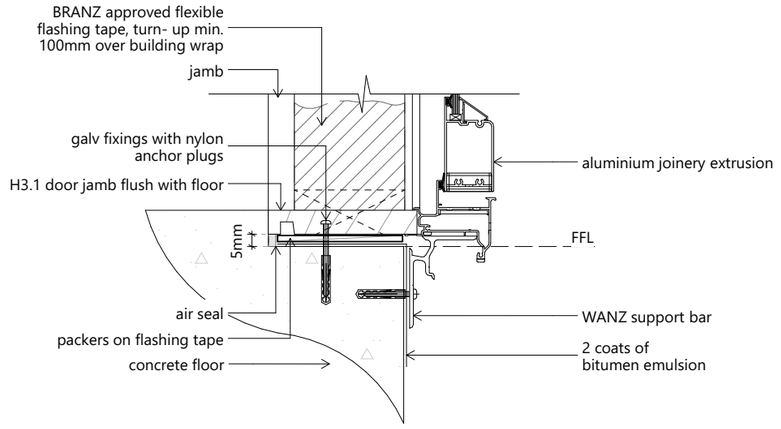


Flexible air seals;
The air seal shall be installed over a closed cell polyethylene foam (PEF) backing rod, or similar and made of self-expanding polyurethane foam

Backing rods are used for self-expanding polyurethane foam as there is a danger foam will expand to the outside of the wall and form a moisture bridge to the interior.

9.1.10.8 Attachments for windows and doors
Install windows and doors using pairs of minimum 75 x 3.15 galvanised jolt head nails or 8 gauge x 65 mm stainless steel screws, through reveals into surrounding framing at:
a) Maximum 450 mm centres along sills, jambs and heads, and
b) Maximum 150 mm from reveal ends.
Install packers between reveals and framing at all fixing points, except between head reveals and lintels.

Flashing tape must be proven compatibility with selected building underlay and other building materials with which it comes into contact as per table 21 of 'E2/AS1'



DOOR SILL - REBATE

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JOINERY DETAILS

Scale:
Rev:
Sheet no: **30**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Amberley

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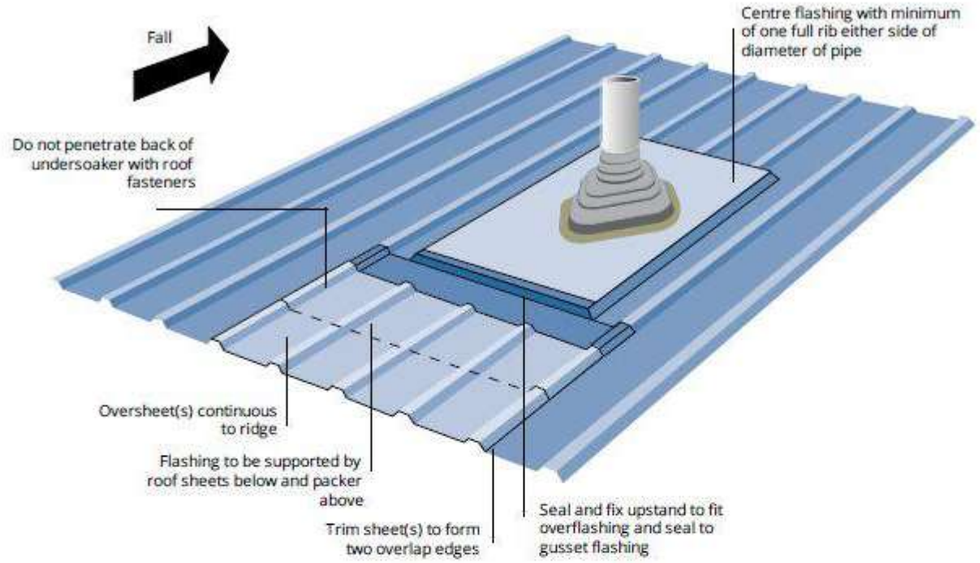
NOTE: REFER TO ATTACHED 'WOODSMAN' FIREPLACE INSTALLATION AND COMPLIANCE DETAILS INCLUDED IN SPECIFICATIONS.

9.5.1B Over-flashed Boot with Soaker Level Curb on Trapezoidal Profile



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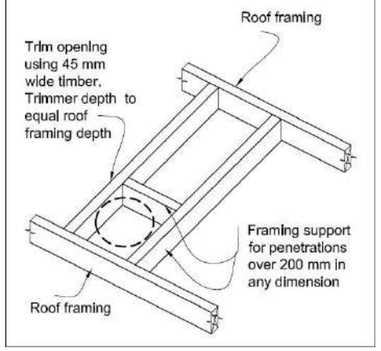
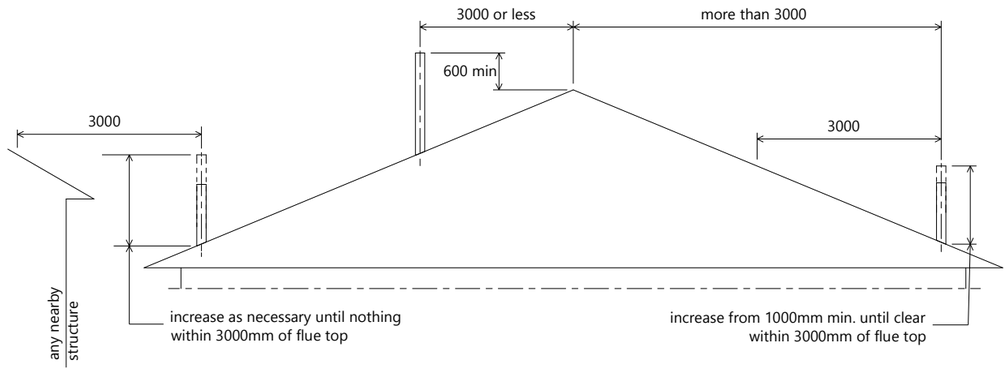
This is a controlled document. This copy of the Code Of Practice was issued 01 August 2019, and the next issue is due 1 November 2019.
The Online version of this document is the most up-to-date and in the case of conflict the Online version prevails over any saved or printed version.

Figure 21: Penetration support
Paragraphs 8.1.7 and 8.4.17



As per AS/NZS 2918:2001 4.9.1 Fig 4.9



Minimum Flue Heights apply
- refer to Manufacturers Specification

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FIREPLACE DETAILS

Scale: 1:1 | Rev: | Sheet no: **31**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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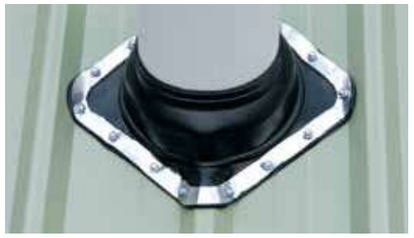
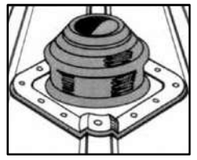
CODE: BLACK EPDM	CODE: GREY EPDM	CODE: RED SILICONE	BASE (MM)	PIPE (MM)	ROOF PITCH
DFE10MB			71 x 71	0-20	Up to 60°* See foot note
DFE100B	DFE100G		100 x 100	0-35	
DFE100BS*		DFE200RES	100 x 100	0-35	
DFE101B	DFE101G		139 x 139	5-55	Up to 45°* See foot note
DFE101BS*		DFE201RES	139 x 139	5-55	
DFE102BA	DFE102GA	DFE202REA	181 x 181	50-70	
DFE103B	DFE103G	DFE203RE	218 x 218	5-127	
DFE104B	DFE104G	DFE204RE	279 x 279	75-175	
DFE105B	DFE105G	DFE205RE	309 x 309	100-200	
DFE106B	DFE106G	DFE206RE	363 x 363	125-230	
DFE107B	DFE107G	DFE207RE	456 x 456	150-300	
DFE108B	DFE108G	DFE208RE	495 x 495	170-355	
DFE109B	DFE109G	DFE209RE	680 x 680	230-508	

* DFE100BS and DFE101BS both have multiple cable nipples



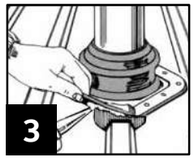
Installation Instructions:



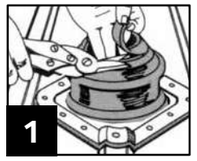
NOTE:

For more effective drainage, always fit the Dektite on the diamond or bias.

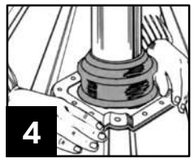
Dektites are suitable for flashing pipes that penetrate wall claddings.



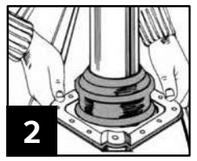
Apply a neutral cure 100% silicone sealant (roof and gutter approved) to the underside of the Dektite by turning back the flexible flange.



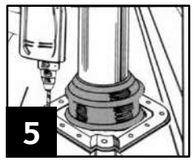
Cut a neat hole in roofing sheet with minimum clearance for pipe and insert pipe through hole. Trim the cone to suit pipe size using sharp tin snips. Where required, support cut sections of sheet with additional framing.



Press base to the roof profile by hand, smooth out any awkward creases. Don't fully extend to allow for vibration.



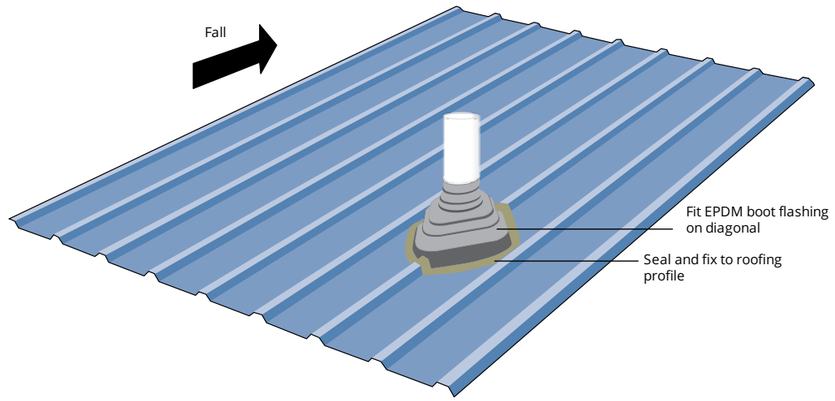
Slide Dektite flashing down over pipe. Lubricating the pipe with water allows the pipe to slide snuggly into position.



Fasten using self drilling washered screws or sealed rivets. Fit fasteners progressively outward in opposing pairs to avoid gaps.

TV PIPE PENETRATION (under 10° roof pitch)

9.5B Direct-fixed Boot on Trapezoidal Profiles



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TV PENETRATION DETAILS

Scale:

Rev:

Sheet no: **32**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Job no: **CH1054**

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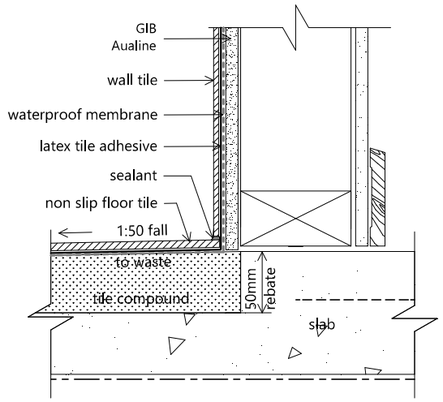
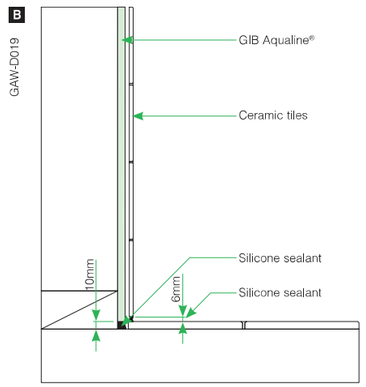
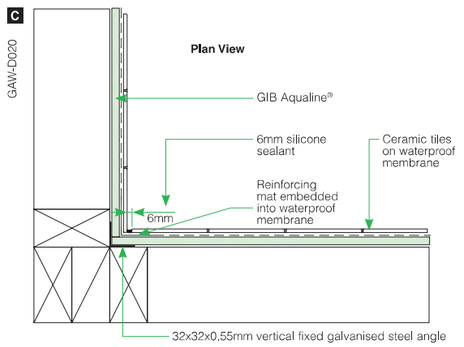
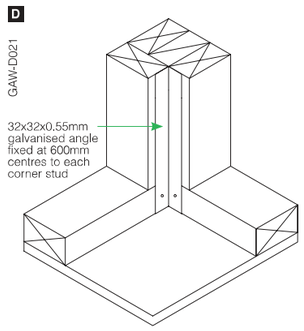
Shower – Tiled Walls and Base

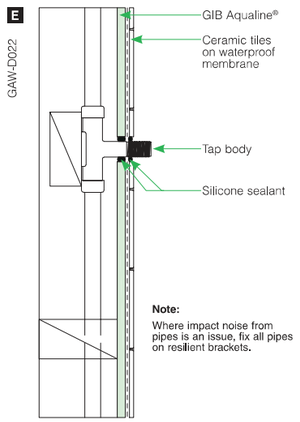
MARCH 2007







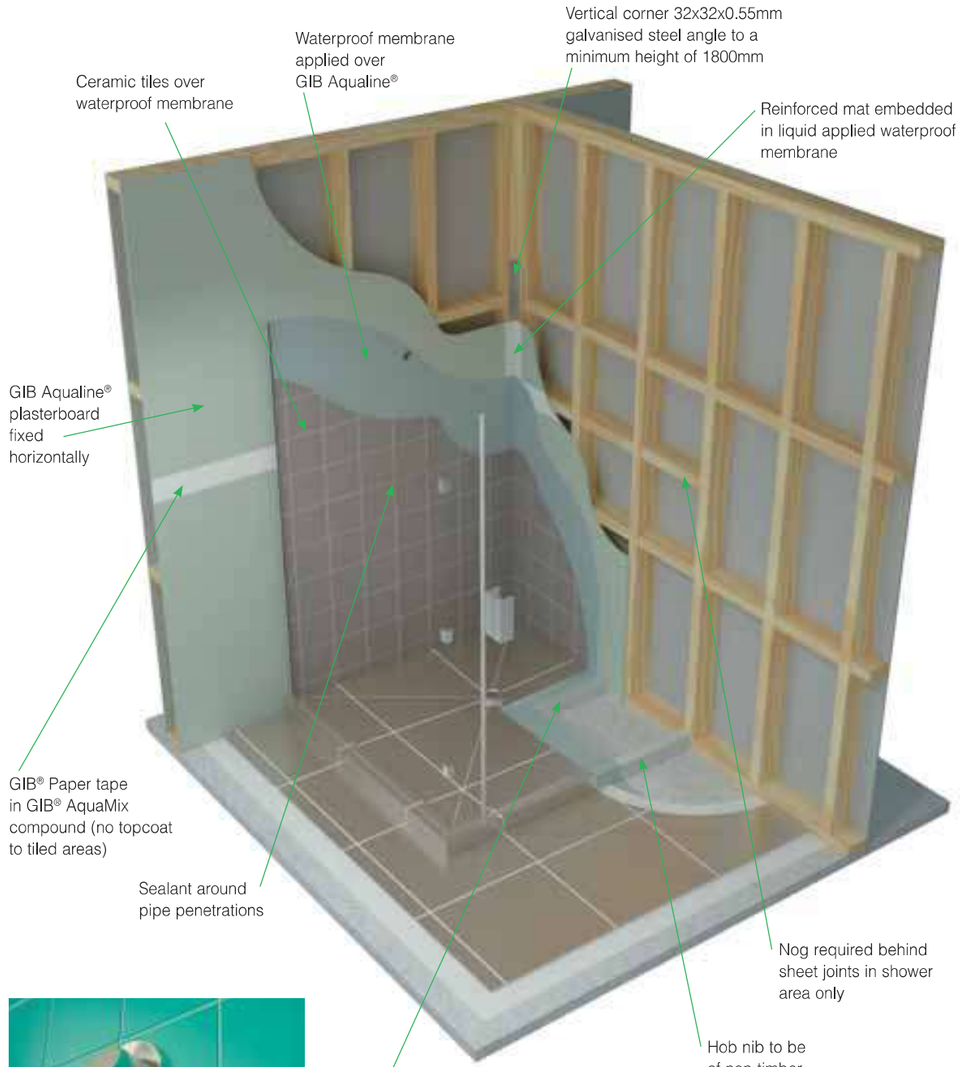




GIB AQUALINE® WET AREA SYSTEMS – TYPICAL DETAILS

Shower – Tiled Walls and Base

MARCH 2007



Run a bead of silicone sealant around the mixer unit on the tiles extending below the bottom of the pipe aperture.

For typical details, see the following pages.

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WET AREA DETAILS

Scale:

Rev:

Sheet no: **33**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 22/10/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Job no: **CH1054**

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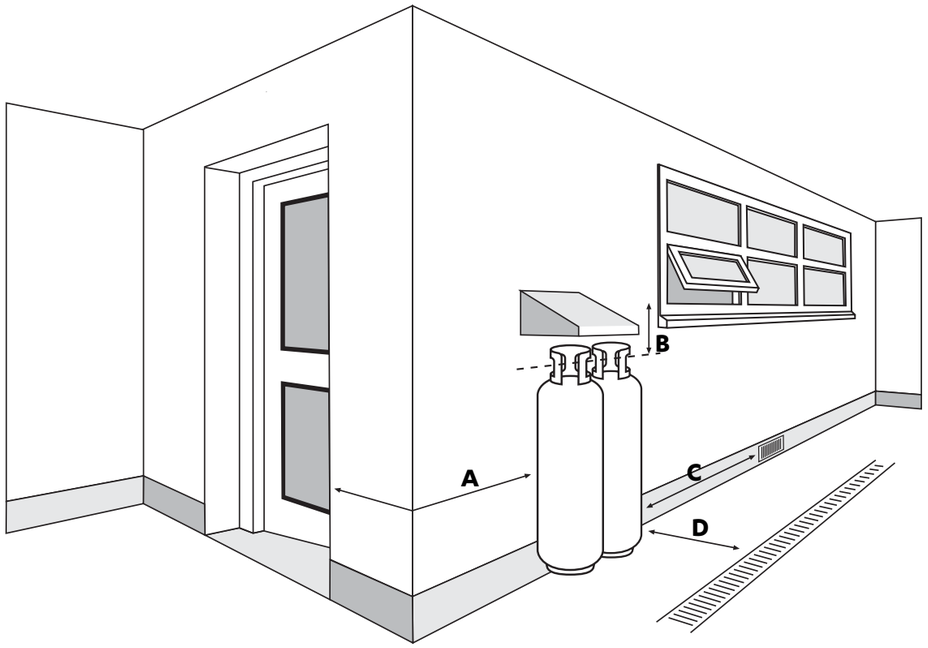
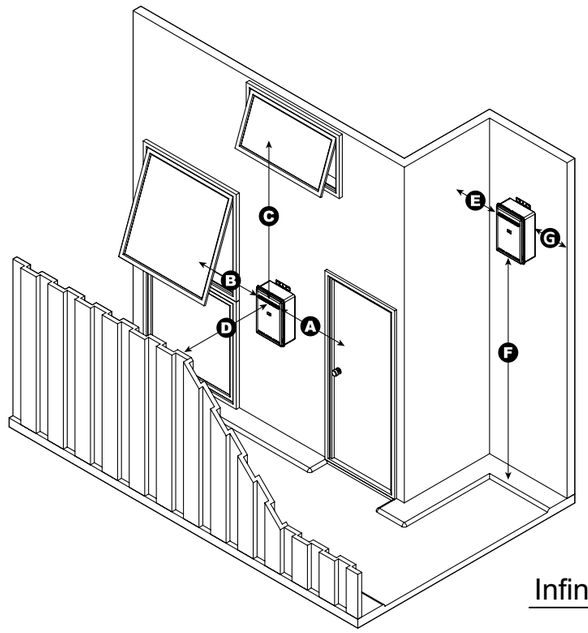
Overview of LPG cylinder clearances

The diagram below is a modified version of a drawing originally produced by ongas (www.ongas.co.nz). It is intended to provide an overview of the general clearances required for LPG cylinders.



A	Min. clearance to a door	1 m
B	Min. clearance to an openable window	150 mm
C	Min. clearance to an air vent or opening	1 m
D	Min. clearance to a drain	1 m

For detailed information relating to LPG cylinder placement it is advisable to consult a licensed gasfitter, your nearest LPG cylinder supplier, or consult AS/NZS 5601.1 Gas Installations.



Dim.	Infinity VT, HD200, EF models	Infinity HD250 models
A	Min. 300 mm	Min. 500 mm
B	Min. 300 mm	Min. 500 mm
C	Min. 1.5 m	Min. 1.5 m
D	Min. 500 mm	Min. 500 mm
E	Min. 300 mm	Min. 300 mm
F	Min. 300 mm*	Min. 300 mm*
G	Min. 300 mm	Min. 300 mm

Clearance below eaves, balconies, and other projections for all models is 300 mm.

* Rinnai recommend 1.5 m to give enough clearance for the pipe work, and to safely expel flue gases.

Infinity Flue Clearance

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HW DETAILS

Scale:

Rev:

Sheet no: **34**

Design: A1 | Drawn: GW/CH | Check: AG/UP | LBP: UP | Date: 3/09/2021

Wind:	Earthq:	Exposure:	Snow:	Climate:
HIGH	**3**	**B**	**N4 1.0kPa**	**3**

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Job no: **CH1054**

KH205 Alt.

A1homes

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-8816 | Fax 03 314-9181 | Email info@hurunui.govt.nz
Web hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil
Skype hdc_customer_services | twitter.com/hurunuidc

Project Information Memorandum 210485

Section 34, Building Act 2004

Issued in accordance with Building Consent No. 210485

This project information memorandum is confirmation that the proposed building work may be undertaken, subject to the provisions of the Building Act 2004, and any requirements of the building consent attached.

This project information memorandum includes:

Details of authorisations which have been granted.

1. This is a permitted activity under the Hurunui District Plan.
2. Water: Connected to 1 unit of Ashley rural water with 1 unit = 1800L per day.

   Stormwater: This falls outside of HDC stormwater jurisdiction and as such the stormwater will need to comply with Section 5.95 or 5.96 of the Canterbury Land and Water Regional Plan. If it complies no further action is required but if is not a permitted activity an application for ECan consent will be required: https://ecan.govt.nz/your-region/plans-strategies-and-bylaws/canterbury-land-and-water-regional-plan/canterbury-land-and-water-regional-plan/

   Wastewater: ECan approved septic tank/system required.
3. For a full chemical analysis of your water supply please visit our website: https://www.hurunui.govt.nz/roading-water/water/water-testing-reports
4. This structure must withstand the following:

   Wind Region: A

   Snow Zone: N4 - Altitude: 80

   Earthquake Zone: 3

   Exposure Zone: B

   Liquefaction Zone: 3

   Hazard Zone: Waipara Syncline Fault Awareness Zone

Signature:

Position: Building Support Officer

On behalf of: Hurunui District Council

Date: 7/12/21

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-8816 | Fax 03 314-9181 | Email info@hurunui.govt.nz
Web hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil
Skype hdc_customer_services | twitter.com/hurunuidc

Required Items for Building Consent No 210485
Proposal: 4-bedroom dwelling with attached garage and woodburner
Site Address: 153 Innes Road

Before Council can issue a Code Compliance Certificate, you will need to ensure the following inspections are completed and that you have provided the paperwork requested.

Inspections Required

1	Foundation - Combined concrete footings & slab
1	Pre-Roof
1	Pre-Cladding - Wrap
1	Pre-Cladding - Mid Cladding
1	Pre-Line
1	Pre-Stop
1	Interior Tanking
1	Drains
1	Heating Unit - Solid Fuel
1	Final - Residential
10	Total Inspections

Documentation Required

Application for CCC
Electrical safety certificate (itemised)
Gas safety certificate
As-built drainage plan
Effluent Field certificate
Plumbers pressure test declaration
Wet Area tanking Certificate
Design statement (truss manufacturer)
Design statement (frame manufacturer)
Under-slab hardfill compaction certificate
Woodburner installers certificate

Licensed Building Practitioner Forms Required

Plumber
Drainlayer
Gasfitter
Designer Alastair Carleton - Received
Carpentry
Foundations
Roofing

Your application for Code Compliance Certificate and all requested documents will be required prior to booking a final inspection.

How do I book an inspection?

- Please give at least 72 hours notice prior to any inspection
- HDC will make every attempt to book inspections when required. However, this is not always possible - flexibility is often required. Please note that inspections are not available in all areas every day, please check the table below to see when an inspector will be in your area
- When you call to book an inspection, please supply: Your building consent number, site address, type of inspection, contact name and phone number
- To make a booking for inspection, email building@hurunui.govt.nz or telephone 03 314 8816
- Standard inspections are included in the consent fee.

Hurunui District Council Building Inspection - days/areas

- Amberley/Leithfield/Waipara areas:	Monday - Friday, all days
- Hanmer Springs/Waiau/Culverden/Waikari areas:	Monday, Wednesday, Friday
- Omihi/Scargill/Cheviot/Parnassus areas:	Tuesday & Thursday

What does the inspector require on site?

- The council approved building consent documents must be on site at the time of the inspection
- The work to be inspected must be completed
- Once the inspection is completed, the inspector will email a copy of the site notice to the email address provided

What happens when the building project is finished?

On completion of the project, please download and complete the Code Compliance Application (Form 6) and arrange for a final inspection. The Form 6 is an important legal document and indicates that consented building work has been completed in accordance with the consent documents

We look forward to working with you during the construction of your project. Please feel free to contact the Hurunui District Council Building Department to discuss any aspect of your project. Our contact details are Ph: 03 314 8816 or email: building@hurunui.govt.nz.

Small construction sites

THE ABSOLUTELY ESSENTIAL HEALTH AND SAFETY TOOLKIT

WORKSAFE

ABOUT THIS TOOLKIT

This toolkit[1] provides useful checklists for common health and safety issues on small construction sites. It will help you manage or avoid these issues to ensure the health and safety of everyone on and around your worksite, including workers, clients and members of the public. Links to more detailed advice are included where relevant.

Doing nothing is not an option

Construction is among the top four sectors for highest worker injury rates. Worker fatalities are more than double the average for all other sectors. The most common injuries are ones to the lower back and spine. The most common cause of serious harm injuries are slips, trips and falls from height. Males aged 20-24 are most likely to be injured.

The costs of workplace injuries to New Zealand business are substantial – ACC pay more than $100 million dollars per year in the construction sector. The direct and indirect costs of all workplace injuries in New Zealand are over $1.3 billion.

Make use of this toolkit. If we all work together we can make the construction industry a healthier and safer place to work in.

Health and safety legislation

The Health and Safety at Work Act 2015 (HSWA) is New Zealand's key work health and safety law. It introduces new responsibilities for managing the work related risks that can cause serious injury, illness or even death.If you have good health and safety practices in place now, you are likely to be well on your way. However the new Act introduces some new features and it's important for you to review your approach to work health and safety.

How to contact WorkSafe

For further advice on health and safety at work, contact the WorkSafe Response Team on (freephone) **0800 030 040**.

[1] The content in this toolkit has been adapted from the Health and Safety Executive publication *The absolutely essential health and safety toolkit for the smaller construction contractor* published in 2008 and available at www.hse.gov.uk
It does not cover legal requirements and is a guide only; for information on how to comply with the law, see the relevant legislation at www.legislation.govt.nz

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1.0 General management

IN THIS SECTION:

1.1 Managing a small construction site

1.2 When to notify WorkSafe

1.3 Contracting and subcontracting

1.1 Managing a small construction site

The checklists below cover some things to consider when managing a small construction site under the Health and Safety at Work Act 2015 (HSWA) which will imposes duties on the 'PCBU'.

What is a PCBU?

The HSWA defines 'PCBU'. It is essentially a person conducting a business or undertaking, whether alone or with others and whether for profit or gain or not. The PCBU is in the best position to control risks to work health and safety. This is why the PCBU has the primary duty to ensure health and safety.

Despite its name, a PCBU can be a business entity, such as a company, as well as an individual person. An individual person will generally be a PCBU if they are a sole trader or a self-employed person.

Examples of a PCBU include:

- a manufacturing business
- an import business
- an owner-driver of their own courier business
- a self-employed person operating their own business
- a partnership
- a building company, whether a principal contractors or a sub-contractors
- a not-for-profit organisation that employs admin staff.

PCBUs have a number of duties under the Health and Safety at Work Act. PCBUs with overlapping duties must work together to achieve health and safety at work.

Keep this in mind when reading the checklists. Many of the things covered in this booklet will help PCBUs to meet their duties under the HSWA.

See the WorkSafe website for more information.

Do you make sure workers:

- are trained, competent and fit to do the job safely and without putting their own or others' health and safety at risk?
- are properly supervised and given clear instructions?
- have access to washing and toilet facilities?
- have the right tools, equipment, plant and personal protective equipment?
- are involved in discussions about health and safety issues?
- are given opportunities to participate in improving health and safety?

1.2 When to notify WorkSafe

In an emergency: *call the emergency services by dialling **111***.

A PCBU must notify WorkSafe as soon as possible if any of the following 'notifable events' occur:

- the death of a person
- a notifiable injury or illness
- notifiable incident.

Call the WorkSafe Response Team on freephone **0800 030 040** (24 hours) and choose option 1.

Fill in and submit a notification form within seven days at worksafe.govt.nz *Reporting: Serious Harm*.

Some types of work also require you to notify WorkSafe. These include where a worker could fall 5 m or more, some excavation work, working involving asbestos or working underground. For a full list of notifiable work and more information on notifable events, see the WorkSafe website.

For a hazardous substances emergency: call the New Zealand Fire Service on 111 and then the WorkSafe Response Team directly on 0800 030 040.

DON'T DISTURB THE SCENE

You must not interfere with an accident scene until authorised by a health and safety inspector. Exceptions include certain situations, such as when people or property are at risk. If you require scene clearance or other immediate assistance from a health and safety inspector, call WorkSafe on 0800 030 040.

1.3 Contracting and subcontracting

When contracting or subcontracting work do you:

- check the health and safety performance of the people you plan to use?
- give them the health and safety information they need for the work?
- talk about the work with them?
- hold regular discussions about how the work is going, including safety problems and concerns?
- make sure that you have provided everything you agreed (eg safe scaffolds, the right plant, access to toilets and other welfare facilities, etc)?
- check their performance and remedy any shortcomings?

For more information for PCBUs check for updates on the WorkSafe and New Zealand Legislation websites:

worksafe.govt.nz

www.legislation.govt.nz

2.0 Health and safety checklist

IN THIS SECTION:

2.1 Site and services

2.2 Working at height

2.3 Moving material

2.4 Working with vehicles and machinery

2.5 Critical health risks

2.6 Worker wellbeing

2.7 Emergency situations

The following pages provide you with an essential checklist of some of the hazards most commonly found on construction sites.

The questions will help you decide whether your site is a safe and healthy place to work. It is not a full list.

2.1 Site and services

Access on site

- Can everyone get to their place of work safely – and work there safely?
- Are access routes in good condition and clearly signposted?
- Do edges that people could fall from have suitable edge protection?
- Are holes protected with clearly marked and fixed covers to prevent falls?
- Is the site tidy, and are materials stored safely?
- Is lighting good enough?

Electricity and other services

- Have all necessary services been provided on site before work begins? Have you also identified existing services present on site (eg electric cables or gas mains) and taken effective steps, if necessary, to prevent harm from them?
- Is the supply isolated from earth with a voltage between phase and earth conductors not exceeding 230 volts?
- Are electrical extension cords connected to power tools using a Residual Current Device (RCD) or Isolating Transformer?

- Are cables and leads protected from damage?
- Are all connections to the system properly made and are suitable plugs used?
- Are tools and equipment checked by users, visually examined on site and regularly inspected and tested by a competent person?
- Have hidden electricity cables and other services been located (eg with a locator and plans) and marked, and have you taken precautions for safe working?
- Where there are overhead lines, has the electricity supply been turned off, or have other precautions been taken, such as providing 'goal posts' or taped markers?

Protecting the public

- Is the worksite fenced off from the public?
- Do roadworks have barriers around them and are the barriers lit?
- Are the public protected from falling material?
- Is clear signage present to warn people of danger (eg 'Keep out', 'Asbestos removal in progress')?

When work has stopped for the day:

- is the boundary secure?
- have steps been taken to prevent any unauthorised access (eg are all ladders removed or their rungs boarded so they can't be used)?
- are excavations and openings securely covered or fenced off?
- is all plant immobilised to prevent unauthorised use?
- are bricks and materials safely stacked?
- are flammable or dangerous substances locked away in secure storage places?

2.2 Working at height

- Have you ensured there is appropriate and fit-for-purpose means to prevent workers from falling from height?
- Have you planned the work properly and identified suitable precautions to make sure work can be carried out safely?
- Have you thought about whether you can avoid working at height by using different equipment or a different work method?
- Can you use equipment that will prevent a fall from happening, such as scaffolding or a mobile elevating work platform?
- Can you put in place measures to reduce the distance and consequences of a fall should one happen, such as nets, soft landing systems or personal fall prevention and protection equipment (eg a harness system)?
- Will the weather conditions threaten the health and safety of those carrying out the work?
- Have you thought about all the options and are you certain that you are gaining access to height using the safest means possible?

For more information, see worksafe.govt.nz

Scaffolds

- Are scaffolds erected, altered and dismantled by competent people?
- Are all uprights provided with base plates (and, where necessary, timber soleboards)?
- Are all uprights, ledgers, braces and out riggers in position?
- Is the scaffold secured to the building or structure in enough places to prevent collapse?
- Are there double guard rails and toe boards, or other suitable protection, at every edge to prevent falling?
- Are additional guards provided to prevent stacked materials such as bricks falling from scaffolds (eg kickboards, toeboards or screens)?
- Are the working platforms fully planked, and are the planks arranged to avoid tipping or tripping?
- Are there effective barriers or warning notices in place to stop people using an incomplete scaffold (eg where working platforms are not fully planked)?
- Is the scaffold strong enough to carry the weight of materials stored on it and are these evenly distributed?

- Are scaffolds being properly maintained?
- Does a competent person inspect the scaffold or proprietary mobile scaffold regularly (eg at least once a week; and always after it has been altered, damaged and following bad weather)?
- Are the results of inspections recorded?
- Are scaffolds erected using using safe work methods, and are they being used according to the supplier's and/or manufacturer's instructions?
- Have the wheels of mobile scaffolds been locked when in use and are the platforms empty when they are moved?
- Are gates (including guardrails being used as gates) and hatches across access points self-closing?
- Are working platforms placed as close as practicable to the working face to reduce the risk of people or materials falling through the gap?

For more information see worksafe.govt.nz

Ladders

- Choose the right tool for the job – can you buy or hire some alternative equipment that would provide a safer means of access?
- Are they in good condition?
- Do ladders rest against a solid surface and not on fragile or insecure materials?

- Are ladders secured at the top and bottom to prevent them slipping sideways and outwards?
- Do ladders rise at least a metre above the landing place? If not, are there other handholds available?
- Are the ladders positioned so that users don't have to overstretch?
- Do you have to use the top three rungs of a stepladder? If so your stepladder is too short.
- Is the user competent? Those using ladders should be trained to use the equipment safely.
- Can users maintain three points of contact at all times?
- Are materials being transported safely (ie not carried up a ladder)? Carrying materials up a ladder increases the risk of falling.

For more information see worksafe.govt.nz

Roofwork

- Is there edge protection to stop people or materials falling?
- Where nets are used, have they been installed properly?
- Have you identified brittle roof materials, such as cement sheets and roof lights?
- Have you taken precautions to stop people falling through fragile materials when working on the roof (eg by providing barriers, covers or working platforms)?
- Are people kept away from the area below the roof work?
- Are roofworkers trained and experienced to recognise the risks and are they competent to do the work?

For more information see worksafe.govt.nz

2.3 Moving material

Manual handling

- Are there heavy materials such as roof trusses, steel beams, kerbstones or bagged products that could cause injury if they have to be moved by hand?
- If so, can you:
  - choose lighter materials?
  - use trolleys, hoists, telehandlers and other plant or equipment so that manual lifting of heavy objects is kept to a minimum?
  - order materials such as cement and aggregates in units that are a manageable weight (eg 25 kg bags)?
  - avoid the repetitive laying of heavy building blocks or other masonry units (eg weighing more than 20 kg)?
- Have people been instructed and trained how to use lifting aids and other handling equipment safely?
- Have people been trained how to lift safely?

For more information see worksafe.govt.nz

Loading and unloading goods

- Have you checked that the load has not moved or destabilised during the journey to site?
- Is there an exclusion zone around the loading/unloading area to keep people who are not involved away from the work?
- Have you planned your method of unloading?

- Does your lifting equipment have a current annual certificate?
- Do you have to access the back of the truck at all, or can the preparation work be done from ground level? If not:
  - do you have a safe way of getting up and down from the back of the vehicle?
  - what do you have in place to prevent workers from falling off the back of the vehicle?
  - are your employees provided with sensible safety footwear with a good grip?

For more information see worksafe.govt.nz

Excavations

- Is the stability of the ground known to ensure against collapse? Or if the stability of the ground is not known, is there a support system in place for the excavation to prevent collapse, or has it been sloped or battered back to a safe angle? (Note: an excavation more than 1.5 m deep that is deeper than it is wide at the top must be notified to WorkSafe.)
- Is a safe method used for putting in the support, without people working in an unsupported trench?
- Is there safe access into the excavation (eg a sufficiently long, secured ladder)?
- Are there barriers or other protection to stop people and vehicles falling in?
- Is the excavation fenced off from unauthorised access?
- Are properly secured stop blocks provided to prevent tipping vehicles falling in?
- Could the excavation affect the stability of neighbouring structures or services?
- Are materials, spoil and plant stored away from the edge of the excavation to reduce the chance of a collapse?
- Is the excavation regularly inspected by a competent person?
- Are the results of inspections recorded?

For more information see worksafe.govt.nz

2.4 Working with vehicles and machinery

Traffic, vehicles and plant

- Have prestart checks been done, and any issues dealt with?
- Are vehicles well maintained, and are log books and maintenance records present and up to date?
- Are vehicles only operated by people trained to do so (where applicable) and are manufacturer's instructions followed?
- Are vehicles and pedestrians kept apart?
- If not, do you:
  - provide barriers to separate them as much as you can?
  - display warning signs?
- Are people kept away from slewing vehicles, or, if not, can you use a zero tail swing machine?
- Are vehicles and plant properly maintained, for example:
  - do the steering, brakes, hydraulics, mirrors and any other vision aid work properly?
  - are tyres in good condition and at the correct pressure?
  - are reversing alarms active?

- Can reversing be avoided (eg by using a one-way system or a turning area? If not, are properly trained spotters used)?
- Have drivers received proper training and are they competent and fit to use the vehicles or plant they are operating?
- Are loads properly secured?
- Have you made sure that passengers are only carried on vehicles designed to carry them?
- Have you made sure that plant and vehicles are not used on dangerous slopes?
- If you need to work on or drive across sloping ground, have you checked that the plant and vehicles are safe to use?
- Do you check that securing pins are in place on excavator quick hitches?

Tools and machinery

- Are the right tools or machinery being used for the job?
- Are all dangerous parts guarded (eg gears, chain drives, projecting engine shafts)?
- Are guards secured and in good repair?
- Are tools and machinery maintained in good repair and are all safety devices operating correctly?
- Are all operators trained and competent?

For more information see worksafe.govt.nz

2.5 Critical health risks

Hazardous substances

- Have you identified all harmful substances and materials, such as asbestos, lead, solvents, paints, cement and silica dust (eg from cutting concrete, bricks, rocks etc)?
- Is protective clothing and respiratory equipment provided?
- Have you checked whether a worker with the relevant approval is needed to deal with asbestos on site? (Most work with asbestos requires permission from WorkSafe, although you can do some very limited work with materials that contain asbestos without one.)

- Have you identified and put into place precautions to prevent or control exposure to hazardous substances, by:
  - doing the work in a different way, to remove the risk entirely?
  - using a less hazardous material?
  - using tools fitted with dust extraction?
  - using tools fitted with water suppression?
  - installing warning signs to show where work involving hazardous substances is taking place?
- Have workers had information and training so they know what the risks are from the hazardous substances used and produced on site, and what they need to do to avoid those risks?
- Have you arranged health monitoring for employees exposed to certain hazardous substances (eg lead, silica, cement, sensitisers such as twopack adhesives or coatings)?

For more information see worksafe.govt.nz

Noise

- Have you identified and assessed workers' exposure to noise?
- Have workers had information and training so they know what the risks are from noise on site, and what they need to do to avoid those risks?
- Can the noise be reduced by using different working methods or selecting quieter plant (eg by fitting breakers and other plant or machinery with silencers)?
- Are people not involved in the work kept away from the source of the noise?
- Is suitable hearing protection provided and worn in noisy areas?
- Have hearing protection zones been marked?
- Have you arranged health surveillance for employees exposed to high levels of noise?

Personal protective equipment

- Is suitable equipment provided to protect the head, eyes, hands and feet where appropriate?
- Do workers wear their protective equipment, and do they wear it correctly?
- Have workers been trained in the safe use, care and storage of protective equipment?

For more information see worksafe.govt.nz

2.6 Worker wellbeing

Amenities and facilities

- Has a suitable toilet been provided?
- Is there a clean wash basin, hot/warm water, soap and towel?
- Is wet-weather gear provided for those who have to work in wet conditions?
- Is there a place where workers can take shelter and have meals? Do they have access to drinking water?
- Is there a suitable first-aid kit?

For more information see worksafe.govt.nz

Workloads and fatigue

- Do workers take regular, quality rest breaks in their working day?
- Are working hours reasonable and not too long? If longer working days are required, are start and finish times staggered, and/or are longer rest breaks and periods off work allowed?
- Are tasks scheduled suitably throughout a work period (eg critical jobs are avoided during the low body clock period of 3 pm to 5 pm)?
- Is work scheduled to allow enough time for completion?
- Are monitoring and limitations in place for overtime worked, consecutive night shifts, shift swapping and on-call duties?
- Are jobs rotated to minimise exposure to extreme temperature and excessive mental or physical demands?
- Is fit-for-purpose plant, machinery and equipment used?
- Are workloads practical and manageable, with consideration given to any work flow changes (eg machinery breakdowns or unplanned absences)?

Alcohol and drugs

- Is there a policy and procedure in place to constructively manage alcohol- and other drug-related hazards?
- Are workers monitored for signs of alcohol and drug use (eg dizziness, slurred speech, drowsiness, sudden aggressive or violent behaviour, lack of or impaired coordination/relflexes)?

For more information see worksafe.govt.nz

2.7 Emergency situations

Emergencies

- Are there emergency procedures (eg for evacuating the site in case of fire)?
- Do people on site know what the procedures are and where the nearest emergency centre is?
- Is there a means of raising the alarm, and does it work?
- Is there a way to contact the emergency services from site?
- Are there enough suitable escape routes and are these kept clear?
- Are first aid arrangements good enough for the site, and is there someone available who can administer first aid if needed?

Fire

- Is the quantity of flammable materials, liquids and gases kept to a minimum?
- Are they properly stored (eg are gas cylinders chained in position)?
- Are flammable gas cylinders returned to a ventilated store at the end of the shift?
- Are smoking and other ignition sources banned in areas where gases or flammable liquids are stored or used?
- Are gas cylinders, associated hoses and equipment properly maintained and in good condition?
- When gas cylinders are not in use, are the valves fully closed?
- Is flammable and combustible waste removed regularly and stored in suitable bins or skips?
- Are suitable fire extinguishers provided?

Notes

Disclaimer

This publication provides general guidance. It is not possible for WorkSafe to address every situation that could occur in every workplace. This means that you will need to think about this guidance and how to apply it to your particular circumstances.

WorkSafe regularly reviews and revises guidance to ensure that it is up-to-date. If you are reading a printed copy of this guidance, please check worksafe.govt.nz to confirm that your copy is the current version.

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worksafe.govt.nz

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WORKSAFE
NEW ZEALAND | MAHI HAUMARU AOTEAROA

Level 6, 86 Customhouse Quay
PO Box 165, Wellington 6140

0800 030 040 worksafe.govt.nz

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-8816 | Fax 03 314-9181 | Email info@hurunui.govt.nz
Web hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil
Skype hdc_customer_services | twitter.com/hurunuidc

Solid/Liquid/Fuel Heater Installer's Installation Certificate

Building Consent Number : Site Address :

Make : Model : Clean Air Registration Number :

☐ Solid Fuel Heater ☐ Liquid Fuel Heater ☐ Free Standing ☐ Inbuilt

	Yes	No	N/A
The existing chimney has been cleaned prior to installation	☐	☐	☐
Is the fireplace surround/chimney face junction sealed up with heat resistant material	☐	☐	☐
The flue pipe is constructed of austenitic stainless steel	☐	☐	☐
Seismic restraint has been fitted	☐	☐	☐
The flue sections are secured together with stainless steel rivets	☐	☐	☐
The flue is secured to the appliance	☐	☐	☐
The chimney void has been vented at the top	☐	☐	☐
Is the Solid Fuel Burner and Flue as per the building consent	☐	☐	☐
Flue joints sealed in accordance with manufactures instructions	☐	☐	☐
Fire safety valve connected and working correctly (diesel burners)	☐	☐	☐
Flue and appliance clearances have been achieved in terms of the manufacturer's instructions (NZS 7421 or AS/NZS 2918:2001)	☐	☐	☐
The flue height meets the minimum specified in the manufacturer's instructions, NZS7421, and Regional Council rules	☐	☐	☐
The application has been installed and commissioned in accordance with the manufacture's installation and operating instructions (Liquid fuel only)	☐	☐	☐
The liquid fuel storage tank and feed system has been installed in accordance with AS1691, or equivalent, and with the requirements of the Council's Hazardous Substances Officer	☐	☐	☐
Smoke detectors as detailed on the building consent documents are installed	☐	☐	☐

If response to any of the items is 'no' please comment :

Water heater – model and part number :

I **(name)** certify that the above specified installation has been carried out as described and in accordance with the manufacturers installation instructions and the current approved building code requirements

Installers Signature : (Installer) Date :

RESOURCE MANAGEMENT ACT MATTERS – LIQUID FUEL HEATER

	Yes	No
Does the fuel storage tank have secondary containment in accordance with the District Plan (NB: Audit monitoring will be carried out)	☐	☐

If response is 'no' please comment why :

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iDesign Architecture

SPECIFICATION of work to be done and materials to be used in carrying out the works shown on the accompanying drawings

Donnelly

CH1054 Donnelly Project Specification

153 Innes Road, Amberley, New Zealand
Project Ref: CH1054
Printed: 30 August 2021

Specification built using masterspec software
Masterspec ID: 233011; Version ID: 229045

masterspec

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4521AR APL RESIDENTIAL ALUMINIUM WINDOWS & DOORS 71
4555 GARAGE DOORS 78
4610 GLAZING RESIDENTIAL 80
4710P PINK® BATTS® & PINK® BATTS® SILENCER® INSULATION 85
5113G GIB® PLASTERBOARD LININGS 88
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6511 CARPETING 107
6700 PAINTING GENERAL 111
7112 WATER STORAGE TANKS 119
7120 HOT & COLD WATER SYSTEM 123
7212 GAS SYSTEM LPG CYLINDERS 128
7411M METALCRAFT ROOFING RAINWATER SPOUTING SYSTEMS 133
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7701 ELECTRICAL BASIC 146

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1233 REFERENCED DOCUMENTS

1. GENERAL

1.1 REFERENCED DOCUMENTS

Throughout this specification, reference is made to various New Zealand Building Code Compliance Documents (NZBC __), acceptable solutions (__ AS_) and verification methods (__ VM_) for criteria and/or methods used to establish compliance with the New Zealand Building Code.

Reference is also made to various standards produced by Standards New Zealand (NZS, AS/NZS, NZS/AS), overseas standards and to listed Acts, Regulations and various industry codes of practice and practice guides. The latest edition (including amendments and provisional editions) at the date of this specification applies unless stated otherwise.

It is the responsibility of the contractor to be familiar with the materials and expert in the techniques quoted in these publications.

Documents cited both directly and within other cited publications are deemed to form part of this specification. However, this specification takes precedence in the event of it being at variance with the cited documents.

1.2 DOCUMENTS

Documents referred to in the GENERAL sections are:

NZBC F5/AS1	Construction and demolition hazards
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 3012	Electrical installations - Construction and demolition sites
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: Materials and workmanship
NZS 4781	Code of Practice for Safety in Welding and Cutting
AS/NZS 5131	Structural steelwork - Fabrication and erection
NZS 6803	Acoustics - Construction Noise

Building Act 2004
Building Regulations 1992
Health and Safety at Work Act 2015
Health and Safety at Work (General Risk and Workplace Management) Regulations 2016
Health and Safety at Work (Hazardous Substances) Regulations 2017
Health and Safety in Employment Regulations 1995
New Zealand Building Code
Heritage New Zealand Pouhere Taonga Act 2014
Resource Management Act 1991
Smoke-free Environments Act 1990

WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe	Good Practice Guidelines - Excavation Safety
WorkSafe	Scaffolding in New Zealand - Good Practice Guidelines
WorkSafe	Managing Work Site Traffic - Good Practice Guidelines

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1234 DOCUMENTATION

1. GENERAL

This general section relates to documentation required by the Territorial Authority / Building Consent Authority for compliance with the New Zealand Building Code. It also includes documentation relating to:
- Substitutions
- Manufacturers' documents
- Branded work sections
- Care of construction documents
- Confidentiality of documents
- Receipt of construction documents

Building Consent Authority documentation

1.1 BUILDING CONSENT
Obtain the original building consent forms and documents from the owner and keep them on site, preserve the condition of consent forms and documents. Liaise with the building consent authority for all notices to be given and all inspections required during construction to ensure compliance. Return the consent form and documents to the owner on completion.

1.2 BUILDING CONSENT COMPLIANCE
It is an offence under the Building Act 2004
- to carry out any work not in accordance with the building consent.
- to carry out Restricted Building Work by anyone other than a Licensed Building Practitioner licensed for that type of work.

The resolution of matters concerning building code compliance to be referred to the contract administrator for a direction and then if required to the BCA for consent.

Where any alteration is requested by the territorial authority or any other authority, do not undertake such alteration until the matter has been referred to the contract administrator for direction.

1.3 PROJECT PERSONNEL
Provide names and contact details of the contractor's key personnel and tradespersons who are involved with the project. Review the list once a month and reissue it if changes have been made.

Licensed Building Practitioner documentation

1.4 LICENSED BUILDING PRACTITIONERS
Provide LBP details. Provide names, LBP numbers, areas of practice and contact information. Provide this information to the BCA before commencing work on the Restricted Building Work in the form required by the BCA. Advise the BCA of any change to an LBP previously advised.

Include the following as applicable
- Site LBP
- Carpenter
- Foundations 1 Concrete foundation walls and concrete slab-on-ground constructor
- Foundations 2 Concrete or timber pile foundations constructor
- Bricklaying and block laying 1 Brick / masonry veneer
- Bricklaying and block laying 2 Structural masonry - Bricklayer / Blocklayer
- Roofing 1 Concrete / clay tile roofer
- Roofing 2 Profiled metal roofer and/or wall cladding installer
- Roofing 3 Metal tile roofer
- Roofing 4 Membrane roofer
- Roofing 5 Torch on membrane roofer
- Roofing 6 Liquid membrane roofer

- Roofing 7 Shingle / slate roofer
- External plastering 1 Solid plasterer
- External plastering 2 Proprietary Plaster Cladding Systems (PPCS) plasterer

Also provide names and contact details of the following
- Registered drainlayer
- Registered plumber
- Registered gasfitter
- Registered electrician

1.5 RECORD OF WORK
Where Restricted Building Work is carried out by a LBP, on completion provide a Record of Work. Provide copies to both the BCA and the Contract Administrator.

Compliance information

1.6 DOCUMENTATION REQUIRED FOR CODE COMPLIANCE
Information may be required either as a condition of the contract documents or as a condition of the building consent. It may include the following:
- Applicators approval certificate from the manufacturer / supplier
- Manufacturer's / supplier's warranty
- Installer / applicator's warranty
- Producer Statement (PS1) - Design
- Producer Statement (PS3) - Construction from the applicator / installer
- Producer Statement (PS4) - Construction review from an acceptable suitably qualified person

Refer to the general sections for the requirements for compliance information to be provided by the contractor.

Refer to the building consent for the requirements for compliance information to be provided by the contractor.

Obtain required documents from the relevant parties for delivery to the contract administrator after the final inspection has been carried out by the BCA.

1.7 PRODUCER STATEMENTS
When producer statements verifying construction are required, provide copies to both the Building Consent Authority and the Contract Administrator. Provide producer statements in the form required by the BCA.

Residential building contract

1.8 CHECKLIST
If requested provide evidence of the prescribed checklist given to the residential client.

1.9 DISCLOSURE STATEMENT
If requested provide evidence of the disclosure statement given to the residential client.

1.10 BUILDING CONTRACT
If requested provide evidence of the written building contract that the residential customer has signed.

1.11 DOCUMENTATION REQUIRED ON COMPLETION
As soon as practicable after completion of the building work, provide in writing the following information and documentation to the client and the relevant territorial authority.

Information and documentation relating to:
- The identity of the building contractor and the subcontractors who carried out the work.
- Maintenance requirements for any products incorporated in the building.

If applicable also provide any guarantee or insurance obtained by the building contractor in relation to the building work.

Substitutions

1.12 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS
Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

1.13 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified products and systems listed in a section unless specified otherwise. If a product is not available then immediately contact the contract administrator for direction.

1.14 PROPOSED SUBSTITUTIONS
Substitution of products or systems contained within branded work sections is not allowed. The contractor may propose substitutions to products within non branded work sections, when the contractor has determined that the proposed substitution is an alternative to the specified product. The Contract administrator is not bound to accept any substitutions. Submit a draft proposal detailing the substitution to the contract administrator before proceeding with full notification.

1.15 NOTIFICATION OF SUBSTITUTIONS
Notify the contract administrator of proposed substitution of specified products. Notification to include but not be limited to:
- Product identification
- Manufacturer's name, address, telephone number, website and email address
- Detailed comparison between the properties and characteristics of the specified product and the proposed substitution
- Statement of NZBC compliance including durability
- Details of manufacturer warranties

Plus an assessment of:
- Any changes required to the programme including any extension of time required
- Any consequential effects of the proposed substitution
- Any effect the substitution may have on Health & Safety requirements
- Allowance for time and cost for re-design and documentation (if applicable)
- Allowance for time and cost for obtaining an amendment to the Building Consent (if applicable)
- Any change in cost associated with the proposed substitution

and if requested:
- All current manufacturer's literature on the product
- Accreditations and appraisals available
- Reference standards
- Product limitations
- Samples
- List of existing installations in the vicinity of the project

1.16 ACCEPTANCE OF SUBSTITUTIONS
Acceptance of any proposed substitutions will be given in writing by the contract administrator.

Amendments to issued Building Consent

1.17 CONTRACTOR AMENDMENTS TO BUILDING CONSENT
Where the contractor has sought acceptance of a substitution or a variation which is for the contractor's own convenience and the substitution or variation requires an amendment to the Building Consent, the contractor must apply for and obtain the required amendment.

The contractor must:
- Obtain approval for substitutions from the contract administrator.
- Prepare and provide to the BCA all documentation required for the amendment.

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- Pay all fees and other costs associated with this amendment.
- Where the amendment affects other approved plans, also amend those plans.

1.18 PRINCIPAL AMENDMENTS TO BUILDING CONSENT
Where the principal is proposing a substitution or a variation which requires an amendment to the Building Consent, the contractor must provide to the principal information that the contractor has that is required for the amendment.

The principal will:
- Prepare and provide to the BCA all documentation required for the amendment.
- Pay all fees and other costs associated with this amendment.
- Where the amendment affects other approved plans, also amend those plans.

Manufacturer's documents

1.19 MANUFACTURER'S AND SUPPLIER'S INSTALLATION REQUIREMENTS
Manufacturer's and supplier's requirements, instructions, specifications or details mean those issued by them for their particular product, material or component and are the latest edition.

1.20 CONTRACTOR TO OBTAIN CURRENT DOCUMENTATION
Where manufacturer’s installation, application and execution requirements are referred to in this specification, the Contractor must ensure they are fully aware of this documentation. Whenever necessary obtain and keep on site the relevant latest version of such documentation and make it available to workers carrying out that part of the work.

1.21 DOCUMENTATION PROVIDED FOR BUILDING CONSENT
Documentation including manufacturer’s installation instructions, specification data sheets, producer statements, BRANZ and similar appraisals may be included in the issued Building Consent. These documents have been provided only to demonstrate compliance with the NZBC.

Branded work sections

1.22 BRANDED PRODUCTS / SYSTEMS
Where branded products and systems are specified, all products and components of the system must be as per the specification.

1.23 CROSS REFERENCED WORK SECTIONS
If any related work is cross referenced to a generic work section, but only the equivalent branded section is included in the specification, use that branded section. Confirm with the contract administrator if there is any doubt.

Care of construction documents

1.24 CONSTRUCTION ISSUE
Take receipt of the plans, specifications and other documents issued “for construction”. Keep at least one copy on site available for use by all on site workers. Keep a record of copies provided to others including subcontractors. Protect the documents as appropriate. Obtain replacement copies for documents that have become damaged.

1.25 REVISIONS TO CONSTRUCTION ISSUE
Where revised plans and other documents are issued ensure that superseded documents are deleted from the working sets. Ensure that subcontractors are provided with amended documents. Delete superseded documents by either:
- removing them from the working copy of the construction issue; or
- marking them as superseded

1.26 RETURN DOCUMENTS ISSUED FOR CONSTRUCTION
On completion of the contract works:
- Keep such copies of the plans, specification and other documents as reasonably required for contractor’s record purposes.
- Retrieve all other copies no longer required by parties.

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- Agree method of disposal of such documents with the Contract Administrator.

The Contract Administrator will advise whether such documents shall be:
- delivered to the Contract Administrator/Owner; or
- disposed of by normal waste disposal methods; or
- disposed of by secure document disposal methods.

Confidentiality of documents

1.27 CONFIDENTIALITY OF DOCUMENTS
Documents shall not be given or copied to others who do not require them for carrying out services required for the construction of the works. Documents are only to be used for the contract. Maintain confidentiality of documents.

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1250 TEMPORARY WORKS & SERVICES

1. GENERAL

This general section relates to temporary works and services required for the construction of the contract works. It includes
- Temporary works and services including temporary fencing and hoardings
- Scaffolding
- General care and protection
- Rubbish removal

Temporary works

1.1 COSTS RELATING TO TEMPORARY WORKS
Pay all rates/fees in respect of temporary works.

1.2 MAINTENANCE OF TEMPORARY WORKS
Maintain alter, adapt and move temporary works and services as necessary. Clear away when no longer required and make good.

1.3 SAFEGUARD THE SITE, THE WORKS AND MATERIALS
Take reasonable precautions to prevent unauthorised access, including access outside working hours, to the site, the works and adjoining property. Safeguard the site, the works, materials and plant from damage and theft.

1.4 CONSULTANTS TEMPORARY SITE OFFICE
Provide temporary accommodation and facilities for site meetings and for use by consultants while on site.

1.5 SITE FENCING
Provide and maintain a site fence, 2 metres high from ground level on the side accessible to the public. Construct to comply with NZBC F5/AS1 Construction and demolition hazards. Construct as required for public areas and as shown on the drawings.
Construct the fence with:
- galvanized chain link netting with a 50mm x 50mm maximum grid size
- posts at 2.5 metre centres maximum
- gap at the bottom of the fence no greater than 100mm

1.6 SITE FENCING - NON-PUBLIC AREAS
Provide and maintain a 1 metre high site fence to non-public areas. Construct using:
- warratah stakes at 1.5 metre centres fitted with safety caps
- plastic safety mesh

1.7 PROVIDE SEDIMENT AND SILT RUN OFF PROTECTION
Provide appropriate measures to prevent or minimise sediment generation and silt run off. Comply with territorial and other authority requirements relating to carrying out earthworks.
Prevent silt run off by:
- exposing only as much ground as required at any time
- providing run off channels, contour drains or earth bunds to divert clean water away from the site on to stable sealed or grassed ground
- capture silt by the use of silt fences, vegetation buffer strips, sediment ponds or earth bunds.

Provide sediment control by:
- earth bunds constructed across the slope to control and detain run off
- silt fences constructed using filter fabric stretched between posts at a maximum of 1 metre spacing.

Pump water from trenches and other areas of the site using methods to prevent sediment entering any drain or watercourse. Filter dirty water before discharging into drainage system.

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1.8 PROVIDE CONCRETE WASHWATER RUN OFF PROTECTION

Provide appropriate measures to prevent cement/concrete washwater or slurry run off to; drains or waterways, landscaped areas new or remaining and adjoining public or private properties. Comply with territorial and other authority requirements relating to cement/concrete washwater.

Control run off from:
- Cement/concrete based material production, placing and finishing.
- Hosing down and cleaning of, tools and equipment, fresh material, and spilt or surplus material, pumps and mixers etc.
- Wet cutting or grinding.
- Slab watering etc.
- Water cleaning of new concrete elements, fresh used formwork etc.

Small project with relatively large exposed ground areas - prevent run off by:
- directing small amounts of washwater onto the area of ground closest to the work.
- for larger amounts provide run off channels, and small soak pits
- very small amounts of washwater with no aggregate and only a small amount of sand may be spread over existing lawns.

Large project and those without suitable ground area - prevent run off by:
- plan and implement washwater control measures based on the expected volumes, allow for the timely removal and safe disposal of liquids and solids.
- Limit the volume of water used for washing down to the extent required.
- Control the flow of washwater so that it is directed to proper catchments.
- providing watertight bunds, pits or tanks, filtered washwater is not to be discharged to drains.

Spilt or surplus material:
- if possible allow to set and either use or dispose of as hardfill.
- pre-made concrete items, either use or dispose of as hardfill.

Pump washwater away from drains, waterways and adjoining property.

1.9 EXCAVATION SAFETY

To the Health and Safety at Work Act 2015.
Carry out excavation to WorkSafe NZ, Good Practice Guidelines - Excavation Safety.
This may include deep excavation, trenching, and areas behind unfilled retaining walls.
Carry out excavation using plant and equipment suitable for the purpose.

Scaffolding

1.10 SCAFFOLDING

Provide scaffolding for the efficient execution of the works.
Comply with:
- Health and Safety at Work Act 2015
- Health and Safety in Employment Regulations 1995
- Health and Safety at Work (General Risk and Workplace Management) Regulations 2016
- Worksafe - Scaffolding in New Zealand - Good Practice Guidelines

Temporary services

1.11 WATER

Provide clean, fresh water for the works and make arrangements for distributing about the site.

1.12 ELECTRICITY

To AS/NZS 3012.
Nominate the person to install and be responsible for the complete temporary electrical installation. The name and designation of the person responsible is to be displayed prominently and close to the main switch or circuit breaker.

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Inspect and overhaul the installation at such intervals as are prescribed by the network utility operator but not more than three monthly intervals.

1.13 TELEPHONE
Provide on-site temporary telephone facilities.

1.14 COMPUTER FACILITIES
Provide on-site temporary computer facilities complete with an email and internet connection capable of sending, receiving and printing site communications.

1.15 PRINTER
Provide on-site temporary printing facilities capable of printing A4 and A3 colour prints.

1.16 IMAGING
Keep available devices able to take and send quality printable digital photographs.

Care and protection - Site

1.17 LOCATE AND PROTECT SURVEY MARKS
Review information provided relating to survey marks. Physically locate and protect survey marks. Where required use a licensed cadastral surveyor to reinstate survey marks disturbed during construction.

1.18 LOCATE EXISTING SERVICES
Review information provided relating to underground and above ground services. Physically locate the position of all such services. Arrange with the network utility operator for all necessary exploratory work, location, protection, isolation, off-setting, reinstatement or alterations required. Record any alterations made to such utilities.

1.19 PROTECT EXISTING SERVICES
Protect existing services and parts of service systems, whether indicated or not, that are to remain in place during the execution of the works. Provide temporary caps or covers to prevent the ingress of dust and other contaminants into the systems, ducts, pipes etc. Reinstate where required and repair any damage resulting from carrying out the contract works.

1.20 PROTECT EXISTING LANDSCAPE ELEMENTS
Protect existing trees, fences, gates, walls, gardens and other designated landscape features which are to remain in position during the execution of the works. Construct a temporary fence at the outer edge of the drip line of trees to be protected. Comply with territorial authority requirements.

1.21 MAKE GOOD - SITE
Make good all damage to existing roads, footpaths, grounds, services, landscape elements and site features caused in carrying out the contract works.

Care and protection - miscellaneous

1.22 CONSTRUCTION KEYING AND SECURITY
Provide locksets with temporary keying, or install with the cylinders removed.

1.23 TEMPORARY STORAGE
Provide temporary storage areas and protective covers and screens to meet the requirements of the products to be stored.

Rubbish removal

1.24 PERIODIC RUBBISH REMOVAL
Maintain on site appropriate means for the storage and removal of construction waste material. Where required or appropriate provide for the separate storage of recyclable waste and other materials requiring special disposal.

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1270 CONSTRUCTION

1. GENERAL

This GENERAL section relates to common requirements for construction issues including:
- Quality control and assurance
- Noise and nuisance
- Set-out and tolerances
- Common execution requirements
- Qualifications
- Common product requirements
- Common requirements for samples and prototypes
- Common requirements for spare and maintenance products
- Cleaning during the works
- Removal of protection
- Completion requirements
- Commissioning
- Practical completion submission
- Defects period submissions
- Completion submissions

Quality control and assurance

1.1 QUALITY ASSURANCE

Carry out and record regular checks of material quality and accuracy, including:
- Concrete quality and finish.
- Dimensional accuracy of structural column locations (following completion of foundations).
- All perimeter columns and frames for plumb.
- Levels of all floors relative to the site datum.
- Framing timber moisture content.

Where any material, quality or dimension falls outside specified or required tolerances, obtain written direction from the contract administrator. Where building consent approval is affected, confirm remedial action with the Building Consent Authority.

Provide all materials, plant, attendances, supervision, inspections and programming to ensure the required quality standards are met by all project personnel.

1.2 PROVIDE QUALITY PLAN

Prepare a quality plan for the execution of the contract works and submit a copy of the quality plan to the Contract Administrator within 10 Working Days of the date of award of the contract. The quality plan shall describe the procedures for meeting the requirements of the contract in respect of:
- Materials and workmanship
- Monitoring and maintaining subcontractors' performance
- Record keeping
- The level of documentation for signing off the contract works as complete
- Procedures to ensure that all persons engaged in undertaking the contract works are qualified, experienced and trained for the work they are undertaking
- Inspection and testing required by the contract
- Auditing the quality plan

1.3 REVIEW OF QUALITY PLAN

Within 5 working days of the contractor submitting a quality plan to the contract administrator for review, the contract administrator may advise that:
- they have completed their final review, or
- that they have undertaken a review and require resubmission of the quality plan.

Review by the contract administrator of the quality plan does not make the quality plan a contract document. The contractor at all times remains responsible for the construction

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of the Works. If resubmission of a quality plan is required, the contract administrator will give their reasons. The contractor shall take account of the reasons and resubmit a revised quality plan within a period of 5 working days.

1.4 COMMENCEMENT OF WORK
Do not commence any part of the contract works, other than establishment, setting out and site preparation until the contract administrator has completed their final review of the quality plan.

1.5 NOTICE
Give notice to the contract administrator and any other nominated person of hold points and notification points. Refer to work sections and 1260 PROJECT MANAGEMENT for hold points and notification points required.

1.6 NOTIFIABLE WORK
Lodge notice of the intention to commence any notifiable work and any work that will at any time include any notifiable work, in accordance with Health and Safety in Employment Regulations 1995.

Noise and nuisance

1.7 LIMIT CONSTRUCTION NOISE
Minimise the effects of noise generation by including in the planning of the work such factors as placing of plant, programming the sequence of operations and other management functions. Limit construction noise to comply with the requirements of NZS 6803, the requirements of the Resource Management Act sections 326, 327 and 328 and the Health and Safety in Employment Regulations 1995 clause 11.

1.8 ACCEPTABLE NOISE LEVELS
Refer to NZS 6803 Tables 2 and 3 for the upper limits of construction work noise received in residential zones, dwellings in rural areas, industrial areas and commercial areas, note also the allowed adjustments. Do not exceed these limits or any limits imposed by regional councils or territorial authorities.

1.9 PROVIDE INFORMATION TO NEIGHBOURS
Provide information to neighbours of any noise generation from the site liable to constitute a problem. Explain to them the means being used to minimise excessive noise and establish with them the timings most suitable for the noise generating work to be carried on.

Discuss with any complainant the measures being used to minimise noise. Where possible modify these measures to accommodate particular circumstances. Finally, determine the sound level at the location under discussion using methods and observation reporting as laid down in NZS 6803. If the noise level is above the upper limits of NZS 6803, table 2 and table 3, cease the noise generating operation and remedy the problem.

1.10 INCONVENIENCE TO OTHERS
When the works are to be carried out in or around occupied premises, ascertain the nature and times of occupation and use. Carry out the works in a manner to minimise inconvenience, nuisance and danger to occupants and users.

1.11 ROADWAY AND FOOTPATH
Keep the adjacent footpath and road clear at all times. Where work must be carried out in the roadway or footpath, obtain required consents from the territorial authority. Where temporary use is made of the footpath or roadway for deliveries and the like ensure that public safety is protected and the goods and materials moved as soon as practicable. Sweep, wash and otherwise clean the roadway/footpath and restore it to its previous condition.

1.12 VEHICLE CROSSING
Make good damage that has occurred as a result of carrying out the contract works. Where there has been significant damage, contact the territorial authority and obtain

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instructions for making good. Pay the territorial authority costs associated with making good.

1.13 DIRT AND DROPPINGS
Remove dirt and droppings deposited on public or private thoroughfares from vehicles servicing the site to the satisfaction of the appropriate authorities and the contract administrator.

1.14 DAMAGE AND NUISANCE
Take precautions to prevent damage and nuisance from water, fire, smoke, dust, rubbish and all other causes resulting from the construction works.

1.15 SMOKE FREE REQUIREMENTS
In accordance with the Smoke Free Environments Act 1990 smoking is not allowed on site.

1.16 RESTRICTIONS
Do not:
- light rubbish fires on the site.
- bring dogs on to or near the site.
- bring radios/audio players on to the site.

Set-out and tolerances

1.17 SURVEY INFORMATION
Locate and verify survey marks and datum points required to set out the works. Where these do not exist or cannot be located advise the contract administrator who will arrange for the required points to be established.

Record and maintain their position. Re-establish and replace disturbed or obliterated marks.

1.18 DATUM
Establish a permanent site datum to confirm the proposed levels and their relationship to all other existing and new levels.

1.19 SET-OUT
Set out the work to conform with the drawings.

1.20 SET-OUT BY LICENSED CADASTRAL SURVEYOR
Before commencing construction provide the contract administrator with a certificate prepared by a licensed cadastral surveyor that the set-out is complete and that the building is accurately placed on the site.

During construction provide the contract administrator with a certificate, prepared by the same licensed cadastral surveyor confirming the set-out of the foundations and grid lines. Necessary adjustments are to be determined and agreed to by the contract administrator before proceeding further.

1.21 CONFIRM HEIGHT IN RELATION TO BOUNDARY
Arrange for the licensed cadastral surveyor to provide a certificate certifying that the building has been constructed within the allowed height in relation to boundary. Obtain details from the principal of the person they have engaged to carry out this certification and advise the surveyor when they can carry out the required survey.

Provide the certificate to the local authority. Provide a copy of the certificate to the contract administrator.

1.22 USE OF SET-OUT INSTRUMENTS
Permit without charge, the use of instruments already on site for checking, setting out and levels.

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1.23 CHECK DIMENSIONS
Check all dimensions both on drawings and site, particularly the correlation between components and work in place. Take all dimensions on drawings to be between structural elements before linings or finishes, unless clearly stated otherwise.

1.24 TOLERANCES
All work to be level, plumb, and true to line and face. Unless otherwise specified in specific work sections of this specification, tolerances for structural work shall comply with the following:

Concrete construction:	To NZS 3109 Concrete construction Clause 3.9 Tolerances for reinforcement Table 5.1 Tolerance for precast components Table 5.2 Tolerance for in situ construction To NZS 3114 Concrete surface finishes
Masonry construction:	To NZS 4210 Masonry construction: Materials and workmanship Clause 2.6.5 Tolerances Table 2.2 Maximum tolerances
Structural steelwork:	To NZS 3404.1 Steel structures standard Section 14.4 Tolerances (after fabrication) Section 15.3 Tolerances (erection)
Timber framing:	To NZS 3604 Timber-framed buildings Clause 2.2 Tolerances Table 2.1 Timber framing tolerances

Refer to work sections for tolerance requirements for finishes.

Execution

1.25 EXAMINE PREVIOUS WORK
Before commencing any part of the work carefully examine the previous work on which it depends, to ensure it is of the required standard.

1.26 REPORT DEFECTIVE PREVIOUS WORK
Refer defects to the contractor to be remedied, if the remedy is outside the scope of the contract documents the contractor shall obtain direction from the contract administrator. Do not carry out work over previous work that is defective and will affect the required standard.

1.27 EXECUTION GENERALLY
Construct the work in accordance with the documents issued for construction including any direction that may have been given by the contract administrator that varies the construction document.

1.28 EXECUTION - NO DETAIL IS PROVIDED
The documents issued for construction will not include all details relating to every material, junction and interface with other materials.

Where the detail provided is of a general nature, or where no detail is provided, refer to the manufacturer's documents for information relating to installation and execution of that part of the work.

Where there is more than one method or detail appropriate to the part of the work in question, refer the options to the Contract Administrator for direction as to which detail or method to use.

1.29 EXECUTION - ACCEPTABLE SOLUTION IS REFERRED TO
Where a NZBC Acceptable Solution is referred to in the specification but not shown on the plans, obtain a copy of that Acceptable Solution and make it available to the workers carrying out that part of the work.

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1.30 MINIMISE DELAYS DUE TO WEATHER
Use appropriate techniques and methods to prevent damage and minimise delays due to weather.

Qualifications

1.31 QUALIFICATIONS GENERALLY
The work is to be carried out by workers and / or supervisors who are experienced, competent and familiar with the materials and the techniques specified. Workers must also be familiar with the manufacturers' and suppliers' installation and application instructions and standard details provided by them in relation to the use of the products for this project. If requested provide evidence of qualification / experience.

1.32 QUALIFICATIONS WORKERS – RESTRICTED BUILDING WORK
Where restricted building work (RBW) forms part of the contract works, workers, or supervisors of that work must be licensed building practitioners (LBP) holding current licenses for the particular restricted building work.
For rare instances where non-RBW also requires an LBP refer to individual work sections for details.

1.33 QUALIFICATIONS WORKERS – MANUFACTURER / SUPPLIER REQUIREMENTS
Where required by a manufacturer or supplier, workers must be specifically trained /approved / accredited / registered / licensed / certified by them. Refer to individual work sections for details.

1.34 QUALIFICATIONS WORKERS – LICENSED UNDER STATUTE
Where workers and / or supervisors of work are required to be licensed, registered or similar under legislation, they must have a current license before they start the work and maintain currency until their part of the work has been completed and all documentation that is required has been provided.

1.35 QUALIFICATIONS – PRODUCER STATEMENTS
Where producer statements are required for parts of the work, ensure that person is suitably qualified and authorized to issue such producer statements.

1.36 REPLACEMENT OF PERSON
Should it be necessary to replace a person, ensure that records of work, producer statements, warranties and the like required for the part of the work they have carried out are obtained.

Ensure that the replacement person takes responsibility for the work they carry out and that they are able to provide such records of work, producer statements, warranties and the like required as a condition of the contract and the building consent.

Products

1.37 NEW PRODUCTS
Products to be new unless stated otherwise, of the specified standard, and complying with all cited documents.

1.38 COMPATIBILITY OF PRODUCTS
Ensure all parts of a construction or finish are compatible and their individual use approved by the manufacturers and suppliers of other parts of the system. Source all parts of a system from a single manufacturer or supplier.

1.39 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Protect products during transit and delivery on site and / or off site. Reject and replace goods that are defective or damaged or will not provide the required finish.

Handle products carefully to avoid damage and distortion and in accordance with codes of practice and the manufacturer's or supplier's requirements. Avoid any contact with potentially damaging surfaces or conditions.

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Store products to avoid visual damage, environmental damage, mechanical damage and distortion. Store in accordance with codes of practice and the product manufacturer's or supplier's requirements. Maintain the proper condition of any protective packaging, wrapping and support.

Refer to individual work sections for any special requirements.

1.40 SUBSTRATE CONDITIONS
Ensure substrate conditions are within the manufacturer's or supplier's stated guidelines both before and during the installation of any material, product or system. Obtain written instructions on the necessary action to rectify unsatisfactory conditions.

1.41 INSTALLING PRODUCTS
Install in accordance with the manufacturer's or supplier's technical literature. Ensure that all installers are familiar with the required substrate conditions and the manufacturer's or supplier's specified preparation, fixing and finishing techniques.

1.42 COMPLY WITH STANDARDS
Comply with the relevant and/or cited Standard for any material or component. Obtain certificates of compliance when requested by the contract administrator.

1.43 CONDITION OF PRODUCTS
To be in perfect condition when incorporated into the work.

1.44 INCOMPATIBLE PRODUCTS
Separate incompatible materials and metals with separation layers, sleeves or gaskets of plastic film, bituminous felt or mastic or paint coatings, installed so that none are visible on exposed surfaces.

Samples

1.45 SAMPLES FOR REVIEW
Where specified in the work sections submit samples and any nominated supporting documentation to the named reviewer and notify the contract administrator of the submission. Where no person is named as the reviewer, submit to the contract administrator.

Samples for review may be described as a portable sample for review, portable control sample, fixed sample for review or fixed control sample. A portable sample refers to a sample that is easily movable, convenient for carrying. A fixed sample refers to a sample that is not portable. If the location of a fixed sample is not defined in the work section, obtain direction from the contract administrator.

For samples that are located on site, or by agreement with the contract administrator are located off site, notify the reviewer and contract administrator of their location and availability for review.

Timing for the provision and review of samples is to be included in the contract programme. Where no time is stated in a work section allow 10 working days for each review. Allow for such resubmission and further review as may be required. No extension of time will be allowed for resubmission and further review.

Obtain written instructions in relation to the samples from the contract administrator. Do not proceed further with related work items until advised to continue.

Samples may be incorporated in the finished work if confirmed in writing by the contract administrator, otherwise allow to completely remove any fixed samples. Remove from the site any rejected samples.

Refer to SAMPLES clauses in work sections for further detail.

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1.46 CONTROL SAMPLES
Samples become control samples if an instruction is given by the contract administrator to that effect. Control samples will be used for comparison purposes throughout the contract. Control samples may be portable or fixed in place, refer to SAMPLES clauses in work sections for further detail.

Control samples that are to remain on site, or otherwise in the care of the contractor, are to be maintained in original condition.

If confirmed by the contract administrator, fixed control samples may be incorporated in the finished work, otherwise allow to remove fixed control samples from site when instructed by the contract administrator.

1.47 OTHER SAMPLE REQUIREMENTS
Where specified in the work sections obtain samples for the purposes described.

Prototypes

1.48 PROTOTYPES - TESTING
Where specified in the work sections provide and test prototypes. Timing for the provision, testing, disassembling, re-assembling, retesting and review of prototypes and test results is to be included in the contract programme. Where no time is stated in a work section allow 10 working days for each review of test results. Submit test results to the named reviewer and to the contract administrator. Where no person is named as the reviewer submit test results to the contract administrator.

Obtain written instructions in relation to the prototype from the contract administrator. Do not proceed further with related work items until advised to continue.

Refer to PROTOTYPES - TESTING clauses in work sections for further detail.

1.49 PROTOTYPES - REVIEW
Where specified in the work sections provide prototypes for review. Timing for the provision, disassembling, re-assembling and review of prototypes is to be included in the contract programme. Where no time is stated in a work section allow 10 working days for review by the named reviewer. Where no person is named as the reviewer notify the contract administrator for direction.

Obtain written instructions in relation to the prototype from the contract administrator. Do not proceed further with related work items until advised to continue.

Refer to PROTOTYPES - REVIEW clauses in work sections for further detail.

1.50 PROTOTYPES - GENERAL
Refer to the PROTOTYPES - TESTING and PROTOTYPES - REVIEW clauses in work section for details on what is to happen after the review and or testing of the prototype is complete. Where no information is provided refer to the contract administrator for direction.

Prototypes may become control samples if an instruction is given by the contract administrator to that effect.

Spares & maintenance products

1.51 SPARES & MAINTENANCE PRODUCTS
Collect, protect, package, label and store safely all spares and maintenance products specified in the work sections. Give the contract administrator an inventory of all spares and maintenance products.

If no instruction is given within a work section for the location of spares and maintenance products, then deliver to the owner.
If no instruction is given within a work section for timing in relation to the provision of spares and maintenance products, then provide at practical completion.

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Refer to SPARES & MAINTENANCE PRODUCTS clauses in work sections for further detail.

Cleaning during the works

1.52 PERIODIC SITE CLEANING
Carry out periodic site cleaning during the contract period. Place waste material in appropriate storage pending removal from the site. Keep food waste separate from construction waste.

1.53 TRADE CLEANING
Keep the work area clean, remove of all debris, unused and temporary materials and elements from the site as work progresses and on completion. Refer to individual work sections for any specific requirements.

Remove protection

1.54 REMOVE PROTECTION
Remove all temporary markings, labels, packaging and coverings to products unless instructed otherwise, or where they are required for protection.

Maintain temporary protection until removal is required by the manufacturer/supplier, the execution of the work or the requirements of individual work sections. Re-establish protection as necessary.

Remove temporary protection and special protection immediately prior to practical completion or before when there is no further risk of damage.

Refer to individual work sections for any special removal requirements.

Completion

1.55 REMOVE CONSTRUCTION WASTE
Remove all debris, unused materials and the like from the site. Arrange for material to be recycled to be collected or delivered to the recycler.

1.56 COMPLETE ALL SERVICES
Ensure all services are complete and operational, with all temporary labelling removed, required labelling fixed and service instructions provided.

1.57 CLEANING BY CONTRACTOR
Clear the contract works of all construction materials, waste, dirt and debris. Clean the contract works including:
- Wipe all surfaces to remove construction dust.
- Clean out service ducts and accessible concealed spaces.
- Clean out all gutters and rainwater heads.
- Wipe dust from both sides of glass. Take particular care when removing paint or cementitious materials to not damage the glass. Do not use metal scrappers that may damage the glass.
- Remove adhesive residue left by labels and other temporary protection/markings.
- Clean out the interior of all cabinetry.
- Wash down external concrete including driveways and concrete masonry. Take care when waterblasting to not cause damage to the surface or allow water to enter the building.
- Remove rubbish and building material from the area immediately adjacent to the contract works.

1.58 CLEANING BY COMMERCIAL CLEANER
In addition to cleaning carried out by the contractor, use a commercial cleaning company to clean the whole of the interior of the building, including all appliances, equipment, fittings, surfaces and finishes to leave it without any blemish. Cleaning to include:
- Clean and wash down all external surfaces to remove dirt, debris and marking.

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- Clean all interior surfaces including cabinetwork, joinery, sanitary and hardware items.
- Clean all floor finishes.
- Clean and polish all glass, both sides. Take particular care when removing paint or cementitious materials to not damage the glass. Do not use metal scrappers that may damage the glass.

Commissioning

1.59 MOVING PARTS
Adjust, ease and lubricate all doors, windows, drawers, hardware, appliances, controls and all moving parts to give easy and efficient operation.

1.60 INSTRUCTION AND DEMONSTRATION
Provide instruction and demonstration to the owner/occupier to the extent that is listed below and as required for them to reasonably occupy and use the building. This is to include at least the following:
- Location and isolation of all services connections.
- Operation of all emergency systems.
- Locking and security arrangements.
- Operation of basic building services including lighting, heating, mechanical ventilation, air conditioning and security.
- Special cleaning requirements and procedures.
- Any other features that the owner/occupier needs to know about.

1.61 SECURITY AT COMPLETION
Remove any temporary lock cylinders and complete final keying prior to handing over keys to the principal on completion of the works. Leave the works secure with all accesses locked. Account for all keys/cards/codes and hand to the principal along with an itemised schedule, retaining a duplicate schedule signed by the principal as a receipt.

Practical completion submission

1.62 ADDITIONAL PRACTICAL COMPLETION INFORMATION
In addition to requirements in the contract and contained elsewhere in the specification provide the following information submissions for practical completion:
- All documents which the contractor has obtained on behalf of the owner/occupier.
- Information required by the owner/occupier to be able to use the building.
- Advice that NUO accounts in the contractor's name have been closed and as appropriate changed to be in the name of the owner/occupier.
- A list of persons to be contacted to carry out any emergency or remedial work including 24 hour/7 day contact details.

1.63 ADDITIONAL PRACTICAL COMPLETION REQUIREMENTS
Refer to the conditions of contract for the definition of practical completion and the conditions relating to practical completion.

Defects period submissions

1.64 DEFECTS REMEDIATION - SUBMISSIONS
Provide the following at periods required by the contract administrator, where no period is stated, provide this information monthly:
- A copy of the contractor's check list identifying remaining defects and omissions to be completed recording progress made in completing and correcting the items.
- A copy of lists issued by the principal/employer identifying omissions and defects recording progress made in completing and correcting the items.
- A copy of lists issued by the contract administrator identifying omissions and minor defects recording progress made in completing and correcting the items.

Completion submissions

1.65 FINAL COMPLETION - SUBMISSIONS
In addition to requirements in the contract and contained elsewhere in the specification provide:

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- Contractors advice that all defects have been corrected and omissions and deferred work completed.
- All documents which the contractor has obtained on behalf of the owner/occupier.

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2210 PREPARATION & GROUNDWORK

1. GENERAL

This section relates to the clearance, excavation and backfilling of the site area in preparation for:
- footings and floor slabs
- backfilling behind basement retaining walls

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3604	Timber-framed buildings
WorkSafe	Good Practice Guidelines - Excavation Safety

1.2 SITE SAFETY
Provide adequate support for all excavations. Cover holes and fence off open trenches and banks.

1.3 ARCHAEOLOGICAL DISCOVERY
If fossils, antiquities and other items of value are found refer to the general section 1220 PROJECT for actions to be taken with archaeological discovery.

2. PRODUCTS

2.1 EXCAVATED CLEAN FILL
Clean, free of contamination, mineral soil from other formations in the excavation which may be selected and approved as suitable for filling by having grading and moisture content properties that will allow recompaction to 95% of maximum density.

2.2 VOLCANIC TUFF FILL
Scoriaceous tuff of variable grading excluding excessive silt or clay material, capable of being placed and compacted as specified.

2.3 ROCK FILL
Hard material comprising rock, broken stone, hard brick, concrete, run of pit scoria, or other comparable inert material capable of being placed and compacted as specified.

2.4 SAND FILL
Clean sand of such grading in particle size to achieve mechanical compaction to 90% maximum density.

2.5 HARD FILL
Scoria or crushed rock to GAP (General All Passing) 40 grading.

2.6 GRANULAR FILL
Approved screened crushed gravel or scoria, graded in size from 20mm to 7mm, clean. When tested with a standard sieve of 4.75 opening no material is to pass.

2.7 DRESSING COURSE
Scoria to GAP 20 grading, or "dirty footpath scoria", or equivalent "all in" graded crushed metal aggregate.

2.8 FREE-DRAINING AGGREGATE
Scoria or crushed gravel graded 50 to 14 clean.

3. EXECUTION

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3.1 WASHOUT BAY FOR TRUCK
Provide a designated area for trucks to be washed down to avoid mud and dirt being carried off site.

3.2 EXCAVATION GENERALLY
Carry out excavation, using plant suitable for the purpose, to the guidelines set by the WorkSafe, Good Practice Guidelines - Excavation Safety.

3.3 BURNING OF MATERIALS
Burning of materials is not permitted on site.

3.4 PROTECT EXISTING WORK
Protect from damage existing buildings, structures, roads, paving and services nominated on the drawings as being retained.

3.5 EROSION CONTROL
Ensure measures are in place to contain silt dislodged as a result of water infiltration and to prevent it being carried off site with stormwater.

3.6 SURFACE PREPARATION
Comply with NZS 3604, section 3.5, **Site preparation**. Remove all turf, vegetation, trees, topsoil, stumps, uncontrolled fill and rubbish from the area to be built on.

3.7 STOCKPILE TOPSOIL
Stockpile excavated topsoil on site where directed. Keep separate from other excavated materials. Spread and level where directed before completion of the works.

3.8 GENERAL EXCAVATION
Trim ground to required profiles, batters, falls and levels. Remove loose material. Protect cut faces from collapse. Keep excavations free from water.

3.9 ROCK EXCAVATION
If rock is found at any level above the underside of the structural foundations, or above required base levels for site service trenches, immediately notify the owner. Obtain written instructions from the owner on the proposed approach to rock excavation, or consequent alterations to subgrade construction. Confirm any changes with the territorial authority.

3.10 FOUNDATION EXCAVATION
Take foundation excavations to depths shown. Keep trenches plumb and straight, bottoms level and free of soft spots, stepped as detailed and clean and free of water.

3.11 INADEQUATE BEARING
If localised bearing is not to NZS 3604, 3.1.2 **Foundations** and 3.1.3 **Determination of good ground**, then excavate further and backfill with material as follows:
- Below slabs on grade: Hardfill compacted in 150mm layers
- Below footings: 10 MPa concrete

If excavation exceeds the required depths, backfill and compact to the correct level with material as listed.
Confirm any changes with the territorial authority.
For inadequate bearing or over excavation of service trenches, use hardfill compacted in 150mm layers.

3.12 STANDARD OF COMPACTION
Place fill in layers of not more than 150mm and compact to achieve 95% of maximum dry density. For granular fill material, the fill shall be compacted to 80% of saturated dry density.

3.13 GRANULAR BASE FOR SLABS
To conform to NZS 3604, section 7.5.3, **Granular base**. Consolidate with a vibrating roller. Blind the surface with 20mm of coarse sand or sand/cement and roll ready to receive a damp-proof membrane.

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3.14 GENERAL BACKFILLING

Obtain written confirmation from the owner before using any excavated material. Compact approved backfilling in 150mm layers with the last 200mm in clean topsoil, lightly compacted and neatly finished off.

3.15 RETAINING WALLS

Backfill behind retaining walls with free draining granular material and compact in 200mm layers. Ensure any tanking membranes, protection sheets, drain coil and damp-proofing are not damaged.

3.16 SURPLUS MATERIAL

Remove surplus and excavated material from the site.

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2310 FOUNDATIONS

1. GENERAL

This section relates to all foundation and piling work, with the exception of in situ concrete work and concrete masonry.

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3605	Timber piles and poles for use in buildings
NZS 3603	Timber structures standard

2. PRODUCTS

2.1 CONCRETE PILES IN SITU
To NZS 3604 for concrete, reinforcement, footing and type.

2.2 CONCRETE PILES PRE-CAST
200mm square parallel-sided to NZS 3604 for footing and type.

2.3 ROUND TIMBER PILES
Corsican pine or radiata pine, treated H5 CCA (preservative code 01 or 02) to NZS 3602, table 1A, and complying with NZS 3605 for cross section, length, straightness, strength and branding. All to NZS 3604 for footing and type.

2.4 SQUARE TIMBER PILES
Corsican pine or radiata pine, treated H5 CCA (preservative code 01 or 02) to NZS 3602, table 1A, and complying with NZS 3605 for cross-section, length, straightness, strength and branding. All to NZS 3604 for footing and type.

2.5 TIMBER SUB-FLOOR FRAMING
Species, grade, moisture content in service and level of treatment as set out in NZS 3602. Grading to NZS 3603 and treated to NZS 3602, table 1C.

2.6 NAILS
Steel, stainless steel and galvanized steel of pattern to NZS 3604, table 6.6 **Nailing schedule for hand-driven and power-driven nails** and section 4 Durability.

2.7 BOLTS
Steel, stainless steel, and galvanized steel to NZS 3604.
Refer to SELECTIONS.

2.8 NAIL PLATES
Stainless steel and galvanized steel toothed or nailed steel plates to the plate manufacturer's design for the particular locations shown on the drawings.

2.9 CORROSION RISKS
For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

3. EXECUTION

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3.1 FOUNDATIONS GENERALLY

Comply with NZS 3109, 3602 and NZS 3604 except as varied by this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 EXCAVATIONS

Refer to 2210 PREPARATION AND GROUNDWORK.

3.3 INSTALL CONCRETE PILES IN SITU

Box for, reinforce and pour in 17.5 MPa concrete the footings and piles in the various types to NZS 3604.

3.4 INSTALL CONCRETE PILES PRECAST

Pour 17.5 MPa concrete footing and set in pre-cast concrete piles in the various types to NZS 3604.

3.5 INSTALL ROUND TIMBER PILES

Prepare for and drive timber piles to NZS 3604, section 6.6, **Driven timber piles**. Protect pile heads with a suitable cushion.

3.6 INSTALL SQUARE TIMBER PILES

Prepare for, place and secure as detailed on the drawings.

3.7 SUB-FLOOR FRAMING

Frame up off foundation walls and piles, all fabricated, fastened and braced to NZS 3604, section 6, **Foundation and subfloor framing**.

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3101 CONCRETE WORK - BASIC

1. GENERAL

This section relates to formwork, reinforcement, concrete mixes and the placing of concrete.

1.1 ABBREVIATIONS AND DEFINITIONS
The following definitions apply specifically to this section:

ACRS	Australian Certification Authority for Reinforcing Steels - An independent certification scheme for reinforcing steel and structural steel, by product and manufacturer/processor. Certifies compliance with Australia/New Zealand Standards.

ACRS web site - www.steelcertification.com

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC B1/VM1	Structure
NZBC E2/AS3	External moisture
AS 1366.3	Rigid cellular plastics for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
NZS 3101.1	Concrete structures standard
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4858	Wet area membranes
CCANZ CP 01	Code of practice for weathertight concrete and concrete masonry construction

Requirements

1.3 QUALIFICATIONS
Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 STEEL REINFORCING COMPLIANCE
Steel reinforcing materials for concrete to AS/NZS 4671. Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

2. PRODUCTS

2.1 NORMAL CONCRETE
Normal concrete 17.5 to 50 MPa grade, (refer to SELECTIONS), maximum aggregate size 19mm ready-mixed to NZS 3104. Provide delivery dockets listing mix and despatch details.

2.2 SITE CONCRETE
Concrete 10 MPa with minimum water for workability, all materials and batching to NZS 3104, table 3.1, Prescribed mixes (P).

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2.3 REINFORCEMENT
Bars to AS/NZS 4671. Grade 300E deformed, other than for ties, stirrups and spirals, unless shown otherwise on the drawings. Welded reinforcing mesh Class E to AS/NZS 4671, and 500E mesh to AS/NZS 4671 as modified by NZS B1/VM1.

2.4 MESH FOR SLABS TO NZS 3604 OR NZS 4229
For slabs on ground mesh to be welded reinforcing mesh to AS/NZS 4671 as modified by NZS B1/VM1, Class E, minimum to B1/AS1 - Grade 500E, 2.27kg/m2 (1.14kg/m2 in each direction).

2.5 TYING WIRE
Mild drawn steel wire not less than 1.2mm diameter.

2.6 SPACERS AND CHAIRS
Precast concrete or purpose made moulded PVC to approval. Where concrete spacer blocks are used in exposed concrete work use blocks matching surrounding concrete.

Accessories

2.7 WATERPROOFING FOR EXTERIOR OPENINGS
Unreinforced wet area membrane to AS/NZS 4858 for waterproofing around openings for windows, doors, meters and other services openings, at or above floor level, also parapets and ends of masonry walls abutting other claddings to CCANZ CP 01. Refer to SELECTIONS.
Do not use bituminous coatings.

3. EXECUTION

3.1 HANDLE AND STORE
Handle and store reinforcing steel and accessories without damage or contamination. Store on timber fillets on hard ground in a secure area clear of any building operation. Lay steel fabric flat.

Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity.

3.2 FALSEWORK AND FORMWORK
Use falsework and formwork of sufficient strength to retain and support the wet concrete to the required profiles and tolerances. Select formwork finish to produce the specified finished quality. Ensure timber or plywood used for formwork is non-staining to the set concrete.

Securely fix and brace formwork sufficiently to support loads and with joints and linings tight enough to prevent water loss. Do not use tie wires or rods unless approved in writing by the Contract Administrator. Unless detailed otherwise, provide a 19mm chamfer or fillet strip at all interior and exterior angles of beam and column forms. Mitre at intersections.

Water blast to clean formwork. Keep formwork wet before concrete is placed.

Unless detailed otherwise, set up soffit boxing for beams and slabs to provide a camber when forms are stripped, of 3mm rise for every 3 metres of total clear span.

3.3 CUT AND BEND REINFORCEMENT
Cut and bend bars using proper bending tools to avoid notching and to the requirements of NZS 3109: 3.3 Hooks and bends. Minimum radii of reinforcement bends to NZS 3109, table 3.1, Minimum radii of reinforcement bends. Do not rebend bars. Where rebending is approved, use a purpose built tool, proper preparation and preheating.

3.4 ADJUSTMENTS
Use a purpose built tool for on site bending and to deal with minor adjustments to steel reinforcement.

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3.5 TOLERANCES, BENDING

To NZS 3109, 3.9, Tolerances for reinforcement.

3.6 SECURE REINFORCEMENT

Secure reinforcement adequately with tying wire and place, support and secure against displacement when concreting. Bend tying wire back well clear of the formwork. Spacing as dimensioned, or if not shown, to the clear distance minimums in NZS 3109, 3.6, Spacing of reinforcement.

3.7 LAPPED SPLICES

Length of laps where not dimensioned on the drawings in accordance with the SELECTIONS. Provide laps only where indicated on the drawings. Tie all lapping bars to each other. Plain bars lapped splices must be hooked.
Wire mesh laps to NZS 3101.1, lap one mesh square plus 50mm minimum (do not count bar extension beyond the outermost wire).

3.8 MESH LAPS FOR SLABS TO NZS 3604 OR NZS 4229

For slabs on ground the welded reinforcing mesh to be lapped such that the outermost wires overlap by the greater of:
- the spacing of the cross wires plus 50mm
- 150mm or
- manufacturer's requirements

Do not count bar extensions beyond the outermost cross wire.

3.9 REINFORCEMENT COVER TO NZS 3101.1

Minimum cover to all reinforcing bars, stirrups, ties and spirals, as shown on drawings. Where cover is not shown on drawings provide minimum cover to NZS 3101.1, table 3.6, **Minimum required cover for a specified intended life of 50 years**. Sub-soil cover to NZS 3101.1, to suit soil and groundwater conditions. Fix chairs for top reinforcement in slabs at 1.0 metre centres or to ensure adequate support. Cover tolerances to NZS 3109, 3.9, Tolerances for reinforcement.

3.10 REINFORCEMENT COVER TO NZS 3604 OR NZS 4229

For in-situ concrete, foundations and interior slabs on ground, to NZS 3604 or NZS 4229, the reinforcement and welded mesh cover to be:

Location, cover to	**NZS 3604**	**NZS 4229**
Footing, to earth	75mm	75mm
Footing, to DPM	75mm	50mm
Foundation, to edge	75mm	75mm
Slab, to slab top	30mm	30mm
Slab, to slab edge	50mm to 75mm	50mm to 75mm

3.11 CASTING IN

Build in all grounds, bolts and fixings for wall plates and bracing elements, holding down bolts, pipes, sleeves and fixings as required by all trades and as shown on the drawings, prior to pouring the concrete.

Do not use grounds exceeding 100mm in length. Location and form of conduits to be approved in writing by the Contract Administrator. Minimum cover 40mm. Do not encase aluminium items in concrete. Do not paint steel embedded items more than 25mm into the concrete encasement. Cut back form ties to specified cover and fill the cavities with mortar.

Form all pockets, chases and flashing grooves as required by all trades and as shown on the drawings.

Wrap all pipes embedded in concrete with tape to break the bond and to accommodate expansion. Do not embed pipes for conveying liquids exceeding a temperature of 50°C in concrete.

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3.12 CONSTRUCTION JOINTS
Locate and construct as shown on the drawings or in accordance with NZS 3109, 5.6, Type B.

3.13 PRE-PLACEMENT INSPECTION
Do not place concrete until all excavations, boxing and reinforcing have been inspected and passed by the Building Consent Authority.

3.14 SURFACE FINISHES
To NZS 3114, 105, Specification of finishes, as scheduled or as denoted on the drawings.

3.15 CONCRETE SURFACE TOLERANCES
To NZS 3114, 104, Surface tolerances and NZS 3114, 105, Specification of finishes, with the suggested tolerances becoming the required tolerances.

3.16 PUMPING CONCRETE
Set up and supervise pump operation, placing and compaction of the mix to NZS 3109, 7.4, Handling and placing and NZS 3109, 7.6, Compaction Advise the ready-mix supplier of the type of pump and the slump required, in addition to the concrete grade, strength and quantity.

3.17 COMPACTION
Use power operated vibrators on foundations, vertical constructions and beams.

3.18 FLOOR SLABS TO NZS 3604
Generally for slabs on ground to NZS 3604 as modified by NZBC B1/AS1 and NZBC E2/AS3.
Construct to NZS 3604, 4.5 **Concrete and concrete masonry** and NZS 3604, 7.5, **Concrete slab-on-ground floors in timber buildings** as modified by NZBC B1/AS1, 3.0 **Timber**. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish. Tolerance on flatness: maximum 3mm gradual deviation over a 3 metre straight-edge, to NZS 3114, 304, **Surface tolerances**.
Allow for free joints maximum 24m centres to NZBC B1/AS1, 3.1.13 **NZS 3604 New clause**.

3.19 FLOOR SLABS TO NZS 4229
Generally for slabs on ground to NZS 4229 as modified by NZBC B1/AS1 and NZBC E2/AS3.
Construct to NZS 4229, 6, **Footings** and NZS 4229, 7, **Foundation walls and concrete slab-on-ground** as modified by NZBC B1/AS1, 2.0 **Masonry**. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish. Tolerance on flatness: maximum 3mm gradual deviation over a 3 metre straight-edge, to NZS 3114, 304, **Surface tolerances**.
Allow for free joints maximum 18m centres to NZS 4229, 7.8.5.3 **Free joints**.

3.20 SAW CUTS TO NZS 3604 OR NZS 4229
Cut slabs where indicated on the drawings as required to control shrinkage cracking. Form by saw cutting the slab (blade width approximately 5 mm) to a quarter of the depth of the slab after it has hardened (saw cutting shall take place no later than 24 hours after initial set for average ambient temperatures above 20 ºC, and 48 hours for average ambient temperatures below 20ºC).

3.21 SAW CUTS
Cut slabs where indicated on the drawings and as required to control shrinkage cracking. Carry out cutting as soon as possible, without causing tear-out of aggregate and before shrinkage cracking has occurred, generally within 24 hours of pouring.

3.22 SPACING OF SAW CUTS
Spacing of sawcuts

Floor situation	Maximum spacing of sawcuts both ways
Industrial floor	5m
Architectural, exposed floor, thin finishes, rigid finishes	4m

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Carpet on underlay flooring	6m

3.23 SURFACE DEFECTS

Make good surface defects immediately after forms are stripped. Make good hollows or bony areas with 1:2 mortar or plaster, finished to the same tolerances as the parent concrete. Fill any tie rod holes with 1:2 mortar.

3.24 CURING OF CONCRETE

Keep damp for not less than seven days. Ensure curing of slabs commences as soon as possible after final finishing, by the use of continuous water sprays, or ponding. Alternately, apply a curing membrane. Ensure any membrane used will not affect subsequent applied finishes.

3.25 STRIKE FORMWORK

Strike formwork without damaging or overloading structure. Do not remove formwork before the following minimum periods:

12 hours:	Sides of beams, walls and columns
4 days:	Slabs in beam and slab construction (leave props under slab spans over 2 metres)
10 days:	Props from under slab spans over 2 metres
18 days:	Beams, soffits and slab spans over 5 metres

3.26 WATERPROOFING EXTERIOR OPENINGS

Apply waterproofing to the exposed face of openings for, windows, doors, meters etc, also if necessary the top of parapets/balustrades and ends of masonry walls abutting other claddings. To CCANZ CP 01, waterproofing manufacturer's requirements and as detailed.
Provide temporary protection from direct sunlight.

3.27 CLEAN OUT

Clean out saw cuts. Fill with cement grout where the floor will be covered with carpet or vinyl.

3.28 REMOVE

Remove all unused materials and all concrete and reinforcing debris from the site.

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3155FR FIRTH RIBRAFT® FLOOR SYSTEMS

1. GENERAL

This section relates to the supply and installation of **Firth Industries** RibRaft® floor system and RibRaft® X-Pod® floor system.
It includes:
- a nonspecific design reinforced concrete waffle raft floor slab-on-ground (RibRaft®) system.
- a specific design reinforced concrete waffle raft floor slab-on-ground RibRaft® X-Pod® floor system.
- a RibRaft® floor system incorporating an integrated thermal edging, HotEdge®.

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following definitions apply specifically to this section:

ACRS	Australian Certification Authority for Reinforcing Steels - An independent certification scheme for reinforcing steel and structural steel, by product and manufacturer/processor. Certifies compliance with Australia/New Zealand Standards. ACRS Web site - www.steelcertification.com

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/VM1	Structure
NZBC B1/AS1	Structure
NZBC G13/AS1	Foul Water
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
NZS 3631	NZ Timber grading rules
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer and supplier documents relating to this part of the work:
Firth RibRaft® Floor System Manual **
Firth RibRaft® Technical Manual January 2020
Firth RibRaft® Flooring Solutions (Introductory brochure)
Firth RibRaft® HotEdge® installation manual
Firth RibRaft® X-Pod® Brochure (Introductory brochure)
Firth RibRaft® X-Pod® Structural Design Guide
CodeMark™ Bureau Veritas CM70056 - RibRaft® Floor System

** A copy of this manual must be held on site.

Manufacturer/supplier contact details

Company:	**Firth Industries**
Web:	www.firth.co.nz
Email:	info@firth.co.nz
Telephone:	0800 FIRTH1 (0800 347841)

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Further information and/or names of tradespeople who have installed Firth RibRaft® floors are available by phoning Firth Information Service 0800 347841.

Requirements

1.4 NO SUBSTITUTIONS
Substitutions are not permitted to any specified Firth RibRaft® Floor System and Firth RibRaft® X-Pod® Floor System product or component, or associated Firth products. Concrete used for the construction of Firth RibRaft® Floor System and Firth RibRaft® X-Pod® Floor Systems must be supplied by Firth. RibRaft® & RibRaft® X-Pod® formers are only available from Firth Industries and are only supplied on a project with confirmation of an order for Firth Concrete.

1.5 QUALIFICATIONS
Tradespeople to be competent, experienced, and familiar with the Firth RibRaft® Floor System and Firth RibRaft® X-Pod® Floor System materials and techniques specified.

1.6 STEEL REINFORCING COMPLIANCE
Steel reinforcing materials for concrete to AS/NZS 4671. Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

1.7 QUALITY RECORDS
Keep accurate records relating to strength and quality of materials used during construction. Include records of workmanship during construction and photographs of as-built details. Make the information available to the Building Consent Authority inspector on request.

Performance

1.8 COMPLIANCE - RIBRAFT® FLOOR SYSTEM
RibRaft® Floor System meets the requirements of the CodeMark® certificate CodeMark™ Bureau Veritas CM70056 when used within the conditions and limitations of its Certificate of Conformity. Achieves compliance with NZBC as follows:
- NZBC B1.3.1, 3.2, 3.3, B1.3.1, B1.3.3 (a,b,f,g,h,q,m), B1.3.4
- NZBC B2.3.1 (a), B2.3.1(a), B2.3.2(a)
- NZBC E2.3.3
- NZBC F2.3.1
- NZBC H1. 3.1 (refer to limitation c)

2. PRODUCTS

Materials

2.1 BLINDING
50mm maximum compacted GAP 7.

2.2 TIMBER FORMWORK
No. 2 framing and dressing or merchantable grade radiata pine boards to NZS 3631.

2.3 DAMP-PROOF MEMBRANE
0.25mm minimum polyethylene to NZS 3604: clause 7.5.4, Damp-proof membrane (DPM). Refer to SELECTIONS.

2.4 POLYSTYRENE PODS FORMERS– RIBRAFT® FLOOR SYSTEM
Firth RibRaft® proprietary purpose made polystyrene pods.

2.5 REINFORCEMENT
Bars to AS/NZS 4671. Grade 500E deformed, other than for ties, stirrups, and spirals, unless shown otherwise on the drawings.

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2.6 INTERNAL CORNER REINFORCEMENT – RIBRAFT® FLOOR SYSTEM
Minimum 2 x HD12 bars Grade 500E to AS/NZS 4671.

2.7 MESH – RIBRAFT® FLOOR SYSTEM
Welded reinforcing mesh to AS/NZS 4671 as modified by NZS B1/VM1, generally, Class E, minimum to NZBC B1/AS1 - Grade 500E, 2.27kg/m2 (1.14kg/m2 in each direction). Minimum SE62 500E mesh or the equivalent.

2.8 TYING WIRE
Mild drawn steel wire not less than 1.2mm diameter.

2.9 CONCRETE 20Mpa – RIBRAFT® FLOOR SYSTEM
Firth Raftmix, a 20 MPa 100mm slump mix in either 13mm or 19mm nominal aggregate size, supplied by Firth Industries.
Firth Raftmix™ for direct placement and Firth Raftmix™ Pump for pump applications.

2.10 NORMAL CONCRETE - NON RIBRAFT® APPLICATIONS
Normal concrete 20 MPa grade, maximum aggregate size 19mm to NZS 3104 for concrete work where Firth Raftmix™ or Firth Raftmix™ Pump are not appropriate.

Components

2.11 SPACERS
Firth proprietary spacers. Refer to SELECTIONS for size.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage, and handling of products.

3.2 ROUTINE MATTERS
Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

Application -General

3.3 SITE CLEARANCE
Clear the slab area of any vegetation and topsoil down to the subgrade level.

3.4 BUILDING PLATFORM
Create a building platform to a level surface to the required depth below finished floor level to suit the RibRaft® or RibRaft® Xpod system. Cut and/or fill sloping sites. Confirm finished floor level.

3.5 POST-CUT INSPECTION – RIBRAFT® FLOOR SYSTEM
Inspect and confirm that the soil conditions are as anticipated by the geotechnical investigation and report and conform to the requirements of the Firth RibRaft® manual. Refer to Firth RibRaft® Floor System Manual Section 1 - Design Information, 3.5 Foundation Soils.

3.6 TEMPORARY BUILDING PLATFORM DRAINAGE
Construct suitable drainage to keep excessive ground water off the building platform during and after construction as required.

3.7 HARDFILL
Place hardfill and ensure it is spread and compacted with mechanical compaction.

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3.8 PIPED SERVICES – BELOW SLAB INSTALLATION
Ensure piped and cabled underfloor services are installed in the subsoil or hardfill in locations as shown on the drawings and according to Firth RibRaft® floor system requirements. Refer to Firth RibRaft® Floor System Manual Section 2 - Installation Information, 3.4 Plumbing and Services.

3.9 BLINDING LAYER
Spread GAP 7 blinding layer to a minimum 500mm past the outside edge of the slab, compact to a level layer no greater than 50mm thick and no higher than 305mm below finished floor level.

3.10 FORMWORK
Construct formwork as required, well braced, and tied to remain in position, straight and plumb during construction. Ensure formwork will provide for the topping depth, including rebates and the required concrete finish.

3.11 INSTALL DAMP-PROOF MEMBRANE
Apply DPM to the prepared basecourse extending to the outside of all edge beams or fold and staple up the inside of the formwork. Overlap all joints in the DPM sheets a minimum 150mm. Tape laps and penetrations with 50mm wide pressure sensitive plastic tape. Ensure DPM is not damaged during the construction process. Repair all damage to DPM before proceeding with following procedures.

3.12 PLACE POLYSTYRENE PODS
Place polystyrene pods in a regular waffle pattern using the spacers in the specified grid pattern to fit the floor plan. Cut pods on site with a saw or suitable hot wire as required. Cut holes for services and trim around piles as required on site.

3.13 INSTALL SPACERS
Install spacers and locations to the Firth RibRaft® floor system requirements.

Form standard ribs between pods using Firth 100mm spacers. Place the spacers at a minimum of one spacer along each edge of each pod or part pod. The ribs in both directions form a waffle pattern throughout the slab.

Form the edge beam using Firth 300mm spacers. Place the spacers at 1200mm centres maximum along the perimeter of the slab at least and one spacer per pod or part pod.

Form ribs to support loadbearing walls using Firth 300mm spacers. Place the spacers at a minimum of one spacer along the edge of each pod or part pod.

3.14 PLACE REINFORCING STEEL: RIB STEEL
Place rib reinforcing steel in the bottom of the internal ribs and supported in the correct position by the Firth spacers. Lap all steel 720mm minimum and hook all plain bars. At the junction with the edge beam, each rib steel bar shall sit on top of the edge beam bars and extend to the outermost bar. Allow for 75mm cover to the edge of the beam. Place 1 x HD12 bar in each 100mm wide rib and 2 x HD12 bars in each 300mm wide rib.

3.15 PLACE REINFORCING STEEL: EDGE BEAM STEEL
Place the two edge beam reinforcing bars in the bottom of the edge beam and supported in the correct position by the Firth spacers. Tie one edge beam bar below the mesh at the perimeter of the area covered by the polystyrene pods. Lap all steel 720mm minimum and hook all plain bars. At corners, the inner bottom bars and the top bars cross each other and extend to 75mm from the outside face of the edge beam. Tie these bars together where they cross. Tying of edge beam steel is only required at corners.

3.16 PLACE REINFORCING STEEL: RE-ENTRANT CORNER STEEL
Place two HD12 bars, 1200mm in length across the corner. Tie to the top of the mesh at re-entrant corners at 200mm centers with 50mm side cover from the internal corner.

Install specified steel to Firth RibRaft® Floor System Manual Section 2 - Installation Information, 3.9 Reinforcing Steel. Ensure specified minimum cover requirements are maintained.

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3.17 PLACE REINFORCING MESH AND CHAIRS
Place reinforcing mesh over the pods and support on the mesh chairs spaced at 1200mm centerss minimum, with two mesh chairs minimum placed per pod and with one mesh chair minimum per part pod.

3.18 MESH LAPS
For slabs on ground the welded reinforcing mesh to be lapped and tied, such that the outermost wires overlap by the greater of:
- the spacing of the cross wires plus 50mm
- 225mm or
- manufacturer's requirements

Do not count bar extensions beyond the outermost cross wire.

3.19 FORM SLAB AND OPENING REBATES
Form rebates, as detailed on drawings.

Form a minimum 50mm rebate in slab for masonry veneer construction with a width dependent on the veneer width, cavity width and overhang. Waterproof the rebate with a bituminous sealer on both the vertical and horizontal faces.

3.20 TOPPING SLAB DEPTH
Refer to SELECTIONS for required topping slab depth.

3.21 PRE-PLACEMENT INSPECTION
Arrange for excavations, formwork and reinforcement to be inspected and passed by the Building Consent Authority.

3.22 CONCRETE PLACEMENT AND COMPACTION
Ensure the rib and edge beam canals are clean, free of debris. Pour the floor in a single pour using only Firth Raftmix™, Firth X-Pod® Raftmix™, Firth Raftmix™ Pump or Firth X-Pod® Raftmix™ Pump concrete and ensuring that the pods remain in position during placing. Pour concrete onto the top of each pod prior to filling the ribs around the pod to help prevent them from floating and lifting.

Use Firth Raftmix™ or Firth X-Pod® Raftmix™ for placement in the floor directly from the concrete truck chute or Firth Raftmix™ Pump or Firth X-Pod® Raftmix™ Pump concrete for placement in the floor by concrete pump.

Compact concrete using a suitable poker vibrator for the ribs and ground beams and into all corners of the formwork. Screed as required. Confirm levels with a laser level.

3.23 CONCRETE FINISHING
Float and trowel to provide a U3 finish to NZS 3114: table 2, Classes of floor, exterior pavement and invert finishes.

3.24 CONCRETE CURING
Curing of the concrete slab must take place immediately after finishing the concrete to NZS 3109 by one of the following curing methods:
- ponding or continuous sprinkling of water
- placing a wet covering or plastic membrane over the slab
- the use of liquid membrane curing compounds

3.25 SHRINKAGE CONTROL JOINTS
Cut shrinkage control joints as shown on the plans after hardening to a depth of 25mm within 24 hours in summer or 48 hours in winter.

Where shrinkage control joints have not been shown on the plans, position the shrinkage control joints to coincide with major changes in the floor plan. Agree position of shrinkage control joints with the designer.

Bay dimensions formed by the shrinkage control joints to be limited to a maximum ratio of length to width of 2 to 1 with a maximum dimension of 6 metres. Place the shrinkage

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control joints over the 100mm wide internal ribs wherever possible. Where a shrinkage control joint runs along the line of a 300mm wide loadbearing rib, locate the cut directly above one edge of the 300mm rib.

3.26 CLEAN OUT SHRINKAGE CONTROL JOINTS
Clean out control joints. If required fill with suitable flexible sealant.

Application - other concrete work

3.27 PLACE CONCRETE
Do not place fresh concrete against the preceding layer after more than 45 minutes, or such lesser time as required by the circumstances, to NZS 3109: clause 7.4, Handling and placing.

3.28 SCREED THE SURFACE
Screed the concrete surface by straight edge or vibrating screed immediately after compaction and to tolerances in NZS 3109: table 5.2, Tolerances for in situ construction.

3.29 CONCRETE FINISHING
Screed and provide a U3 finish to NZS 3114: table 2, Classes of floor, exterior pavement and invert finishes.

Finishing

3.30 STRIKE FORMWORK
Strike formwork after at least 12 hours after the slab has been finished without damaging or overloading structure.

3.31 SURFACE DEFECTS
Make good surface defects immediately after forms are stripped. Make good hollows or bony areas with suitable patching mortar, finished to the same tolerances as the parent concrete. Fill any tie rod holes with 1:2 mortar.

Completion

3.32 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4. SELECTIONS

For further details on selections go to www.firth.co.nz.
Substitutions are not permitted to the following, unless stated otherwise.

4.1 FIRTH RIBRAFT® POD FLOOR SYSTEM

Brand:	Firth Ribraft® Floor System
Size:	1100mm x 1100mm x 220mm
Topping thickness:	85mm
Mesh:	Class E, Grade 500E, minimum SE62 or equivalent

4.2 FIRTH SPACERS

Brand:	Firth
Size:	100mm and 300mm

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3811M MITEK (GANG-NAIL) PREFABRICATED TIMBER TRUSSES

1. GENERAL

This section relates to the manufacture, supply and erection, of prefabricated:
- MiTek® timber roof trusses (GANG-NAIL® roof trusses)
- MiTek® bolted style timber roof trusses - (GANG-NAIL®) XPOTRUSS roof trusses
- MiTek® floor trusses (Posi-STRUT® truss systems)
- MiTek® rafter and purlin trusses (Posi-STRUT® truss systems)

1.1 RELATED WORK
Refer to 3821M MITEK TIMBER FRAMING for general timber framing, bracing, lintels, beams etc.

1.2 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

FTMA	Frame and Truss Manufacturers Association of New Zealand Inc.
SED	Specific Engineering Design

Documents

1.3 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/VM1	Structure
NZBC B2/AS1	Durability
AS/NZS 1170.0	Structural Design Actions - General principles
AS/NZS 1170.2	Structural Design Actions - Wind actions
NZS 1170.5	Structural Design Actions - Earthquake actions - New Zealand
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3640	Chemical preservation of round and sawn timber
FTMA CoP	Frame and Truss Manufacturers Association Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
MiTek® (GANG-NAIL®) Roof Truss System Manual
MiTek® (GANG-NAIL®) Roof Truss Installation manual
MiTek® (GANG-NAIL®) XPOTRUSS Roof Truss System brochure
MiTek® (GANG-NAIL®) Posi-STRUT® Truss System Manual
MiTek® Structural Fixings On site guide for Building Code Compliance (2012)
For the latest version of the documents refer to the manufacturer's web site.

Manufacturer/supplier contact details

Company:	**MiTek New Zealand Limited**
Web:	www.miteknz.co.nz
Email:	design@miteknz.co.nz
Telephone:	09 274 7109 or 03 348 8691

Requirements

1.5 QUALIFICATIONS
Fabricators to be experienced competent workers, familiar with the materials and the techniques specified.
Fabrication companies to be MiTek® accredited fabricators.

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1.6 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.7 DESIGN CRITERIA NON-SPECIFIC DESIGN
Individual timber framing members used separately, but in association with the trusses, to NZS 3604.

1.8 DESIGN CRITERIA SED
Frames and trusses to, Alternative Solution MiTek® 20/20 and MiTek Sapphire® Design Programme, NZBC B1/VM1, AS/NZS 1170.0, AS/NZS 1170.2, NZS 1170.5 and NZS 3603.

Documentation for Building Consent/Code Compliance Certificate

1.9 DOCUMENTATION - FABRICATOR / MANUFACTURER
To NZS 3604, 10.2.2.3 **Drawings and Specifications** and the provisions/requirements of the following related clauses.

1.10 PROVISION OF STATEMENTS
Provide the following documentation. The statements shall include the name and position within the company of the person providing the statement.
Fabricator Design and Manufacturing Statements shall be noted as being:
- Issued by a named company, accredited as a fabricator by the nail plate manufacturer
- Issued to the named Owner and available for use by a BCA to assist in determining compliance with the NZBC.

1.11 SHOP DRAWINGS
Provide drawings showing the trusses and their layout;
- one prior to fabrication (buildable truss layout) for consent purposes.
- one post fabrication As Built (as fabricated layout) for construction and code compliance purposes.

The drawing shall be identified as 'Buildable' or 'As Built' (as fabricated) and shall include the following:
- The name and contact details of the accredited fabricator
- The job/design reference name or number
- The site address/location

Site specific structural and loading information including
- Pitch
- Cladding type
- Wind and snow loading values
- Date drawn
- A truss layout with truss labels and dimensions to locate the trusses on the supporting structure
- Identification of all load bearing walls/beams used to support trusses
- Specification and location of truss to truss and truss to top plate fixings or notification that such items are specified by others
- Identification of the location of any resulting loads where the design of the supporting member will be outside the scope of NZS 3604 (point loaded lintels and point loads on internal walls where the downward and upward loads are higher than 16kN) and where appropriate, any slab thickening required
- Reference to the Fabricator Design Statement

1.12 AS BUILT DOCUMENTS
Refer to the general section 1238 AS BUILT DOCUMENTATION for the requirements for submission and review of as built documents and records.

Provide the following as built documents and records:
- Provide final post fabrication as built information for construction and code compliance purposes.

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1.13 DESIGN STATEMENT - BUILDABLE TRUSS LAYOUT SERVICE

Roof truss layouts, a truss design statement and a producer statement (design) produced by MiTek Buildable Truss Layout (BTL) service have been included as a part of building consent documentation.

1.14 DESIGN STATEMENT - FABRICATOR

Provide a Design Statement issued by the fabricator listing the job specific inputs used in the design process.

The Design Statement shall identify:
- The name and contact details of the accredited fabricator
- The name of the software/nail plate manufacturer that has accredited the fabricator
- Software date/version
- Reference to the Producer Statement - Design
- Supporting compliance documents including standards for material grades and sizes
- The job/design reference name or number
- The site address/location

Job specific information:
- Loads allowed for in the specific design including dead loads (cladding and ceiling) and live loads (wind and snow)
- Roof pitch
- Nominal overhang length
- Importance Level

Design working life:
- A list of the designed trusses, spans and maximum spacing
- Date of design

1.15 PRODUCER STATEMENT - DESIGN

Provide a Producer Statement - Design issued by the software provider, supporting the software and the engineering principles being applied by the software.

The Producer Statement shall:
- Have a level of detail consistent with that of an IPENZ Producer Statement PS1
- State the means of compliance with NZBC
- Reference the truss layout and Fabricator Design Statements
- Identify the job/design reference name or number
- Identify the software date/version
- Be signed by a Chartered Professional Engineer

1.16 MANUFACTURING STATEMENT

Provide a statement to support the manufacture of the roof trusses in accordance with the principles of the design statement and truss layouts. This statement is to be issued by a fabricator after manufacture has occurred and identifying:
- The job/design reference name or number
- The site address/location
- The name and contact details of the accredited fabricator
- The name of the software/nail plate manufacturer that has accredited the fabricator
- That the trusses were manufactured in accordance with the Design Statement
- The name and position within the company of the person providing the statement

Truss identification

1.17 IDENTIFICATION OF TRUSSES ON SITE

A selection of trusses in a job lot manufactured by a fabricator shall carry identification labels or markings fitted during manufacture, to NZS 3604, 10.2.2.5, **Truss identification**.

Identification shall be evident on the bottom chords of main rafter or girder trusses on a minimum of 6 trusses in a job lot, or on every truss where there are less than 6 trusses in the job lot.

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Identification text shall be a minimum of 10mm high and shall include:
- The fabricator name
- The nail-plate manufacturer name
- The job/design reference name or number

2. PRODUCTS

Materials

2.1 MITEK TRUSSES - TIMBER
Structural grade timber to NZS 3602, NZBC B2/AS1, gauged, maximum moisture content of 20%, treated to NZS 3640, NZBC B2/AS1, hazard class H1.2 and identified with its unique identifier.

2.2 MITEK ROOF TRUSSES - TOOTHED PLATE
MiTek® (GANG-NAIL®) timber roof trusses with toothed plate connectors. Design and layout to be determined by a MiTek® accredited fabricator, refer SELECTIONS.

Accessories

2.3 STEEL TOOTHED CONNECTOR PLATES
GANG-NAIL® 1.0mm to 2.0mm thick steel sheet, Z275 galvanized to NZS 3604, table 4.2, **Galvanizing of steel components other than nails and screws** and punched to form a toothed connector. For (roof) spaces designated closed environments to NZS 3604.

2.4 STAINLESS STEEL TOOTHED CONNECTOR PLATES
GANG-NAIL® 1.2mm to 2.0mm thick 316 grade, GS12 stainless steel sheet, punched to form a toothed connector.

2.5 BOWMAC GALVANIZED STRUCTURAL BRACKETS
MiTek® BOWMAC® >3mm thick steel plate brackets, hot-dip galvanized to NZS 3604, table 4.2, **Galvanizing of steel components other than nails and screws** with hot-dip galvanised bolts/screws and washers.

2.6 BOWMAC STAINLESS STEEL STRUCTURAL BRACKETS
MiTek® BOWMAC® >3mm thick, 304 stainless steel plate brackets with stainless steel bolts/screws and washers.

2.7 CORROSION RISKS
For interior timber, treated with copper-based timber preservatives (H3.2 or higher), use a minimum of hot-dipped galvanized steel fixings and fasteners.

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

3. EXECUTION

Conditions

3.1 COMPLY
Comply with current standards, code requirements and the FTMA CoP in the design and fabrication of trusses and frames.

3.2 DELIVER, HANDLE AND STORE TRUSSES AND FRAMES
Deliver, handle and store frames and trusses so no structural damage occurs, corners and edges are not damaged, or surfaces marked or stained. Follow manufacturer's requirements. Handle all frames and trusses with nylon strops or similar to prevent damage. Store under cover and clear of the ground, to keep dry prior to installation.

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Fabrication

3.3 DIMENSIONS, NOT EXPOSED ELEMENTS
Each member calculated length ±3mm. Width and thickness to gauging tolerances. Each overall joint within ±3mm of correct outside profile (including camber allowance).

3.4 FABRICATION
Factory fabricate to the GANG-NAIL® Manufacturing System. Build camber into all elements to accommodate normal deflection under load. Lay up members accurately with all joints tight fitting. Mechanically press plates to manufacturer's tolerances, fully and flat over their whole area into the members forming the joint.

Site installation

3.5 MITEK (GANG-NAIL) ROOF TRUSS ERECTION
To MiTek® (GANG-NAIL®) Roof Truss Installation manual.
Lift, place and fix trusses without overstressing or deformation. Use temporary supports as needed without causing damage. Fit trusses to wall plates and beams to MiTek® (GANG-NAIL®) requirements, but no less than NZS 3604, section 10, **Roof framing** and in particular section 10.2.2, **Roof trusses**. Fit and fix bracing as detailed and to NZS 3604: section 10.2.2, **Roof trusses** and section 10.3, **Systems to resist horizontal loads**. Ensure all trusses are correctly located, plumb and true to line and face.

3.6 MITEK (GANG-NAIL) ROOF TRUSS CONNECTION AND FIXING
To MiTek® (GANG-NAIL®) Roof Truss Installation manual.
Fit connectors and fixings to obtain full bearing over all contact surfaces and ensure the required loading capacity for the truss and frame roof is maintained. Fix each roof framing member in accordance with MiTek® (GANG-NAIL®) requirements and NZS 3604, Section 10, **Roof framing.** Ensure the size, number and location of nails to be used in roof framing comply with requirements of Table 10.8, **Nailing schedule for hand-driven and power-driven nails**, or to engineering specific design. Ensure all elements are correctly located, plumb and true to line and face.

3.7 ROOF BRACING
Refer to 3821M MITEK TIMBER FRAMING for roof bracing of trussed roofs.

3.8 WALL BRACING
Refer to 3821M MITEK TIMBER FRAMING for wall bracing.

3.9 DPC TO TIMBER
Lay DPC between all timber frames and concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier. For LOSP treated timber use only a DPC specifically suitable with LOSP treatment.

3.10 TIGHTEN BOLTS
Check and tighten any related fixing bolts after erection is completed.

Completion

3.11 REPLACE
Replace or repair damaged elements.

3.12 REMOVE
Remove debris, unused materials and elements from the site.

3.13 LEAVE
Leave work to the standard required by following procedures.

4. SELECTIONS
For further details on selections go to www.miteknz.co.nz.

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3813F FUTUREBUILD® NZ - LVL STRUCTURAL FRAMING

1. GENERAL

This section relates to the supply and installation of Futurebuild LVL engineered wood products including:
- hyONE®
- hySPAN®
- hyCHORD®
- hy90®
- hyJOIST®

1.1 RELATED WORK
Refer to 3811 PREFABRICATED STRUCTURAL TIMBER FRAMING for supply of trusses and frames.

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1	Structure
AS/NZS 2269.0	Plywood - Structural - Specifications
NZS 3604	Timber-framed buildings
AS/NZS 4357.0	Structural laminated veneer lumber - Specifications

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.3 MANUFACTURER DOCUMENTS
Futurebuild LVL documents relating to work in this section are:
- Futurebuild LVL Residential Design Guide
- Futurebuild LVL Specific Engineering Design Guide
- hyJOIST Design and Installation Guide:2.1
- hyJOIST HJ240 45 and HJ300 45 Brochure
- Product Technical Statement - Futurebuild LVL Products specified for Residential Applications through software and literature
- Product Technical Statement - Futurebuild LVL Products: General/Specific Design
- Product Technical Statement - Futurebuild LVL Products: Specified through designIT for commercial floors
- Product Technical Statement - Futurebuild® LVL Products: Specified through computeIT® Software Solutions
- designIT Software which includes installation details, Design Certificate and Producer Statement

Copies of the above literature and software are available from Futurebuild LVL.

Web:	www.futurebuild.co.nz
Email:	info@futurebuild.co.nz
Telephone:	0800 808 131 (Customer Services), 0800 585 244 (Technical)

Requirements

1.4 NO SUBSTITUTIONS
Substitutions are not permitted to any specified Futurebuild LVL engineered wood products or associated components or accessories. The structural properties of other manufactures LVL products may not be comparable.

1.5 QUALIFICATIONS GENERALLY
Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

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1.6 CO-ORDINATION
Refer to all drawings to ensure details and fixings required are provided for in the structural LVL work.

2. PRODUCTS

Materials - Laminated Veneer Lumber (LVL)

2.1 HYONE LINTELS & BEAMS
High stiffness structural LVL lintels and beams manufactured to AS/NZS 4357.0

2.2 HYSPAN
Structural radiata pine LVL bearers, lintels, rafters, floor joists, floor and roof beams, to AS/NZS 4357.0.

2.3 HYJOIST
Structural composite "I" beam floor joists and rafters comprised of a cross banded plywood web with LVL flanges in-grade tested to meet published Characteristic Values.

2.4 HYCHORD
Structural LVL truss chords for high load applications and wall studs to AS/NZS 4357.0

2.5 HY90 LINTEL
Structural LVL lintels and beams manufactured to the requirements of AS/NZS 4357.0

Components

2.6 JOIST HANGERS
Top mount hangers, full depth face mount hangers and partial depth face mount hangers with nails and/or screws to Futurebuild LVL technical literature requirements.

2.7 WEB STIFFENERS
Futurebuild LVL web stiffeners used to resist web buckling or installed in conjunction with partial height joist hangers, and/or to accommodate uplift forces. Fixed to Futurebuild LVL technical literature requirements.

2.8 STEEL STRAPS
Mild steel galvanized straps, to suit tie down applications for rafters, 27mm x 0.6mm, 25mm x 0.8mm and 25mm x 1.0mm.

3. EXECUTION

Conditions

3.1 ERECTION GENERALLY
Carry out the erection of LVL and associated support framing for houses and similar structures to the requirements of NZS 3604 and/or Futurebuild LVL literature and software as detailed. Comply with NZBC B1/VM1, 6.0 Timber. Refer to Futurebuild LVL guidelines for the installation of LVL structural framing. Prop long length beams and lintels at the mid span until the moisture content has reached a suitable level for the application of internal linings.

Application - hySPAN & hyCHORD

3.2 ERECTION
Lift, place and fix hySPAN or hyCHORD without overstressing or deformation. Use temporary supports as needed without causing damage. Fix hySPAN or hyCHORD to NZS 3604 and/or to Futurebuild LVL requirements. Ensure all members are correctly located, plumb and true to line and face.

3.3 HOLES AND NOTCHES IN SOLID FUTUREBUILD LVL FLOOR JOISTS
Holes and notches in Futurebuild LVL floor joists to NZS 3604 and/or Futurebuild LVL requirements.

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Application - hyJOIST

3.4 ERECTION
Lift, place and fix hyJOIST without overstressing or deformation. Use temporary supports as needed without causing damage. Fix hyJOIST to Futurebuild LVL requirements. Ensure all hyJOIST is correctly located, plumb and true to line and face.

3.5 WEB HOLE LOCATIONS IN HYJOIST
Circular holes, square holes and rectangular holes to be located in hyJOIST floor joists as per limitations in the hyJOIST Design and Installation Guide, designIT sITe APP or designIT Software. Do cut web area as specified. Do not cut, notch or bore through flanges.

3.6 HYJOIST RAFTERS AND OVERHANGS
To Futurebuild LVL hyJOIST Design and Installation Guide, or designIT Software, for details of rafter tie down, restraint at supports, lateral restraint for hyJOIST rafters, ridge support detail, fascia connection detail and overhang details. For sloping soffit with hyJOIST rafters birdsmouthed at supports, cut notch to provide 45mm minimum bearing. Flange must not overhang support. Do not cut beyond flange.

3.7 HYJOIST BEARING AND SUPPORT DETAILS
To hyJOIST Design and Installation Guide, or designIT Software, for details of bearing and support, nailing down to supports, installation of joist hangers, web stiffeners, web stiffeners for double joists, for joists oblique to bearer, concentrated loads from jamb studs or posts and limited notching at end supports.

3.8 JOIST HANGERS FOR HYJOIST JOISTS
To Joist Hanger Specification in Futurebuild LVL hyJOIST Design and Installation Guide, or designIT Software.

Application - hy90 & hyONE

3.9 ERECTION GENERALLY
Lift, place and fix hy90 or hyONE without overstressing or deformation. Use temporary supports as needed without causing damage. Fix hy90 or hyONE to NZS 3604 and to Futurebuild LVL requirements. Ensure all members are correctly located, plumb and true to line and face.

3.10 LINTEL END CONNECTIONS
To hy90 and hyONE Lintels for residential construction - Information for design and installation for lintel end connections and cantilevered lintel connections construction details and to NZS 3604 and/or designIT for houses software for trimming stud connections and tie down where required for uplift.

Completion & Commissioning

3.11 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

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3820 CARPENTRY

1. GENERAL

This section relates to the supply and erection of timber framing, as a framed structure, or as partitioning. It includes prefabricated timber and engineered wood.

1.1 RELATED WORK
Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
AS/NZS 1328.1	Glued laminated structural timber - Performance requirements and minimum production requirements
AS/NZS 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3622	Verification of timber properties
NZS 3640	Chemical preservation of round and sawn timber
AS/NZS 4357.0	Structural laminated veneer lumber - Specification
FTMA CoP	Frame and Truss Manufacturers Association Code of Practice

***A copy of NZS 3604 Timber-framed buildings, must be held on site.**

1.3 QUALIFICATIONS
Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 DIMENSIONS
All timber sizes except for battens are actual minimum dried sizes.

2. PRODUCTS

2.1 TIMBER FRAMING, TREATED
Species, grade and in service moisture content to NZS 3602, NZBC B2/AS1 and treatment to NZS 3640, NZBC B2/AS1. Structural grade (SG) to NZS 3604, NZS 3622 with properties to NZS 3603.

2.2 LAMINATED TIMBER
Radiata pine laminations to AS/NZS 1328.1; treated as required by NZS 3602, NZBC B2/AS1, to the requirements of NZBC B2/AS1, AS/NZS 1604.1, NZS 3640, with special attention to Appendix B "Specification advisory notes". Supply weather resistant sealed.

2.3 ENGINEERED WOOD
LVL members to AS/NZS 4357.0, to required sizes and lengths and the manufacturer design properties.
Treatment to NZS 3640 and AS/NZS 1604.1.

2.4 TIMBER TRUSSES
To FTMA CoP. Moisture content 16% at supply.

2.5 WALL DWANGS, NOGS AND BLOCKING
If dwangs, nogs or blocking is required for exterior insulated walls, ensure they are not full depth of framing. Install flush with face of wall required, leaving a minimum 20mm or 45mm preferable gap to the other face to NZS 3604, 8.8. Dwangs and nogs if required to be at 1350mm centres maximum to NZS 3604, 8.8.

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2.6 EXTERIOR CAVITY WALL BATTENS - PROPRIETARY - NON-STRUCTURAL
Extruded polypropylene battens, size approximately 45mm wide x 18mm thickness. Temporary fix battens before being fixed into the framing with the cladding fixings. To the scope limitations of NZBC E2/AS1, and NZS 3604 Building Wind Zones up to, and including "Extra High".

Components

2.7 NAILS
Type to NZS 3604, section 4, **Durability**, and of the size and number for each particular types of joint as laid down in the nailing schedules of NZS 3604, sections 6-10.

2.8 BOLTS AND COACH SCREWS
Bolts and coach screws complete with washers, to the requirements of NZS 3604, clause 2.4.5 Bolts and Coach Screws, and section 4, **Durability**, and of the type, number and form required for each particular junction to NZS 3604, sections 6 - 10.

2.9 NAIL PLATES
Comply with the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6 - 10. Plates to the plate manufacturer's design for the particular locations as shown on the drawings.

2.10 CONNECTORS
Comply with the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Connectors and structural brackets to the connector manufacturer's design for particular locations shown on drawings.

2.11 CORROSION RISKS
For interior timber, treated with copper-based timber preservatives (H3.2 or higher), use a minimum of hot-dipped galvanized steel fixings and fasteners.

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

2.12 DPC
Refer to 4161 UNDERLAYS, FOIL AND DPC section

3. EXECUTION

3.1 EXECUTION GENERALLY
To NZS 3604 except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 SEPARATION
Separate all timber framing timbers from concrete, masonry and brick by: -
- a full length bituminous damp-proof membrane overlapping timber by at least 6mm; or
- a 12mm minimum free draining air space

3.3 ATTENDANCE
Provide and fix blocks, nogs, openings and other items as required by other trades.

3.4 MOISTURE CONTENT
Maximum allowable equilibrium moisture content (EMC) for non air-conditioned or centrally heated buildings for framing to which linings are attached.

Framing at erection:	24% maximum
Framing at enclosure:	20% maximum
Framing at lining:	16% maximum

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3.5 SET-OUT
Set out framing in accordance with the requirements of NZS 3604 and as required to support sheet linings and claddings. When necessary provide framing to suit any required cladding/lining control joints and sheet joints.

3.6 FRAMING SUB-FLOOR
Frame up off foundation walls and piles, all fabricated, fastened and braced to NZS 3604, section 6.10, **Framed subfloor walls**.

3.7 FRAMING FLOORS
Framed and fastened to NZS 3604, section 7, **Floors**.

3.8 FRAMING WALLS
Frame to required loading and bracing complete with lintels, sills and nogs, all fabricated and fastened to NZS 3604, section 8, **Walls**.

3.9 FRAMING ROOFS
Frame to required loading and bracing complete with valley boards, ridge boards and purlins. Design and fit roof trusses complete with anchorage. All fabricated and fastened to NZS 3604, section 9, **Posts** and 10, **Roof framing**.

3.10 FRAMING CEILINGS
Frame to required loading and bracing complete with runners and battens set out to support ceiling lining. All fabricated and fastened to NZS 3604, section 13, **Ceilings**. Trim for openings in ceilings and hatches to NZS 3604 section 13.3, **Openings in ceilings**. Provide blocking for water tanks located in the ceiling space to NZS 3604, section 13.4, **Water tanks in roof space**.

3.11 INSTALLING WALL UNDERLAYS
Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.12 FIT CAVITY BATTENS
Fit and fix 20mm cavity battens over wall underlay or rigid air barrier, fully nail to timber studs to the requirements of the manufacturer or to NZS 3604. Fit and fix related flashings. Make allowance for cladding control joints where required. Fit and fix cavity closers to base of walls, open horizontal (or raking) junctions and over openings (windows, meters etc.).

3.13 DPC TO LOSP TREATED TIMBER
Refer to 4161 UNDERLAYS, FOIL AND DPC section.

3.14 DPC TO TIMBER
Refer to 4161 UNDERLAYS, FOIL AND DPC section.

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4161MI MARSHALL WEATHERIZATION SYSTEM

1. GENERAL

This section relates to the application of the **Marshall Weatherization System** which consists of:
- **Tekton® Building Wrap** (also called **Tekton HouseWrap)**
- **HYDRA wall underlay**
- **HYDRA roof underlay**
- **SUPER-STICK Building Tape®**
- **Tekton® Seam Tape**
- **One-Piece Sill Tape**
- **TRADE-SEAL** (penetration seal)
- **Protecto Wrap Detail Tape**
- **Protecto Wrap Sill Tape**
- **Protecto Tak** (spray primer/adhesive)

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following definitions apply specifically to this section:

Wall underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic wall underlays, sometimes called, wall wraps, building wraps or building papers.
Roof underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic roof underlays

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC E2/AS1	External moisture

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
Specification for **Marshall Weatherization System**
Specification for **Tekton® Building Wrap**
Brochure for **Tekton® HouseWrap**
Specification for **SUPER-STICK Building Tape®**
Brochure for **SUPER-STICK Building Tape®**Specification for **TRADE-SEAL**
Brochure for **TRADE-SEAL**
BRANZ Appraisal 444 - Protecto Sill Window Sealing System
BRANZ Appraisal 548 - Tekton® Building Wrap
BRANZ Appraisal 591 - One Piece Sill Tape
BRANZ Appraisal 621 - The Marshall Weatherization System
BRANZ Appraisal 719 - Trade-Seal Pipe and Penetration Seal
BRANZ Appraisal 846 - SUPER-STICK Flexible Flashing Tape
BRANZ Appraisal 1071 - HYDRA Roof Underlay
BRANZ Appraisal 1072 - HYDRA Wall Underlay

Manufacturer/supplier contact details

Company:	**Marshall Innovations Limited**
Web:	www.mwnz.com
Email:	headoffice@mwnz.com
Telephone:	0800 776 9727

Warranties

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1.4 WARRANTY - MANUFACTURER/SUPPLIER
15 years:Provide a material manufacturer/supplier warranty:
15 years: For **Tekton® Building Wrap**
15 years: For **HYDRA wall underlay**
15 years: For **HYDRA roof underlay**
15 years: For **SUPER-STICK Building Tape®**
15 years: For **Tekton® Seam Tape**
15 years: For **One-Piece Sill Tape**
15 years: For **TRADE-SEAL**
15 years: For **Protecto Sill Window System**

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS - WORKERS - MANUFACTURER / SUPPLIER REQUIREMENTS
Work to be carried out by competent, experienced tradespeople, who are familiar with the **Marshall Innovations Limited** materials and techniques specified, by or under the supervision of a Licensed Building Practitioner (LBP) with the relevant Licence Class.

1.6 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified **Marshall Innovations Limited** systems, components and associated products listed in this section.

Performance - general

1.7 SURFACE FIRE PROPERTIES FOR LININGS
Flammability index ≤ 5, to NZS/AS 1530.2. Refer to SELECTIONS.

2. PRODUCTS

Materials

2.1 TEKTON BUILDING WRAP
Tekton® Building Wrap, a synthetic breather-type wall underlay, as a coated spun-bonded polypropylene product approximately 0.6mm thick. Supplied in rolls 2740mm x 37m and 1370mm x 37m.

2.2 HYDRA WALL UNDERLAY
HYDRA Wall Underlay, a synthetic wall underlay, as a plain non-woven scrim and a woven bottom scrim with a polymeric laminated face. Supplied in rolls 1370mm x 36.5m and 2740mm x 37m.

2.3 SUPER-STICK BUILDING TAPE
SUPER-STICK Building Tape®, a multi-layered silver polyester-faced, copolymer, self-adhesive tape. Utilizes a high tack pressure sensitive adhesive (PSA) combined with a high-performance toughened film. Tape is supplied in 75mm, 150mm and 200mm wide x 22.86m long rolls.

2.4 TEKTON SEAM TAPE
Tekton® Seam Tape, a white polypropylene film coated with a cold weather acrylic adhesive. Tape is supplied in rolls 48mm wide x 50m long.

2.5 ONE-PIECE SILL TAPE
One-Piece Sill Tape, a polythene-faced SBS modified rubberised asphalt self-adhesive membrane. Tape is supplied in rolls 150mm wide x 1.0mm thick x 20m long.

2.6 TRADE-SEAL
TRADE-SEAL, a one piece self-adhesive EPDM collar bonded to a polyethylene carrier, for pipes and conduits that penetrate the cladding/wrap/underlay. Provides secondary

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protection air and moisture seal, and is available in ten size options to suit penetration diameters from 8mm to 220mm.

2.7 PROTECTO WRAP DETAIL TAPE
Protecto Wrap Detail Tape, a black, self-adhering, un-reinforced, conformable, modified SBS rubberised asphalt membrane tape. Supplied in rolls 150mm wide x 1.0mm thick x 15m long.

2.8 PROTECTO WRAP SILL TAPE
Protecto Wrap Sill Tape, a polyethylene-backed, modified SBS rubberised asphalt adhesive membrane tape. Supplied in rolls 150mm wide x 0.5mm thick x 30m long.

2.9 PROTECTO TAK SPRAY PRIMER
Protecto Tak Spray Primer, a solvent-based spray-on adhesive primer, coloured blue. Primer is supplied in a 369g can.

Accessories

2.10 FIXINGS
Staples, clouts, screws, proprietary wrap fixings or other temporary fixings to attach the wall or roof underlay to the framing.

2.11 BUILDING WRAP/WALL UNDERLAY RESTRAINTS
Polypropylene tape or galvanized wire or 75mm galvanized mesh, to NZBC E2/AS1, clause 9.1.8.5, **Wall framing behind cavities**, for intermediate restraining of the building wrap/wall underlay from bulging into the drained cavity where stud spacings are greater than 450mm. Wire or tape to be run horizontally at 300mm centres.

3. EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS
To NZBC E2/AS1 Table 23 Properties of Roof Underlays and Wall Underlays; and manufacturers technical literature.
Note: Care should be taken not to expose the underlay to continuous wet and windy conditions.

3.2 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.
Store all products under clean dry conditions that ensure no deterioration or damage.
Store rolls in an upright position on a smooth floor and protected from sunlight, UV radiation and moisture. Rolls of **Tekton® Building Wrap** to be to be stored on end.

3.3 ROUTINE MATTERS
Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.4 PRE-INSTALLATION REQUIREMENTS
Before starting work, check that the framing will allow work of the required standard. The framing must be free from any sharp protrusions that may damage the wrap/underlay.
Carry out remedial work identified before the installation of the **Marshall Weatherization System**.

Installation/application - generally

3.5 STANDARDS AND TOLERANCES
To NZBC B2/AS1 and NZBC E2/AS1. Refer to the general section 1270 CONSTRUCTION for general requirements.

Installation - Tekton® Building Wrap

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3.6 WRAP/UNDERLAY GENERALLY
To comply with Marshall Innovations Limited specification for the **Marshall Weatherization System**, BRANZ Appraisal 621 - The **Marshall Weatherization System** and BRANZ Appraisal 548 - Tekton® Building Wrap.

Face branded side of the wrap/underlay away from the framing. Run horizontally and extend from upper side of the top plate to the underside of bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs.

Ensure horizontal laps no less than 75mm with the direction of the lap ensuring that water is shed to the outside. End laps to be made over framing and be no less than 150mm wide.

3.7 FIXINGS
Fix the wrap/underlay into place using 6mm to 8mm zinc plated staples, hot dip galvanised large head clouts, tek screws or proprietary wrap/underlay fixings. Care to be taken when fixing in windy conditions, due to large sail area created by roll widths.

3.8 POSITION ROLL
Position roll against the framing with a short length of wrap/underlay free of the roll. Align the guide marks printed on the **Tekton® Building Wrap** with visible studs and nail/staple to the framing.

3.9 FIX TO FRAMING
Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taught over framing. Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taut over framing.

Installation - HYDRA Wall Underlay

3.10 WRAP/UNDERLAY GENERALLY
To comply with Marshall Innovations Limited specification for the **Marshall Weatherization System**, BRANZ Appraisal 1072 - HYDRA Wall Underlay.

Face branded side of the wrap/underlay away from the framing. Run horizontally and extend from upper side of the top plate to the underside of bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs.

Ensure horizontal laps no less than 75mm with the direction of the lap ensuring that water is shed to the outside. End laps to be made over framing and be no less than 150mm wide.

3.11 FIXINGS
Fix the wrap/underlay into place using 6mm to 8mm zinc plated staples, hot dip galvanised large head clouts, tek screws or proprietary wrap/underlay fixings. Care to be taken when fixing in windy conditions, due to large sail area created by roll widths.

3.12 POSITION ROLL
Position roll against the framing with a short length of wrap/underlay free of the roll. Align the **HYDRA Wall Underlay** with visible studs and nail/staple to the framing.

3.13 FIX TO FRAMING
Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taught over framing. Unroll wrap/underlay across framing and fix to all framing members at a maximum of 300mm centres. Keep straight and taut over framing.

Installation - penetrations and joints

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3.14 APPLY SEAM TAPE
Apply **Tekton® Seam Tape** to all horizontal and vertical building wrap/underlay joints. Lap joint to sit halfway under the tape width. Press all tape firmly into position to enhance adhesion. Use **Tekton® Seam Tape** to repair small rips, punctures or tears in the building wrap/underlay and tape into place. Ensure overlapping material extends at least 150mm beyond the damaged area.

3.15 INSTALL PENETRATION SEAL
For pipe and conduit penetrations of the cladding/wrap/underlay use the appropriate sized **TRADE-SEAL**, to ensure a tight fit around the pipe. Any paired cable or multiple air conditioning pipes must pass through a conduit. Conduits must be sealed to prevent entry of any wind driven moisture. Conduits can be sealed with either an expanding foam or sealant. Install the **TRADE-SEAL** to Marshall Innovations Limited requirements. Push back the collar to fit the cavity width. Ensure the **TRADE-SEAL** exposure to weather and UV does not exceed 90 days. Trade-Seals should never be forced over pipes or conduit, they can be trimmed to get appropriate fit.

Installation - openings

3.16 WRAP/UNDERLAY OVER OPENINGS
Run wrap/underlay over any openings and leave covered until windows and doors are ready to be installed.

3.17 FORM OPENINGS
Form openings by cutting wrap/underlay at a 45°diagonal in from each corner. Fold and staple wrap/underlay to the inside of the framed opening.

Installation - SUPER-STICK Building Tape

3.18 SUPER-STICK BUILDING TAPE
To comply with Marshall Innovations Limited specification for **Marshall Weatherization System**, BRANZ Appraisal 621 - The **Marshall Weatherization System** and BRANZ Appraisal 846 - SUPER-STICK Building Tape®.

3.19 PREPARATION
Ensure all surfaces are clean, dry and free of any foreign matter that may adversely affect adhesion. Do not install tape below -6ºC. When used in conjunction with LOSP treated timber, allow solvent to evaporate for a minimum of 7 days prior to application. Extend building wrap/underlay over opening and cut on a 45º angle away from each corner. Fold flaps into opening and secure to the interior face of framing.

3.20 SILL AREA – OVER BUILDING WRAP
Cut 4 strips of SUPER-STICK at 150mm x 75mm, Apply 2 strips at a 45 degree angle to the two bottom corners overlapping the corner by 3mm to create a seal at the corner junction. Measure and mark 150mm (for 90mm framing) / 200mm (for 140mm framing) up the jamb from the bottom corners of opening. Measure sill length. Measure and cut a length of **SUPER-STICK** 300mm (for 90mm framing) / 400mm (for 140mm framing) longer than sill length. Roll up the cut length with the split release film to the outside of the roll. Peel back 50mm of the split release film from the inside edge. Align SUPER-STICK with 150mm (for 90mm framing) / 200mm (for 140mm framing) mark and flush with inside edge of the opening. Apply tape down frame and tight into corner.

When the sill jamb junction is reached ensure tape is pressed firmly into corner. Continue removing backing paper and adhering SUPER-STICK across the length of the sill and up the other jamb. Keep tape flush with inside edge of opening and the overhang to the outside of the framing.

At the corner and starting at the front edge of the tape overhang, carefully cut the tape back towards the framing stopping 3mm from the opening corner. The remainder of the split release film can now be removed. Fold the overhang onto the face of the framing and smooth firmly into place over the building wrap and corner butterflies. Press the tape down firmly to ensure proper adhesion.

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Apply a layer of 75 mm SUPER-STICK over the top of the original flashing tape along the entire length of the sill. Align the tape to the inside face of the sill or alternatively apply a 150 mm by 150 mm square of Super Stick on top of the original flashing tape on the sill, where a nail will penetrate, to provide a fixing seal as per BRANZ Appraisal.

3.21 TOP CORNERS - OVER BUILDING WRAP

Cut two 300mm (for 90mm framing) / 400mm (for 140mm framing) lengths of **SUPER-STICK**. Mark 150mm (for 90mm framing) / 200mm (for 140mm framing) down from the underside of the lintel. Roll up the cut length with the split release film to the outside of the roll. Peel back 50mm of the split release film from the inside edge. Align SUPER-STICK with 150mm (for 90mm framing) / 200mm (for 140mm framing) mark and flush with inside edge of opening. Apply tape up the frame and tight into the corner. Press tape firmly into the corner junction, then continue across the underside of the opening. At the corner and starting at the front edge of the tape overhang, carefully cut the tape back towards the framing stopping 3mm from the opening corner. The rest of the split liner / release film can now be removed.

Fold the overhang onto the face of the framing and smooth firmly into place.

Take the 75mm x 150mm strips of **SUPER-STICK**, remove the backing paper. Adhere diagonally across each corner, overlapping the corner by 3mm to create a seal at the corner junction. Press the overlap tightly into the corner to form a tight bond between the tapes. Smooth all tape firmly into place to maximize adhesion.

3.22 SILL AREA – OVER RIGID AIR BARRIER (RAB)

Install tape over Rigid Air Barrier in accordance with Marshall Innovations Limited **SUPER-STICK** specifications and the Rigid Air Barrier manufacturer's specifications.

3.23 HEAD FLASHING

Install tape to head flashings using **SUPER-STICK** 75mm in accordance with Marshall Innovations Limited **SUPER-STICK** specification and RAB manufacturers specifications.

3.24 RIGID AIR BARRIER - JOINT SEALING

Cut a length of **SUPER-STICK 75** and apply evenly over RAB joint. Smooth all tape firmly into place to enhance adhesion. Only to be used on vertical joints and in accordance with Marshall Innovations Limited **SUPER-STICK** specification and RAB manufacturers specifications.

Installation - One Piece Sill Tape

3.25 ONE PIECE SILL TAPE

To comply with Marshall Innovations Limited specification for **Marshall Weatherization System**, BRANZ Appraisal 591 - **One Piece Sill Tape Flexible Flashing**.

3.26 PREPARATION

Ensure all surfaces are clean, dry and free of any foreign matter that may adversely affect adhesion. Do not install tape below -5ºC. When used in conjunction with LOSP treated timber, allow solvent to evaporate for a minimum of 7 days prior to application. Extend building wrap/underlay over opening and cut on a 45º angle away from each corner. Fold flaps into opening and secure to the interior face of framing.

3.27 APPLY PROTECTO TAK ADHESIVE PRIMER

Apply Protecto Tak adhesive primer to all surfaces that are to receive One Piece Sill Tape. The primed surface should be tacky when touched and have a light blue colour. The curing time will vary depending on temperature. If the surface loses its tack, re-apply the Tak Spray.

3.28 SILL AREA – OVER BUILDING WRAP

To dress the bottom of the opening, cut One Piece Sill Tape to the opening plus sufficient length to return up either side of the opening 150mm. Keep the tape flush with the interior face of the opening, and ensure that the exposed timber framing is covered. Remove the release film from the back face of the tape and fold the exposed face into the frame. Prior to pressing the tape onto the front face of the wall underlay, fold back the

outer branded face, exposing the front face of the tape. Press the tape onto the outer face of the wall underlay. Fold the branded front face flap forward, cut at the corner, and press onto the exposure front face of the tape.

3.29 TOP CORNERS - OVER BUILDING WRAP
For the top corners of the opening, install a 300mm length of One Piece Sill Tape, 150mm down the jamb and 150mm across the lintel. Keep the tape flush with the interior face of the opening, and ensure that the exposed timber framing is covered. Remove the release film from the back face of the tape and fold the exposed face into the frame. Prior to pressing the tape onto the front face of the wall underlay, fold back the outer branded face, exposing the front face of the tape. Press the tape onto the outer face of the wall underlay. Fold the branded front face flap forward, cut at the corner, and press onto the exposure front face of the tape.

Installation - Protecto Sill Window Sealing System

3.30 PROTECTO SILL WINDOW SEALING SYSTEM
To comply with Marshall Innovations Limited specification for **Marshall Weatherization System**, BRANZ Appraisal 444 - **Protecto Sill Window Sealing System**.

3.31 PROTECTO WRAP DETAIL AND SILL TAPES GENERALLY
To avoid wastage, the tape can be lapped 100mm minimum onto itself without reducing the performance of the Proteto Sill System.

3.32 PREPARATION
Ensure all surfaces are clean, dry and free of any foreign matter that may adversely affect adhesion. Do not install tape below -6ºC. When used in conjunction with LOSP treated timber, allow solvent to evaporate for a minimum of 7 days prior to application. Extend building wrap/underlay over opening and cut on a 45º angle away from each corner. Fold flaps into opening and secure to the interior face of framing.

3.33 APPLY PROTECTO TAK ADHESIVE PRIMER
Spray Protecto Tak adhesive primer to all surfaces prior to the application of Protecto Wrap Detail Tape and Protecto Sill Tape. The primed surface should be tacky when touched and have light blue colour. The curing time will vary depending on temperature. If the surface loses its tack, re-apply the Tak Spray.

3.34 APPLY PROTECTO WRAP DETAIL TAPE
Install a 300mm length of Protecto Wrap Detail Tape around all four corners of the opening, keeping the tape flush with the interior face of the opening and ensuring the exposed timber framing is covered. After removing the protective film, mould the tape that overhangs the front of the opening onto the face of the building wrap to create an airtight seal at the framing junction.

3.35 APPLY PROTECTO WRAP SILL TAPE - SILL AREA
Cut individual lengths of Protecto Wrap Sill Tape to suit the sill opening. Install tape flush with the interior face of the opening, and apply along the entire length of the sill. Fold the overhanging tape onto the face of the building underlay.

3.36 APPLY PROTECTO WRAP SILL TAPE - JAMBS
Cut two 300mm lengths of Protecto Wrap Sill Tape for the jambs. Install the tape flush with the interior face of the opening and tight into the sill/jamb junction. Fold the overhanging tape onto the face of the building underlay.

Completion

3.37 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

3.38 COMPLETION - TESTS & CERTIFICATION
Refer to 1270 CONSTRUCTION for general test and certification requirements at completion.

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4161T THERMAKRAFT UNDERLAYS, FOILS, DPC, DPM, & TAPES

1. GENERAL

This section relates to the application of **Thermakraft Ltd**, DPC, DPM, Wall & Roof Underlays, Foils, Flashing Tapes, and accessories.

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

NZMRM	New Zealand Metal Roofing Manufacturers Inc.

The following definitions apply specifically to this section:

Wall underlay	the same meaning as defined in NZBC E2/AS1, covering kraft based and synthetic wall underlays, sometimes called wall wraps, building wraps or building papers.

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
NZBC E2/AS1	External moisture
AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
NZS 2295	Pliable, permeable building underlays
AS/NZS 2904	Damp-proof courses and flashings
NZS 3604	Timber-framed buildings
NZS 4214	Methods of determining the total thermal resistance of parts of buildings
AS/NZS 4389	Roof safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Thermakraft documents relating to work in this section are:
Thermakraft product manual and technical data sheets.
BRANZ Appraisal 943 - Covertek 401™ Roof Underlay
Code Mark Certificate 30069 - Thermakraft Covertek 403™ Absorbent Breathable Roof Underlay
Code Mark Certificate 30030 - Thermakraft Covertek 405™ Absorbent Breathable Roof Underlay
Code Mark Certificate 30028 - Thermakraft Covertek 407™ Absorbent Breathable Roof Underlay

Manufacturer/supplier contact details

Company:	Thermakraft Ltd
Web:	www.thermakraft.co.nz
Email:	info@thermakraft.co.nz
Telephone:	0800 806 595

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Warrant this work under normal environmental and use conditions against failure of materials and execution. Thermakraft Ltd warrant performance of products if design and

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installation comply with relevant technical literature, NZBC, and recognised industry Codes of Practice. Copy of Thermakraft™ Product Warranty available on request.

Requirements

1.5 NO SUBSTITUTIONS
Substitutions are not permitted to any specified materials, or associated products, components or accessories.

1.6 INSTALLATION SKILL LEVELS
Installers to be experienced in the installation of Thermakraft™ products and familiar with Thermakraft™ technical literature and the related documents listed in this design i.e. NZMRM CoP NZ Metal Roof and Wall Cladding Code of Practice.

2. PRODUCTS

2.1 QUALIFICATIONS WORKERS - LICENSED UNDER STATUTE
Workers and supervisors to be appropriately qualified to applicable legislative requirements. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

Roof underlays

2.2 THERMAKRAFT 215™ BITUMINOUS ROOF UNDERLAY
Thermakraft 215™, bituminous self-supporting roof underlay to NZS 2295.

Accessories

2.3 AUSNET™ HEXAGONAL WIRE UNDERLAY SUPPORT NETTING
Thermakraft Ausnet 50mm and 75mm galvanized hexagonal wire netting to AS/NZS 4534.

2.4 PREMIUM JOINING TAPE™
Thermakraft Premium Joining Tape™, an acrylic, reinforced tape with superior adhesion and tear resistance used to join laps of wall and roof underlays, plywood rigid underlay, OSB board, fibre cement and insulation panels, DPM and vapour control products such as foil underlays. Exposure 180 days, install from -10oC. Compatibility of the substrate with Premium Joining Tape must be checked by the designer or the installer prior to use. BRANZ Appraised and approved for use with the James Hardie™ RAB™ Board system, refer BRANZ Appraisal 611. NOT to be used as a flashing tape.

3. EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS
Design application and installation of Thermakraft Building products to NZBC E2/AS1, BRANZ Appraisals, Thermakraft Technical Literature and Industry Codes of Practice.

Application - roof underlay

3.2 HEXAGONAL WIRE MESH
Run Thermakraft Ausnet™ hexagonal wire mesh continuously across roof rafters, top truss chords or purlins and fix in place with 25mm long stainless steel staples, galvanized flathead clouts or fencing batten staples onto timber framing or stainless steel self-tapping screws onto steel framing. The installation direction of Ausnet hexagonal wire mesh must be the same as the underlay direction.

3.3 ROOF UNDERLAY
Lay vertically over purlins on wire netting with a 150mm side lap. Fix securely to purlins with galvanized fixings. Lay underlay to avoid excessive dishing between purlins. When used vertically, limit individual runs to 10 metres for bituminous underlays. Do not lay vertically on roof pitches under 10° without support.

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Horizontally lay across the rafter/trusses starting at the gutter line with succeeding sheets in true alignment and lapping 150mm. Scribe around and fit neatly to all penetrations and avoid prolonged exposure by installing the roof immediately.

Completion

3.4 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

4. SELECTIONS
For further details on selections go to www.thermakraft.co.nz.

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4231HA JAMES HARDIE® AXON™ PANEL CLADDING

1. GENERAL

This section relates to the supply and fixing of James Hardie® Axon™ Panel cladding.

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:
LRV: Light Reflectance Value
CLD: Ceramic Low Density

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External Moisture
AS/NZS 1170.2	Structural design actions - Wind actions
AS/NZS 2908.2	Cellulose-cement products-Flat sheet
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
James Hardie® documents relating to this part of the work:
Axon™ Panel technical specification
HardieFlex™ Sheet technical specification
James Hardie® Fire and Acoustic Design Manual

Manufacturer/supplier contact details

Company:	James Hardie New Zealand Limited
Web:	www.jameshardie.co.nz
Email:	info@jameshardie.co.nz
Telephone:	Ask James Hardie™ on 0800 808 868.

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

15 years:	For James Hardie® Axon™ Panels (refer to James Hardie® product warranty)
15 year:	For accessories supplied by James Hardie® (refer to James Hardie® product warranty)
From:	Date of purchase

- Provide this warranty on the manufacturer's standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 NO SUBSTITUTIONS
Substitutions are not permitted to any specified system, or associated components and products.

1.6 SAFE WORKING
To James Hardie® requirements for safe working practices with James Hardie® products, particularly with regards to cutting and drilling.

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1.7 INFORMATION FOR OPERATION AND MAINTENANCE
Provide relevant James Hardie® maintenance requirements at completion of the work.

Performance

1.8 PERFORMANCE - WIND
The design wind speeds/zones are to NZS 3604, up to and including Extra High Wind Zone. James Hardie® Technical Specifications are suitable for these conditions.

2. PRODUCTS

2.1 PERFORMANCE - SPECIFIC DESIGN WIND
The design wind pressures are to AS/NZS 1170.2, for specific design wind zone (beyond Very High Wind Zone). Only specifically designed or approved details included in the Contract Documents can be used.

Materials

2.2 RIGID AIR BARRIERS
Refer to section 4171HR JAMES HARDIE® RIGID AIR BARRIERS.

2.3 WALL UNDERLAY
Refer to section 4161 UNDERLAYS, FOIL AND DPC.

2.4 EXTERIOR CAVITY WALL BATTENS
Radiata pine battens, minimum 45mm wide x 18mm thick, H3.1 treated, height to match timber framing studs. To NZS 3602, Table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.5 EXTERIOR STRUCTURAL CAVITY BATTENS
James Hardie® CLD™ Structural Cavity Batten, 2450mm long, 70mm wide and 19mm thick manufactured from treated cellulose fibre, Portland cement, sand and water. Cured by high pressure autoclaving and manufactured to AS/NZS 2908.2. James Hardie® Axon™ Panel and CLD™ Structural Cavity Batten installed as per the James Hardie® technical specification demonstrate compliance with requirements of NZBC Sections B1, B2 and E2. The battens have both faces and all edges presealed.

2.6 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING
Perforated uPVC, with upstands.

2.7 AXON™ PANEL
James Hardie® Axon™ Panel, a face primed shiplap jointed panel, 9.0mm thick, manufactured from cellulose fibre reinforced cement to AS/NZS 2908.2.

Components

2.8 FASTENER TYPE
Fasteners to minimum durability requirements of the NZBC. Refer to NZS 3604, section 4, **Durability**, for requirements for fixing's material to be used in relation to the exposure conditions.

Refer to NZBC E2/AS1, Table 20, **Material selection** for fixing material, and NZBC E2/AS1, Table 21, **Compatibility of materials in contact**, for selection of suitable fixing materials and their compatibility with other materials.

Zone	Fixings Material
Zone D, Zone E / Microclimates (incl. Geothermal)	Grade 316 Stainless
Zone B, Zone C	Hot-dipped galvanized
Bracing - All zones	Grade 316 Stainless

Check against SED (specific engineering design) requirements for microclimate conditions.

Refer to SELECTIONS.

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Accessories

2.9 FLASHING TAPES
Inseal® 3259 black compressible medium density closed cell foam tape, 1.5mm thick x 50mm wide for vertical joints, and 1.5mm thick x 80mm wide for internal corners.
Polypropylene or polyethylene DPC under CLD™ Structural Cavity Batten internal corners.
Refer to James Hardie® Axon™ Panel technical specification for selection of required width.

2.10 ALUMINIUM ACCESSORIES
Extruded aluminium etch primed. External box corners and horizontal 'h' flashing suitable for dark paints.

2.11 UPVC ACCESSORIES
Extruded uPVC. Alternative accessories only suitable for light paints.

2.12 ADHESIVE FOR CLD™ STRUCTURAL CAVITY BATTEN
Adhesive to be applied continuous 6mm thick bead(s) to the face of CLD™ Structural Cavity Batten to adhere the Axon™ Panel.

2.13 SEALANT
Flexible sealant. Refer to the sealant manufacturer's technical literature to confirm suitability for the application.

3. EXECUTION

Conditions

3.1 STORAGE
Take delivery of products dry and undamaged on pallets, and keep on pallet. Protect edges and corners from damage and covered to keep dry until fixed.

3.2 HANDLING
Avoid distortion and contact with potentially damaging shiplap edges and surfaces. Do not drag panels across each other, or across other materials. Protect edges, corner and surface finish from damage.

3.3 SUBSTRATE
Do not commence work until the substrate is of the standard required for the specified finish; plumb, level and in true alignment. Moisture content of timber framing must not exceed the requirements specified by NZS 3602 to minimise shrinkage and movement after panels are fixed.

Confirm that 70mm framing for vertical joints for timber cavity construction has been correctly installed.

3.4 SEAL EDGES
Seal site cut sheet edges prior to installation. Seal panel edges around window and door openings, meter boxes and at other penetrations.

3.5 SEAL CUT ENDS, CLD™ STRUCTURAL CAVITY BATTEN
Site cut batten ends to be between 20 - 45 degrees and sealed with Dulux AcraPrime 501/1 or Resene Quick Dry sealer prior to installation with the butt joint deflecting moisture to the exterior.

Application - particular installations

3.6 FIRE RESISTANCE RATING
Install mineral fibre insulation or glass fibre insulation fitted tightly in the timber framing cavity. Apply fire retardant wall underlay to the exterior face of the framing and fix fibre cement cladding and lining sheets, direct or on cavity. Refer to project drawings for FRR

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system construction details and James Hardie® Fire and Acoustic Design Manual for further information.

3.7 BRACING SYSTEM
Fix panels in accordance with James Hardie® Bracing Design Manual.

Application - generally

3.8 RIGID AIR BARRIER
Refer to 4171HR JAMES HARDIE® RIGID AIR BARRIERS.

3.9 FIX WALL UNDERLAY
Refer to 4161 UNDERLAYS, FOIL AND DPC.

3.10 INSTALL TIMBER CAVITY BATTENS
Install 18mm minimum thick cavity battens to NZBC E2/AS1: 9.0 Wall claddings, where required. Fix vertical cavity battens to wall framing studs. The battens are fixed by the cladding fixings which will penetrate the wall framing studs over the wall underlay. Seal the top of the cavity and install cavity closer/vermin-proofing at base of walls, open horizontal (or raking) junctions, over openings (windows, meters etc).
Do not use continuous horizontal cavity battens at nogs or at bottom plate. Use cavity spacers where fixing is required between cavity battens.

3.11 CLD™ STRUCTURAL CAVITY BATTEN
Fix battens to all studs over the wall underlay or rigid air barrier using 65mm x 2.8mm RounDrive ring shank nails at fixing centres as per James Hardie® Axon™ Panel and CLD™ Structural Cavity Batten technical specification, Table 1: Batten Fixing. Refer to Table 1 notes for durability requirements of fixings.

3.12 PENETRATIONS AND FLASHINGS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:
- Wall underlay appropriately incorporated with penetration and junction flashings.
- Materials lapped in a way that water tracks down to the exterior face of the wall underlay.
- Wall underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- Required holes in cladding accurately formed and cut to James Hardie® requirements, ensure (if required) services penetration grommets/sleeves/seals/tapes are in place prior to cladding installation.
- Claddings neatly finished off to all sides of openings
- Installation of flashings (those required to be installed prior to installation of penetrating elements).

Install Axon™ Panel cladding

3.13 PANEL LAYOUT
All panel edges must be supported by the framing. Fix Axon™ Panels vertically.

3.14 VERTICAL JOINT
Joint Axon™ Panels to James Hardie® technical specification.

3.15 HORIZONTAL JOINT
Provide a horizontal joint at floor joist levels to accommodate the movement resulting from timber joist shrinkage and settlement. Install a 'z' flashing where drainage is required at floor level.
For Axon™ Panels use a James Hardie® aluminium 'h' mould complete with 'h' mould jointer, external corner jointer or a purpose made 'z' flashing to form a horizontal joint.

3.16 INTERNAL CORNER JOINT
For direct fix and timber cavity battens, install 50mm x 50mm James Hardie corner underflashing or 80mm wide 3259 Inseal® tape over continuous wall underlay to internal

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corner. For CLD™ Structural Cavity Battens there is no requirement for underflashing or Inseal® tape. Install Axon™ Panels fixing to corner framing and leaving a 6mm minimum gap between sheets at corner. Fix 18mm minimum from square edge of sheet. Apply approved and compatible sealant to gap to manufacturers specifications. Ensure site cut Axon™ Panel edges are sealed before fixing and sealant is applied. Refer to Axon™ Panel technical specification.

3.17 EXTERNAL CORNER JOINT

For direct fix, install aluminium external box corner over continuous wall underlay to external corner. For cavity construction, with timber battens or CLD™ Structural Cavity Battens, install aluminium external box corner over battens. Install Axon™ Panels fixing to corner framing 40mm minimum from corner. Ensure site cut Axon™ Panel edges are sealed before fixing. Refer to Axon™ Panel technical specification.

3.18 EXTERNAL CORNER JOINT WITH H MOULD

Fit aluminium horizontal 'h' mould over lower Axon™ Panel and lap the upstand under upper Axon™ Panel. Leave 15mm gap maximum between upper and lower Axon™ Panels at the solid timber floor joist levels.

Fit James Hardie® aluminium external box corner under the aluminium 'h' mould with flanges removed locally. Mitre the 'h' mould over box corner flashing to cover it. Install "h" mould external corner jointer over. The upper box corner flashings are to be finished flush with the bottom edge of upper Axon™ Panel.

A uPVC corner underflashing is required under the aluminium box corner where the box corner is terminated under the 'h' mould. James Hardie aluminium external box corner flanges to be removed locally over the aluminium 'h' mould and corner underflashing to be lapped under the upper box corner flashing. Lap wall underlay over aluminium 'h' mould or seal to flashing with a flashing tape. Refer to Axon™ Panel technical specification.

3.19 FASTENER - SIZE AND LAYOUT

Fix Axon™ Panels to framing using the fixings specified in James Hardie® Axon™ Panel technical specification, Table 4 Panel fixing, and in accordance with the following requirements:

- Nails must have a minimum clearance of 18mm from sheet edges and a minimum of 75mm vertically and 150mm horizontally from sheet corners.
- Nails must finish flush with sheet surface.

3.20 FIXING - DIRECT FIXED TO FRAME

Fix with 40mm x 2.8mm HardieFlex™ nails. Fix sheet at 200mm centres at all sheet edges as well as all intermediate framing. Alternatively fix with ND50 brad nails at 150mm centres.

3.21 FIXING - TIMBER CAVITY CONSTRUCTION

Fix with 60mm x 3.15mm HardieFlex™ nails. Fix sheet at 200mm centres at all studs and at 150mm centres at top plate and bottom plate.

3.22 FIXING - AXON™ PANEL OVER CLD™ STRUCTURAL CAVITY BATTEN

Apply continuous 6mm thick bead(s) of adhesive to the face of CLD™ Structural Cavity Batten to adhere the Axon™ Panel, and fix with C-25 brad nails at 150mm centres. Refer to Axon™ Panel technical specification.

3.23 GUN NAILING

Axon™ Panels can be fixed using nail guns. The gun nails used must have a full round head to provide the required holding power. The length and gauge of nails must at a minimum be as specified in the James Hardie® Axon™ Panel technical specification.

3.24 SEALANTS

Apply and use of sealants to manufacturer's instructions. Check with sealant manufacturer prior to coating over sealants.

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3.25 PAINTING
Refer to painting section/s for protective coating system.

Completion

3.26 REPLACE
Replace all damaged or marked elements.

3.27 LEAVE
Leave work to the standard required for following procedures.

3.28 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS
For further details on selections go to www.jameshardie.co.nz.

4.1 PAINTING
Refer to painting section/s for details.

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4311M METALCRAFT PROFILED ROOFING

1. GENERAL

This section relates to the supply and fixing of **Metalcraft Roofing** profiled roofing complete with accessories.
It includes:
- Trough section roofing profiles
- Asymmetrical rib roofing profiles
- Corrugated roofing profile
- Translucent roofing

1.1 RELATED WORK
Refer to 4161 UNDERLAYS, FOIL AND DPC for underlays, foils and DPC.

1.2 ABBREVIATIONS AND DEFINITIONS
The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
MS	Modified silicone
LBP	Licensed Building Practitioner

Documents

1.3 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC G12/AS1	Water supplies
AS/NZS 1170.2	Structural design actions - Wind actions
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 3566	Self-drilling screws for the building and construction industries
NZS 3604	Timber-framed buildings
ISO 9223	Corrosion of metals and alloys - Corrosivity of atmosphere - Classification determination and estimation
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
Metalcraft Roofing Metdek400 product literature
Metalcraft Roofing Metdek500 product literature
Metalcraft Roofing Metdek855 product literature
Metalcraft Roofing Metrib750 product literature
Metalcraft Roofing Metrib760 product literature
Metalcraft Roofing MC700 product literature
Metalcraft Roofing MC770 product literature
Metalcraft Roofing MC760 product literature
Metalcraft Roofing T-Rib product literature
Metalcraft Roofing MC1000 product literature
Metalcraft Roofing Metcom7 product literature
Metalcraft Roofing Metcom930 product literature
Metalcraft Roofing Metcom965 product literature
Metalcraft Roofing Kahu® product literature
Metalcraft Roofing Corrugate product literature
Metalcraft Roofing Alsynite Topglass® product literature

Manufacturer/supplier contact details

Company:	**Metalcraft Roofing**
Web:	www.metalcraftgroup.co.nz
Email:	frances.charles@unitedindustries.co.nz

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Telephone: 09 274 0408

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
for failure of coating adhesion
for weatherproofing by material penetration
For Warranty requirements in excess of this contact Metalcraft Roofing.

1.6 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
5years for workmanship

- Provide this warranty on the material manufacturers standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

Include a copy of the Metalcraft Roofing maintenance requirements with the warranty.
Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 NO SUBSTITUTIONS
Substitutions are not permitted to any specified system, or associated components and products.

1.8 QUALIFICATIONS
Roof Installers shall be experienced, competent roofers familiar with Metalcraft products. And for Restricted Building Work shall also be, an LBP or supervised by an LBP.
Carry out work with experienced, competent installers familiar with the products being used and preferably with appropriate qualifications such as the National Certificate in Metal Roofing and Cladding.

Performance - wind

1.9 WIND - NON SPECIFIC DESIGN
Building wind zone:
High (refer to NZS 3604, table 5.4)
Refer to Metacraft for "Wind Load Span Design Graphs" for load parameters.

1.10 FIXINGS, WIND
Design and use the fixings/fixing pattern appropriate for the wind design parameters and NZMRM CoP NZ. Refer to Metalcraft profiled roofing product literature for profile details. Allow for specific loadings at corners and the periphery of the roof, where localised pressure factors apply. Fixing pattern to also take into account fixing method and purlin spacings.

Performance - General

1.11 PERFORMANCE
Install roofing materials in accordance with the NZMRM CoP, and Metalcraft profiled roofing product literature, to form a weather-tight performance for the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

1.12 DRINKING WATER
Roofing for collecting potable water to NZBC G12/AS1.

1.13 CO-ORDINATE
Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof. Ensure that all necessary members are positioned so that flashings can be fastened at both edges through the roof profile or cladding to the primary structure.

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2. PRODUCTS

Materials

2.1 PRE-FINISHED HOT-DIPPED ALUMINIUM/ZINC COATED STEEL
Formability steel sheet, G550 for roll forming or G300 for flashings, coated to AS 1397.

Fixings

2.2 FASTENERS GENERALLY
Fixings and fasteners are to be compatible with all materials, the environment and meeting the requirements of the NZ Building Code. Installation is to be in accordance with E2/AS1 and/or the NZMRM CoP and Metalcraft profiled roofing product literature.
For fixing patterns refer to Metalcraft product literature for roofing profile.

2.3 FIXING CLIPS TO TROUGH SECTION ROOFING - METDEK400, METDEK500
Galvanized steel (powdercoated for aluminium) to suit the material and the roofing profile and location as required by Metacraft Roofing for roofing:
- For Metdek400 and Metdek500 roofing, fixings for steel are 16mm x 12 gauge galvanized Wafertek self-drilling screws and for timber 35mm x 12 gauge galvanized screws or spiral shank nails.

2.4 FIXING CLIPS TO TROUGH SECTION ROOFING - METDEK855
Galvanized steel (powdercoated for aluminium) to suit the material and the roofing profile and location as required by Metacraft Roofing for roofing:
- For Metdek855 roofing, plastic lugs to be fixed directly to steel using 14 gauge x 42mm long hex head tek screws and for timber use 12 gauge x 65 long hex screws.

2.5 FIXING SCREWS
To AS 3566. Screws appropriate to the roofing material and the supporting structure, as required by Metalcraft and with a Class 4 or 5 durability and not less than the material being fixed. Screws into timber to penetrate by minimum 30mm. Screw fasteners to be head stamped identifying the manufacturer and class. Refer to SELECTIONS.

2.6 RIVETS
Sealed aluminium, minimum diameter 4.0mm. Refer to Metalcraft for requirements..

2.7 FLASHINGS GENERALLY
To NZBC E2/AS1, 4.0, **Flashings**.
Formable grade 0.55 BMT for galvanized, aluminium/zinc, aluminium/zinc/magnesium - coated and pre-painted steel and 0.90 BMT for aluminium (or 0.7mm for small aluminium flashings) to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

Components

2.8 FLASHINGS TO VERGE, RIDGE AND HIP
To NZBC E2/AS1, 4.0, Flashings.
Supplied by the roofing manufacturer to match or to suit the roofing.

2.9 BOOT FLASHINGS
Generally to E2/AS1, 8.4.17 **Roof penetrations** (note; E2/AS1, Figure.54 **Soaker flashing for pipe penetration**, has an error, use as guide only).
EPDM proprietary pipe flashing laid on 45º bias to roofing, with over-flashing (soaker flashing) if required.
A boot flashing should be positioned so that it dams a roofing pan no more than 50%, if this cannot be avoided use an over-flashing back to the ridge and fix the boot flashing to that.

Accessories

2.10 WIRE NETTING AND SAFETY MESH
Refer to 4161 UNDERLAYS, FOIL AND DPC.

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2.11 UNDERLAY AND REFLECTIVE FOIL
Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.12 SEALANT
Neutral curing silicone or polymer sealant as required by Metalcraft and used as directed.

2.13 CLOSURE STRIPS
Polyurethane profiled closed cell foam strips to fit the sheet profile.
Brand: Ecofoam
Profile: To suit selected cladding profile

3. EXECUTION

Conditions

3.1 INSPECTION
Inspect the roof framing and supporting structure to ensure that it is complete and fully braced ready for roofing and free from any misalignments or protrusions that could damage the roofing.

3.2 FRAMING TIMBER MOISTURE
When continuous metal cladding etc. Runs along a long continuous timber member and is directly fixed to it, the timbers equilibrium moisture content (EMC) to be 18% or less. For flashings in this situation (sometimes called transverse flashings) the framing EMC to be maximum 16%, and preferably as low as 12%. Transverse flashings can be temporarily tacked in place and final fixing done when moisture content is acceptable.

3.3 STORAGE
Upon delivery visually inspect sheets for damage and accept packs of undamaged roofing. Reject all damaged material. Store on a level firm base clear of the ground, with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets. If sheet packs become wet, fillet or cross stack to allow air circulation and drying between sheets.

3.4 HANDLING
Do not drag sheets across each other or other materials. Avoid distortion and contact with damaging substances, including cement. Long lengths of roofing should be lifted onto the roof using an approved load spreading beam. Protect edges and surface finishes from damage, keep under cover and remove as the product is being installed. Use soft, flat sole shoes when fixing and for all other work on the roof. Walk along the purlin line whenever possible.

3.5 SEPARATION
Isolate dissimilar materials (metals and non-metals) in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials. Do not use lead sheet or copper in contact with or allow water run-off onto galvanized or aluminium/zinc coated steel.

Application

3.6 FIX INSULATION
Refer to thermal insulation sections.

3.7 SET-OUT
Carefully set out with consideration of the position of side laps to take account of the prevailing wind and line of sight. Ensure all sheets are square and oversailing the gutter true to line. Check during fixing to eliminate creep or spread and string lines along purlin centres to keep fastenings in line.

3.8 END LAPS
End laps are not recommended, except where specifically detailed.

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3.9 THERMAL MOVEMENT
Fix for Thermal Movement to Metalcraft requirements for thermal movement.

3.10 FIXING GENERALLY
Install and fix in accordance with the NZMRM CoP recommendations, and to Metalcraft required fixing patterns and details for each area of the building roofing. Use only screws as required by Metalcraft. Paint colour matched fixings and accessories before installation.

3.11 MARKING AND CUTTING
Use ink pen, chalk line or coloured pencil for marking roof sheets prior to cutting. Do not use lead pencil for marking Zincalume® and Colorsteel®. Cut by shear only, using nibblers or hand snips. Remove all cutting and drilling debris from the roof.

3.12 FIX SHEETS - CONCEALED CLIP SYSTEM
Fix sheets in place using the clip fixing system required by Metalcraft for roofing profile, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

3.13 STOP ENDS AND DOWNTURNS
Form stop-ends at the upper end of sheets. Form downturns at the gutter line where the roof pitch is less than 8 degrees. Form using the required tools.

3.14 INSTALL FLASHINGS
Flash roof to parapets, walls and penetrations to detail. Flashings to be installed on timber framing with moisture content of less than 20%. Where no detail is provided flash to NZMRM CoP recommendations and Metalcraft and NZBC E2/AS1 requirements. Cut accurately and fix using sealant and rivets to detail and to Metalcraft requirements to form a weatherproof cover. For visible flashings, plan joints/junction to take account of the aesthetic requirements.

3.15 USE OF SEALANTS
Select and use sealants only as recommended by Metalcraft. Apply sealant in two narrow beads transversely across flashing intersections, close to the two edges. Avoid exposing sealant on outside surfaces.

3.16 FLASHING PENETRATIONS
Flash all penetrations through the roof. Fit pipe flashings with a proprietary collar flashing, with other penetrations flashed as detailed and to provide a weathertight installation. Ensure that flashings are set to avoid any ponding of water.

Completion

3.17 REPLACE
Replace damaged or marked elements. Do not attempt to repair coatings by applying colour match paint to pre-finished surfaces.

3.18 LEAVE
Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

3.19 REMOVE
Remove all trade rubbish, swarf and unused materials from the roof and surrounds daily during the work. Sweep down at the end of each day, and clean out spouting, gutters and rainwater pipes on completion of the roof. Remove debris, unused materials and elements from the site.

4. SELECTIONS
For further details on selections go to www.metalcraftgroup.co.nz.

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4521AR APL RESIDENTIAL ALUMINIUM WINDOWS & DOORS

1. GENERAL

This section relates to the fabrication, supply and installation of **APL Window Solutions** residential window and door systems manufactured by either **Altherm**, **First** or **Vantage**. It includes:

- APL Residential aluminium windows and doors
- APL Metro Series aluminium windows and doors
- APL Architectural Series aluminium windows and doors
- APL Metro Thermal Heart aluminium windows and doors
- APL Smartwood composite aluminium / timber windows and doors
- APL Roof windows and overhead glazing
- APL Ventient trickle ventilators
- APL Balustrading
- Hardware and furniture
- Flashings and sealants

1.1 ABBREVIATIONS AND TERMS

SLS	Serviceability limit state
ULS	Ultimate limit state
WGANZ	Window & Glass Association NZ
WEERS	Window Energy Efficiency Rating System
PQAS	Powder Coating Quality Assurance System

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
NZBC H1/VM1	Energy efficiency
NZBC H1/AS1	Energy efficiency
AS/NZS 1170.2	Structural design actions - Wind loads
AS/NZS 1580.108.1	Methods of test for paints and related materials - Determination of dry film thickness on metallic substrates - Non destructive methods
AS/NZS 1734	Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4303	Ventilation for acceptable indoor air quality
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AAMA 2603	Voluntary specification, performance requirements, and test procedures for pigmented organic coatings on aluminium extrusions and panels (with coil coating appendix)
AAMA 2604	Voluntary specification, performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2604.05	Performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2605	Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminium extrusions and panels
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
BRANZ BU 636	Protecting Glass From Damage

Window & Glass Association NZ (WGANZ) documents:

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Window Installation Guide	Guide to Window Installation as described in E2/AS1 Amendment 7
PQAS	Powder Coating Quality Assurance System
SFA 3503-03	Anodic Oxide coatings on wrought aluminium for external architectural application (2005)

US Federal Specification:

TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)
TT-S-00230C	Sealing compound, elastomeric type, single component (for caulking, sealing and glazing in buildings and other structures)

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Altherm Specifier's Guide
First Specifier's Guide
Vantage Specifier's Guide
Vantage Guide to Fluoroset FP - Selling, Fabricating, Handling, Care and Maintenance
APL Guide to specifying powders and issuing/applying for warranties
APL Window Energy Efficiency Rating System (WEERS) Report Series

Manufacturer/supplier contact details

Company:	**APL Window Solutions**
Web:	www.altherm.co.nz www.firstwindows.co.nz www.vantage.co.nz www.aplnz.co.nz
Email:	specifiersguide@aplnz.co.nz
Telephone::	07 849 2113

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

5 years:	For fabrication
2 years:	For hardware

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years:	For installation

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified APL aluminium system, or associated components and products.

1.7 QUALIFICATIONS

Work to be carried out by trades people experienced, competent and familiar with the materials and techniques specified.

1.8 COMPLIANCE

Windows and doors to be manufactured and installed to NZBC E2/AS1.

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1.9 CERTIFICATION
Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of NZS 4211.

Performance

1.10 PERFORMANCE - WINDOWS AND DOORS
To NZS 4211, including:
- deflection, opening sashes, air infiltration, water penetration, ultimate strength, torsional strength of sashes, marking.

Refer to SELECTIONS.

1.11 STRUCTURAL/WEATHER-TIGHTNESS
The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window fabricator.

Performance - Wind (design by contractor)

1.12 DESIGN PARAMETERS - NON SPECIFIC DESIGN
Design the installation to the wind zone parameters of NZS 3604, table 5.1.
Refer to SELECTIONS for wind zone.

2. PRODUCTS

Materials

2.1 ALUMINIUM EXTRUSIONS
Alloy designation to comply with AS/NZS 1866. Branded and extruded for anodising or powder coating.

2.2 ALUMINIUM SHEET AND STRIP
Complying with AS/NZS 1734 of suitable thickness. Rolled for anodising or powder coating.
Alloy designation: 5251 - H16 or 5005 - H16

2.3 STAINLESS STEEL SHEET AND STRIP
Type: 316 austenitic steel
Finish grade: 2B (satin lustre)

2.4 GLASS
Refer to the glazing section for glass types and installation.

Flashings

2.5 FLASHINGS GENERALLY
To NZBC E2/AS1, 9.1.10 **Windows and Doors**. Material, grade and colour of head flashings to match the window frames. Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

Components for installation - cavity systems

2.6 STANDARD CAVITY CLOSER
A device constructed from either aluminium or PVC to close the cavity above the window or door unit, between the cladding and head flashing, to provide ventilation in accordance with NZBC E2/AS1 to the spaces above the window or door.

2.7 SUPPORT BAR
WGANZ extruded aluminium support bar with built in drainage and ventilation to NZBC E2/AS1, and support bar location bracket, to provide continuous support to the window unit. Size to suit cladding type.

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Components

2.8 GLAZING GASKETS
Thermoplastic rubber. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.

2.9 HARDWARE AND FURNITURE
Hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer. Refer to SELECTIONS for type and finish. Key alike all lockable window hardware able to be keyed alike.

2.10 SAFETY STAYS
Stainless steel non releasable restrictors to limit window opening to NZBC F4/AS1, Section 2.0, **Opening windows**.

2.11 FIXING BRACKETS
Designed by manufacturer to specific design.

2.12 WEATHERING/INSTALLATION SEALANT
Building sealant used in accordance with manufacturer's instructions for weather sealing aluminium frames to the cladding, complying with US Federal Specification TT S 0011534A, or a one-part polyurethane moisture curing, elastic joint sealant of medium modulus (± 25% movement) to US Federal Specification TT S 00230C.

3. EXECUTION

Conditions - generally

3.1 DO NOT DELIVER
Do not deliver to site any elements which cannot be unloaded immediately into suitable conditions of storage.

3.2 UNLOAD WINDOW JOINERY
Unload, handle and store elements in accordance with the window manufacturer's requirements.

3.3 AVOID DISTORTION
Avoid distortion of elements during transit, storage and handling.

3.4 PREVENT DAMAGE
Store windows and doors on site in a clean and dry environment in such a manner as to prevent damage to prefinished surfaces. Stack the units in a vertical position resting on their sills, with layers interleaved between to prevent rubbing. Keep paper and cardboard wrappings dry.

3.5 PROPRIETARY ELEMENTS
Fix in accordance with the window manufacturer's requirements.

3.6 PROTECTIVE COVERINGS
Retain protective coverings and coatings to BRANZ BU 636 and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

3.7 ADDITIONAL PROTECTION
Supply and fix additional protection as necessary to prevent marking of surfaces which will be visible on completed work.

Conditions - fixings and fastenings

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3.8 SUPPLY OF FIXINGS
Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS. Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 316 stainless steel or if not exposed to the weather may they be hot-dip galvanized steel with a coating weight of 610 g/m² complying with AS/NZS 4680.

3.9 INSTALLATION FIXING
To NZBC E2/AS1, 9.1.10.8, **Attachments for windows and doors**. Fix windows/doors through reveal to frame with a pair of 75 x 3.15mm minimum galvanised jolt head nails or a pair of 8 gauge x 65mm minimum stainless steel screws. Fix at a maximum of 450 centres along all reveals and a maximum of 150mm from reveal ends. Ensure fixings do not penetrate metal flashings.
Install packers between reveals and framing at fixing points, except at the head.

Assembly

3.10 FABRICATION
Fabricate frames as detailed on shop drawings. Install glazing, hinges, stays and running gear as scheduled. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation.

3.11 HARDWARE GENERALLY
Factory fit all required and scheduled hardware. Account for all keys and deliver separately to the site manager.

3.12 SAFETY STAYS
Factory fit safety stays to all windows scheduled for safety stays and to all windows where safety stays are required to comply with NZBC F4/AS1 4.0, Opening windows.

Installation - windows and doors

3.13 SUPPLY OF FIXINGS
Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS.

3.14 EXPOSED FIXINGS AND FASTENINGS
Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 304 stainless steel.

3.15 PROTECTED FIXINGS AND FASTENINGS
Fixings and fastenings not exposed to the weather may be hot-dip galvanized steel with a coating weight of 610 g/m² complying with AS/NZS 4680.

3.16 CORROSION PROTECTION
Before fixing, apply suitable barriers of bituminous coatings, stops or underlays between dissimilar metals in contact, or between aluminium in contact with concrete.

3.17 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.

Required preparatory work includes the following:
- wall cladding underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 **Wall underlays to wall openings.**
- Full height 20mm jamb battens to NZBC E2/AS1 figure 72A (direct fix only)
- claddings neatly finished off to all sides of openings
- installation of flashings (those which are required to be installed prior to frames).
- application of waterproof sealer to all door and window sills in concrete floor or concrete sill situations. To door sills only, apply a suitable membrane over the sealer
- all in accordance with the shop drawings, where applicable.

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3.18 INSTALLATION
Fix to comply with the reviewed shop drawings and installation details including flashings and bedding compounds, pointing sealants and weathering sealants.

3.19 INSTALLATION CAVITY CONSTRUCTION
Install to WGANZ Window Installation Guide details and drawings including WGANZ sill support bars.
For thresholds with support bars fixed through membranes, pre-fill support bar screw holes with silicone sealant to NZBC E2/AS1, figure 62(d).

3.20 INSTALL FLASHINGS
Install flashings to heads, jambs and sills of frames as supplied and required by the window manufacturer and as detailed on the drawings. Finish head flashings to match window finish.

Place all flashings so that the head flashing weathers the jamb flashings, which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.

Except where window/door frames are recessed, ensure that head flashings over-sail unit by 20mm plus any jamb scriber width at each end.

3.21 COMPLETE AIR SEAL
To NZBC E2/AS1:9.1.6 **Air seals**. Form an air-tight seal by means of proprietary expanding foam or sealants used with PEF backing rods, applied between the window / door reveal and structural framing to a depth of 10 - 20mm, to provide a continuous air tight seal to the perimeter of the window or door.

3.22 FIX HARDWARE
Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing

3.23 SEAL FRAMES ON SITE
Seal frames to each other and to adjoining structure and finishes, all as required by the window and sealant manufacturer and to make the installation weathertight.. In very high and extra high or greater wind zones, seal between the window head and the head flashing. Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.

3.24 PREPARE JOINTS
Ensure joints are dry. Remove loose material, dust and grease. Prepare joints in accordance with the sealant manufacturer's requirements, using required solvents and primers where necessary. Mask adjoining surfaces which would be difficult to clean if smeared with sealant.

3.25 BACK UP
When using back-up materials do not reduce depth of joint for sealant to less than the minimum required by the manufacturer of the sealant. Insert polyethylene rod or tape back-up behind joints being pointed with sealant.

3.26 SEALANT FINISH
Tool sealant to form a smooth fillet with a profile and dimensions required by the sealant manufacturer. Remove excess sealant from adjoining surfaces, using the cleaning materials nominated by the sealant manufacturer and leave clean.

Cleaning

3.27 REMOVE TRADE DEBRIS
Remove trade debris by appropriate means on a floor by floor basis as each floor is completed and again before any work is covered up by others. Arrange for general removal.

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3.28 TRADE CLEAN
Trade clean window frames, operable windows and doors, glass and other related surfaces inside and out at the time of installation to remove marks, dust and dirt, to enable a visual inspection of all surfaces.

Completion

3.29 PROTECTIVE COVERINGS
Retain protective coverings and coatings and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Anodised finishes should be protected from cement products and require immediate clean-up of cement splashes. Only use tapes that have passed WGANZ testing on powder coated products. Remove protection on completion.

3.30 REPLACE
Replace damaged, cracked or marked elements.

3.31 PROTECTION
Protect finishes against damage from adjacent and following work.

3.32 SAFETY
Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Masking tape must not be used for this purpose.

4. SELECTIONS
For further details on selections go to www.aplnz.co.nz.

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4555 GARAGE DOORS

1. GENERAL

This section relates to the manufacture, supply and installation of garage door systems including required opening/operating systems.

Documents

1.1 DOCUMENTS REFERRED TO
Documents referred to in this section are:

AS/NZS 1170	Structural design actions
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
NZS 3604	Timber-framed buildings
AS/NZS 4505	Garage doors and other large access doors

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.2 INFORMATION FOR OPERATION AND MAINTENANCE
Provide operating instructions for the garage doors and associated opening equipment. Provide a list of all components requiring regular maintenance.

Performance

1.3 DESIGN PARAMETERS WIND
Design the installation to the manufacturers requirements and as appropriate for the project wind design stated in the general section 1220 PROJECT.

1.4 LOADS - NON - SPECIFIC DESIGN - DOORS UP TO 3.0M HIGH
Garage doors complete with hinges, roller assemblies and fasteners to comply with wind performance requirements to NZS 3604.

1.5 RESPONSIBILITY FOR PERFORMANCE
Accept responsibility for the structural and weathertight performance of the completed garage door installation.

2. PRODUCTS

2.1 GARAGE DOOR
Manufacture to AS/NZS 4505 complete with a compliance label.

2.2 MOTORISED DOOR OPENER

3. EXECUTION

3.1 PREPARATION FOR INSTALLATION
Check that the trimmed and lined openings are formed and constructed to suit the required door units. Do not proceed until openings are properly formed.

3.2 MANUFACTURER'S REQUIREMENT FOR INSTALLATION
Install door, track and operating equipment complete with all specified and necessary accessories and hardware to the manufacturer's requirements.

3.3 START UP
Carry out start up procedures and verify proper performance of the doors.

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3.4 ADJUSTMENT
Lubricate bearings and sliding parts and adjust doors to operate easily, free of warp, twist or distortion with a weathertight fit round the entire perimeter.

3.5 DEMONSTRATION
Carry out start up procedures and verify proper performance of the door. Demonstrate the operation of the door to the principal/principal's representative. Set security features to principal's requirements. Reset security features at practical completion of the contract works.

Completion

3.6 ENSURE
Ensure all elements are free of marks or blemishes, with all moving parts working fully and freely.

3.7 REPLACE
Replace damaged, cracked or marked elements.

3.8 LEAVE
Leave work to the standard required by following procedures.

3.9 REMOVE
Remove all debris, unused materials and elements from the site.

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4610 GLAZING RESIDENTIAL

1. GENERAL

This section relates to the supply and fixing of glass products for external and internal joinery in residential type buildings and includes:
- windows and doors
- frameless shower and bath screens
- splashbacks, wall linings
- balustrade systems, pool fences
- mirrors and mirror frames

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

PVB	Polyvinyl Butyral
CIP	Cast in place

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC F4/AS1	Safety from falling
NZBC F9/AS1	Means of restricting access to residential pools
NZBC H1/AS1	Energy Efficiency
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4218	Thermal insulation - Housing and Small Buildings
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223.Supp1	Glazing in buildings - Supplement 1 to NZS 4223.1:2008 and NZS 4223.4:2008
NZS 4223.2	Glazing in buildings - Insulating glass units
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 2208	Safety glazing materials in buildings
AS/NZS 4666	Insulating glass units
BRANZ BU 636	Protecting Glass From Damage

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER
Warrant glass under normal environmental and use conditions against failure of materials.

10 years:	for insulating glass units
10 years:	for laminated glass
10 years:	for toughened glass

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Performance

1.4 ENERGY EFFICIENCY
Provide glazing to meet the energy requirements of NZS 4218 and NZBC H1/AS1 for housing small buildings.
Refer to SELECTIONS and schedules for location and type of glazing.

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2. PRODUCTS

Materials

2.1 LAMINATED GLASS
Grade A Safety Glass to AS/NZS 2208 with PVB or CIP resin interlayer.

2.2 TOUGHENED GLASS
Grade A Safety Glass to AS/NZS 2208.
Heat soaked toughened glass to NZS 4223.1, Appendix E required for critical areas.
Refer to SELECTIONS.

Materials, screens

2.3 GLASS SCREENS SHOWER & BATH
Proprietary shower / bath screens, formed to shape before toughening, complete with matching hardware.

Components, timber glazing

2.4 PUTTY, TIMBER FRAME
Linseed oil base glazing putty. Not to be used with laminated or IGUs.

2.5 SPRIGS
Diamond metal pieces to retain glass in timber sashes and frames.

2.6 GLAZING TAPE
Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes for bead glazing. For internal use only.

2.7 GASKETS
PVC or Santoprene to window manufacturers' requirements.

2.8 SETTING BLOCKS
Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes. Use with bead glazing and for IGUs.

3. EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS
To NZS 4223.1, NZS 4223.3, NZS 4223.4. All external glazing to be wind and watertight on completion.

3.2 DELIVERY
Keep glass dry and clean during delivery and bring on to site when ready to glaze directly into place. Comply also with the storage requirements set out in BRANZ BU 636.

3.3 GLASS CONDITION
All glass to have undamaged edges and surfaces.

3.4 GLASS THICKNESS
If not specifically stated in the glazing schedule determine the minimum thickness of glass for each sheet as required by NZS 4223.1, NZS 4223.3, NZS 4223.4 and NZS 4223. Supp 1. For windows tested to NZS 4211, ensure glass meets the requirements of the window testing.
Determine the final glass thickness based on whether wind loading or human impact considerations govern.

3.5 REBATE DIMENSIONS
Provide rebates for glazing to the widths and depths necessary for each situation including minimum glass edge cover to NZS 4223.1, Section 4 Glazing.

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3.6 JOINTING, PUTTY AND SEALING MATERIAL COMPATIBILITY
Ensure jointing, putty and sealing materials are compatible with glass substrates. Confirm compatibility with laminated glass, IGUs and coatings.

Conditions - human impact safety requirements

3.7 SAFETY GLAZING, GENERAL REQUIREMENTS
Glazing of doors, side panels, low level and window seat glazing, bathrooms, stairwell landings and similar locations, to NZS 4223.3 for thickness and maximum areas of safety glass.

3.8 SAFETY GLAZING MATERIAL
Use only safety glazing materials defined in NZS 4223.3, that also comply with the relevant requirements of AS/NZS 2208. Ensure material is permanently marked and if cut by the distributor or installer mark each piece to NZS 4223.3, 2.8 Identification.

3.9 CONTAINMENT
Edge cover to comply with NZS 4223.1, Section 4 Glazing, table 5. Otherwise to NZS 4223.3, 2.3 Edge cover.

Assembly

3.10 WORKING OF GLASS
All working of glass as required in NZS 4223.1.

3.11 EDGE WORK AND BEVELLING
Edgework other than a clean cut. Refer to SELECTIONS/drawings for type.

3.12 SURFACE TREATMENT
Refer to SELECTIONS/drawings for finish.

3.13 SURFACE CUTTING
Refer to SELECTIONS/drawings for finish.

3.14 INSTALL SAFETY GLASS
To NZS 4223.3.

Application - timber glazing

3.15 PREPARE REBATES
Ensure all rebates and grooves are clean, dry and unobstructed at time of priming, sealing and glazing.

3.16 PREPARE TIMBER SURROUNDS
Ensure that all rebates have been primed with a primer suitable for this purpose and applied to the requirements of the painting section/s.

3.17 PREPARE TIMBER BEADS
Before fixing ensure that timber beads are sealed and painted to match the timber surround.

3.18 LOCATE BLOCKS
Centralise the glass in the rebate opening using setting, location and spacer blocks as required in NZS 4223.1, Section 4 Glazing, to prevent movement of glass in the rebate and cushion the effect of wind loading on the sealing system.

3.19 INSTALL PUTTY FRONTING
Back putty to give a bedding of not less than 1mm to 2mm between the glass and the back of the rebate when the glass has been pressed back. Strip off squeezed out putty at a positive angle. Fix glass to wooden surrounds with diamond points or sprigs at maximum 460mm centres. Fix glass to metal surrounds with spring clips or pins provided by the sash manufacturers. Apply putty to the face to form a triangular fillet stopping 1-2

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mm below sight line. Finish putty smooth and true to line and face and with a light brushing.

Leave all windows and doors closed until putty has set sufficiently to prevent glass displacement.

Prime putty fronting once surface has skinned - normally within 10 - 15 days of completion of glazing, but this can be reduced with special XHP putty.

3.20 BEAD GLAZING, PREFORMED STRIPS
Apply the preformed tape to the rebate upstand with securely formed (or sealed) butt joints at corners. Place setting blocks, offer the glass and press back against the tape centralised in the opening and apply the second tape. Press the beads against and compressing the tapes and fix true to line and face sufficiently rigid to prevent flexing or movement. Trim off excess strip.

If a capping bead is required clean and paint the timber surface and when dry apply sealant capping between bead and glass and tool to a smooth camber.

3.21 BEAD GLAZING, NON SETTING COMPOUNDS
Apply compound to the rebate. Push setting blocks into place with distance pieces against the rebate upstand before offering the glass to the surround on setting blocks, centralised in the opening and pushed back into the glazing compound. Fill all voids with compound and apply more compound before setting distance pieces in it opposite the distance pieces already in place. Bed the beads to the glass and rebate and fix true to line and face sufficiently rigid to prevent flexing or movement. Finish compound off at an angle both sides of the glass.

3.22 INSTALLING INSULATING GLASS UNITS
Refer to the glazing manufacturer's requirements and before glazing ensure that the materials forming the opening are strong enough to accept the weight, the rebates are the correct size and prepared to receive the units to AS/NZS 4666. Fit setting and location blocks and bead glaze units using a compatible sealant to NZS 4666 section 3 Glazing, and to the glazing manufacturer's requirements.

3.23 INSTALLING REFLECTIVE AND COATED GLASS
In addition to the type of glazing specified refer to the requirements of the glass manufacturer and ensure that the rebate dimensions, clearances and edge cover are sufficient to allow for the movement created by the particular solar glass being used. Check thermal stability for the particular location and ensure any sealant or compound is compatible with the coating.

Application miscellaneous

3.24 INSTALL GLASS SHOWER & BATH SCREENS
Install shower and bath screens and doors to manufacturer's requirements.

Finishing

3.25 SAFETY
Indicate the presence of transparent glass for the remainder of the construction period, with whiting, tape or signs compatible with the glass type.

Completion

3.26 TRADE CLEAN
Clean off or remove safety indicators at completion of the building.

3.27 REPLACE
Replace damaged, cracked or marked glass.

3.28 LEAVE
Leave work to the standard required by following procedures.

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3.29 REMOVE

Remove debris, unused materials and elements from the site.

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4710P PINK® BATTS® & PINK® BATTS® SILENCER® INSULATION

1. GENERAL

This section relates to Tasman Insulation **Pink® Batts®** insulation materials installed into residential buildings.
It includes:
Thermal:
- **Pink® Batts® Ceiling Insulation** (**Pink® Batts® Classic** and **Pink® Batts® Ultra®**)
- **Pink® Batts® Skillion Roof Insulation**
- **Pink® Batts® Wall Insulation** (**Pink® Batts® Classic** and **Pink® Batts® Ultra®**)
- **Pink® Batts® Masonry Wall Insulation**
- **Pink® Batts® 140mm Wall Insulation**
- **Pink® Batts® Steel Wall Insulation**
- **Pink® Batts® Narrow Wall Insulation**
- **Pink® Batts® SnugFloor® Underfloor Insulation**

Acoustic:
- **Pink® Batts® Silencer®**
- **Pink® Batts® Silencer® Midfloor**

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS1-AS2	Protection from fire
NZBC H1/AS1	Energy efficiency
NZS/AS 1530.1	Methods for fire tests on building materials, components and structures - Combustibility test for materials
AS/NZS 3000	Electrical installations (Known as the Australian/New Zealand Wiring Rules)
NZS 4218	Thermal insulation - Housing and small buildings
NZS 4220	Code of practice for energy conservation in non-residential buildings
NZS 4243.1	Energy Efficiency - Large buildings - Building thermal envelope
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential buildings
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.2 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer and supplier documents related to this section are:
Tasman Insulation New Zealand: Product Data Sheets and Installation Instructions
BRANZ Appraisal 238 - Pink® Batts® Insulation
BRANZ Appraisal 632 - Pink® Batts® SnugFloor® Underfloor Insulation
BRANZ Appraisal 767 - Pink® Batts® Skillion Roof Insulation

Manufacturer/supplier contact details
Company: **Tasman Insulation New Zealand**
Web: www.pinkbatts.co.nz
Telephone: 0800 746 522

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

Lifetime Warranty	For **Pink® Batts®** insulation products

- Commence the warranty from the date of practical completion of the contract works.

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- Provide this Warranty on the **Pink® Batts® Lifetime Warranty Certificate** form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS, PINK® BATTS®
Installers to be **PinkFit® - Preferred Pink® Batts® installers**. A list of approved installers can be obtained from the web, by telephone or from the local building supplies merchant.
Web: www.pinkbatts.co.nz
Telephone: Freephone 0800 746 534

1.5 NO SUBSTITUTIONS
Substitutions are not permitted to any specified Tasman Insulation **Pink® Batts®** insulation or associated products, components or accessories.

Performance - combustibility

1.6 FIRE PREVENTION
Pink® Batts® insulation materials are considered a non-combustible material to NZS/AS 1530.1 and need not be separated from heat sources such as fire places, heating appliances, flues and chimneys to NZBC C/AS1 to C/AS2, except if used in conjunction with, or attached to other heat sensitive materials.

2. PRODUCTS

Components

2.1 FASTENERS
Insul anchors complete with retaining washer.

2.2 WIRE NETTING
Refer to 4161 UNDERLAYS, FOIL AND DPC for wire netting used to support the insulation.

2.3 PLASTIC STRAPPING TAPES
Proprietary plastic strapping tape, stapled over framing to retain insulation in unlined wall, ceiling and underfloor locations.
For drained cavities where stud spaces are greater than 450mm and only flexible underlay is used, strapping required to NZBC E2/AS1 9.1.8.5 **Wall framing behind cavities**.

2.4 ADHESIVE TAPE
Pressure sensitive adhesive tape.

3. EXECUTION

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 ROUTINE MATTERS
Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.
Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 INSPECTION
Before starting installation of blankets and slabs, check that the location and framing are free from moisture, that the cavities are not interconnected and that mesh, wall underlays and vapour barriers are in place.

Application - general

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3.4 INSTALL INSULATION - GENERAL
Lay, install, fit and fix to NZBC H1/AS1: Energy efficiency, 2.0 Building thermal envelope, and to manufacturer's requirements. Install in housing to NZS 4218 and NZS 4246. Install in large buildings to NZS 4243.1 and NZS 4220. Allow insulation to re-loft/relax prior to installation. Do not cover vents. Confirm with fireplace manufacturer for clearances; **Pink® Batts®** insulation need not be separated except if used in conjunction with, or attached to other heat sensitive materials. Lift up electrical wires, lighting transformers/controllers and lay the insulation underneath.

3.5 RECESSED LIGHT FITTINGS - RESIDENTIAL
Residential recessed light fittings to AS/NZS 3000, 4.5.2.3.5;
- Existing fittings or retrofit situations, fittings maybe unmarked
- New fittings can only be labelled - CA 80, CA 90, CA 135, IC, IC-F & IC-4

Refer to clause INSULATION CLEARANCES GENERALLY for clearances.

Application - components

3.6 LAY WIRE NETTING - UNDER JOISTS / PURLINS
Lay at right angles across the rafters/roof joists (under purlins). Pull tight and fix.

3.7 LAY PLASTIC STRAPPING TAPE
Lay at right angles across the framing at a minimum of 300mm centres, staple tape to each framing member with stainless steel staples.

Completion

3.8 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

3.9 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS
For further details on selections go to www.pinkbatts.co.nz.

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5113G GIB® PLASTERBOARD LININGS

1. GENERAL

This section relates to the supply, fixing and jointing of GIB® plasterboard linings and accessories to timber and steel framed walls and ceilings to form:
- standard systems
- superior finish quality systems
- bracing systems
- fire rated garage boundary wall systems
- wet area systems
- GIBFix® Framing systems

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

AWCINZ	Association of Wall and Ceiling Industries New Zealand

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
NZBC E2/AS1	External moisture
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3604	Timber-framed buildings
AS/NZS 4600:2005	Cold-formed steel structures
ISO 5660.1	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate (cone calorimeter method)
ISO 5660.2	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 2: Smoke production rate (dynamic measurement)
BRANZ Technical Paper P21	BRANZ Technical Paper P21: A wall bracing test and evaluation procedure (2010)
NASH	Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer and Supplier documents relating to this part of the work.
- GIB® Site Guide (September 2018)
- GIB® Noise Control Systems (September 2017)
- GIB® Fire Rated Systems (October 2018)
- GIB Aqualine® Wet Area Systems (March 2007)
- GIB Toughline® Aqua (July 2018)
- GIB Ezybrace® Systems (2016)
- GIB Ezybrace® Bracing Software
- GIB Ezybrace® Systems (June 2011), with amendments (December 2014)
- GIB Ezybrace® for Steel Frame Housing (NASH) Software (2011)
- GIBFix® Framing System (2016)
- GIB Rondo® Metal Ceiling Batten Systems
- GIB-Cove®
- GIB RocTape®
- GIB Goldline™ Platinum Tape-on Trims (January 2006)

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	- GIB UltraFlex® high impact corner mould (September 2004) - GIB® Tough Systems (Nov 2014)
BRANZ Appraisal 928 (2016)	GIB Ezybrace® Systems 2016
BRANZ Appraisal 427 (2007)	GIB Aqualine® Wet Area Systems
BRANZ Appraisal 928 (2016)	GIB Ezybrace® Systems 2016
GreenTag Certification	WWLCG001-001-A-2015 - GreenTag™ GreenRate / Level B for: - GIB® Standard (10mm & 13mm) - GIB Fyreline® (10mm, 13mm, 16mm & 19mm) - GIB Braceline® (10mm & 13mm) - GIB Noiseline® (10mm & 13mm) - GIB Toughline® (13mm) - GIB Wideline® (10mm & 13mm)

Copies of the above literature are available at:

Company:	Winstone Wallboards
Web:	www.gib.co.nz
Telephone:	0800 100 442

Requirements

1.4 NO SUBSTITUTIONS
Substitutions are not permitted to any specified GIB® systems, GIB® system components, GIB® plasterboard, associated GIB® products or GIB® accessories.

1.5 INSTALLER WORK SKILLS AND QUALIFICATIONS
GIB® plasterboard fixers and plasterers to be experienced competent workers, familiar with GIB® plasterboard lining systems installation and finishing techniques. Submit evidence of experience on request. For example:
- National Certificate of Interior Systems; or
- Certified Business member of AWCINZ.

Performance

1.6 INSPECTIONS AND ACCEPTANCE
Allow for inspection of the finished plasterboard surface:
- before applying sealer and
- before applying finish coatings or decorative papers,

so that after assessment of the type and/or angle of illumination and its effect on the completed decorative treatment, group approval and acceptance of the surface can be given.

1.7 BRACING REQUIREMENTS
Braced wall systems to NZS 3604 when tested to BRANZ Technical Paper P21, using:
- GIB Ezybrace® Systems (2016) and/or GIB Ezybrace® Bracing Software (2016)
- GIB Ezybrace® Systems (2011)
- GIB Ezybrace® for Steel Frame Housing (NASH) Software 2011 (to NASH Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria)

Refer to drawings for location and type.

2. PRODUCTS

Materials

2.1 GIB® PLASTERBOARD
Gypsum plaster core encased in a face and backing paper formed for standard and water resistance use to AS/NZS 2588. Refer to SELECTIONS for location, type, thickness and finish.
GIB® Standard plasterboard
GIB Wideline® plasterboard

GIB Ultraline® high quality surface plasterboard
GIB Fyreline® fire resistant plasterboard
GIB Braceline® & GIB® Noiseline® dual purpose wall bracing & noise control plasterboard
GIB Aqualine® wet area plasterboard
GIB Toughline®
GIB Toughline® Aqua

Components

2.2 CEILING BATTENS
75X35 timber battens @ 600crs.

2.3 SCREWS
GIB® Grabber® drywall type screws as follows:

Grabber® type	**Used for fixing:**
High Thread	GIB Ezybrace® or Standard systems to timber
Self Tapping	Standard systems to light gauge steel or timber
Dual Thread Screws	GIBFix®, GIB Ezybrace®, or Standard systems, to light gauge steel or timber
Wafer Head Needle Tip	Light gauge metal to timber not directly under plasterboard
Pancake Head Drill Tip	Light gauge metal to light gauge metal directly under plasterboard

Refer to GIB® requirements for appropriate details.

2.4 TAPE ON TRIMS AND EDGES
GIB® Goldline™ tape-on trims
GIB® UltraFlex® high impact corner mould
GIB® Levelline® Tape on Trim

2.5 METAL ANGLE TRIMS
GIB® galvanized steel slim angle trims.

2.6 CONTROL JOINTS
GIB® Rondo® P35 control joints.
GIB® Goldline™ tape-on trims
GIB® plastic W-profile control joints.

Accessories

2.7 ADHESIVE
Timber frame and/or steel frame:
GIBFix® One ultra low VOC water based wallboard adhesive
GIBFix® All-Bond solvent based wallboard adhesive

2.8 JOINTING COMPOUND

Bedding compound:	GIB Tradeset®, GIB Lite Blue®, GIB MaxSet®, GIB ProMix® All Purpose, GIB Plus 4®
Finishing compound:	GIB ProMix® All Purpose, GIB® Trade Finish®, GIB® Trade Finish® Lite, GIB ProMix® Lite, GIB® U-Mix, GIB Plus 4®, GIB Trade Finish® Multi
Cove:	GIB-Cove® Bond

2.9 JOINTING TAPE
GIB® jointing tape.

2.10 GAP FILLER
GIB® Gap Filler ultra low VOC multi-purpose acrylic flexible filler

3. EXECUTION

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Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.2 LEVELS OF PLASTERBOARD FINISH
Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in AS/NZS 2589.

3.3 CONFIRM LEVELS OF PLASTERBOARD FINISH ACCEPTANCE
Before commencing work, agree in writing upon the surface finish assessment procedure towards ensuring that the quality of finish expectations are reasonable and are subsequently obtained and acceptable.

Do not apply decorative treatment until it is agreed in writing by the contractor, subcontractors and decorator that the specified plasterboard Level of Finish has been achieved.

"Levels of plasterboard finish" is a tool for specifying the required quality of finish when installing and flush stopping GIB® plasterboard **prior** to the application of a range of decorative finishes under various lighting conditions. Refer to **AS/NZS** 2589.

3.4 SUBSTRATE
Do not commence work until the substrate is plumb, level and to the standard required by the sheet manufacturer's requirements. Refer to GIB® Site Guide (September 2018).

3.5 TIMBER FRAME MOISTURE CONTENT
Maximum allowable moisture content to AS/NZS 2589 for timber framing at lining: 18% or less for plasterboard linings. Refer to NZBC E2/AS1 and GIB® Site Guide (Sept 2018).

3.6 PROTECTION
Protect surfaces; cabinetwork, fittings, equipment and finishes already in place from the possibility of water staining and stopping damage. Refer to GIB® Site Guide (Sept 2018).

Application

3.7 INSTALL CEILING BATTENS
Install to GIB® Rondo® Ceiling Batten Systems requirements.

3.8 LINING WALLS AND CEILINGS GENERALLY
Form to GIB® Site Guide (September 2018). Ensure bulk insulation thickness shall not exceed that of the wall framing.

3.9 BOARD ORIENTATION
Minimise joints by careful sheet layout using the largest sheet sizes possible, and generally fixing horizontally. Where part sheets are required for various stud heights they should be positioned so the cut sheet is as low as possible to keep joints below eye level.

3.10 FORM WET AREA SYSTEMS
Form to GIB Aqualine® Wet Area Systems requirements.

3.11 FORM BRACING SYSTEMS
Form bracing systems to:
- GIB Ezybrace® Systems (2016)

3.12 FORM CONTROL JOINTS
Form control joints to GIB® Site Guide (September 2018) requirements.

3.13 INSTALL TAPE-ON TRIMS
Install to GIB® Goldline™ Tape-on trims literature and/or GIB® Ultraflex high impact corner mould literature.

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Finishing

3.14 FINISHING GENERALLY
To GIB® Site Guide (September 2018) and AS/NZS 2589.

Completion

3.15 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

3.16 CLEAN DOWN
Clean down completed surfaces to remove irregularities and finally sand down with fine paper to the sheet manufacturer's requirements, to leave completely smooth and clean.

3.17 REMOVE
Remove debris, unused materials and elements from the site.

3.18 LEAVE
Leave work to the standard required by following procedures.

4. SELECTIONS

4.1 GIB® BRACING SYSTEMS
Refer to:
- GIB Ezybrace® Systems (2016)
- GIB Ezybrace® Systems (2011)

For bracing element location refer to drawn documentation.

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5230 INTERIOR DOORS

1. GENERAL

This section relates to the supply and installation of interior doors.

1.1 RELATED SECTIONS
Refer to glazing section/s for glass type and thickness.

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3602	Timber and wood-based products for use in building
NZS 3610	Specification form profiles of mouldings and joinery

2. PRODUCTS

2.1 TIMBER
To NZS 3602.

2.2 PROFILES, FACINGS, SCRIBERS AND ARCHITRAVES
Traditional profiles to NZS 3610. Proprietary profiles and special profiles as detailed. Pencil radius corners of profiled schedules for paint finish.

2.3 DOORS, TIMBER VENEER
Doors as scheduled complete with matching 6mm clashing strip to both sides and to the exposed edge of cavity slider doors.

2.4 DOORS, PAINTED
Doors as scheduled (without clashing strips).

2.5 CAVITY SLIDERS
Doors hung within a proprietary cavity slider frame and complete with brand-matched sliding door gear.

2.6 FRAMED AND GLAZED DOORS
Solid timber framed doors, stop end jointed and bead glazed.

2.7 FRAMED AND PANELLED DOORS
Solid timber framed doors, stop end jointed and beaded as detailed.

2.8 FRAMED AND LOUVRED DOORS
Solid timber framed doors, stop end jointed and beaded as detailed.

2.9 DOOR HINGES
Size and gauge to carry door. 3 hinges per door.

2.10 SLIDING DOOR GEAR
To suit door/sash size and glazed weight and as detailed.

2.11 SLIDING-FOLDING DOOR GEAR
Bi-fold pattern to suit size and weight of doors and as detailed.

3. EXECUTION

3.1 SITE MEASURE
Confirm framed openings on site for dimension, plumb and straightness prior to fabrication or ordering of timber joinery. Confirm lintel head and sill deflection for sliding or bi-fold door systems is within the manufacturer's specified tolerances. Provide not less than 10mm unless otherwise required.

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3.2 EXECUTION GENERALLY
Manufacture to the methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.3 FACTORY FIT HARDWARE
Factory fit the following where specified:
- Hinges

3.4 FACTORY FINISHING
Before delivery to site:
- Brace square and provide protection to assemblies during delivery to site. Where factory glazed, indicate the presence of transparent glasses with whiting, tape or signs compatible with the glass type.

Internal doors

3.5 INTERNAL JOINERY FRAMES
Fabricate as detailed. Wedge and rigidly fix in place without distortion, plumb, and true to line and face. Pre drill for fixings through frame. Countersink and plug frames scheduled for clear finish.

3.6 DOOR FRAMES, SOLID REBATED
Fabricate as detailed. Hang doors to operate freely on hinges, sliding, or bi-fold gear and to the door manufacturer's requirements. Pre drill for fixings through frame. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.7 DOOR LINERS
Heads and jambs finished minimum 18mm, with 10mm planted door stops. Width to match width of lined walls. Hang doors on hinges, sliding, or sliding-folding gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.8 DOOR LINERS, EXTENDED
Heads and jambs finished 30mm, rebated for wall linings and extended a minimum of 10mm. 10mm planted door stops. Hang doors on hinges, sliding and bi-fold gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.9 CAVITY SLIDERS
Install in accordance with the door manufacturer's requirements, allowing for removal of top trim for maintenance.

Completion

3.10 CHECK
Check and adjust operation of all sashes, doors, hardware and furniture.

3.11 TEMPORARY PROTECTION
On completion remove any temporary protection and leave ready for following work.

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6221 TILING SYSTEMS

1. GENERAL

This section relates to the supply and installation of interior and exterior floor and wall tiles.
It includes:
- Underlays
- Screeds and levelling compounds
- Primers
- Waterproofing systems
- Tile adhesives
- Grouts and sealants
- Tiles
- All other required components and accessories necessary to complete installation

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC D1/AS1	Access routes
NZBC E3/AS1	Internal moisture
AS 3740	Waterproofing of wet areas within residential buildings
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
NZS 4121	Design for access and mobility - Buildings and associated facilities
AS/NZS 4671	Steel reinforcing materials
AS ISO 13007.1	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for adhesives
AS ISO 13007.3	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for grouts
BRANZ	Good practice guide: Tiling

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR - FOR TILING SYSTEMS
Provide an installer/applicator warranty:
2 years: For installation of tiling systems

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.4 WARRANTY - INSTALLER/APPLICATOR - FOR WATERPROOFING SYSTEMS
Provide an installer/applicator warranty:
5 years: For installation of waterproofing systems

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Requirements

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1.5 QUALIFICATIONS - TILING SYSTEMS
Tilers to be experienced, competent trades people familiar with the materials and techniques specified.

1.6 QUALIFICATIONS - WATERPROOFING SYSTEMS
Waterproofers to be experienced, competent trades people familiar with the materials and techniques specified.

1.7 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.8 ADHESIVES COMPATIBILITY
Adhesives selected for use on proprietary substrates or waterproof membranes to have documented compatibility approval from the respective manufacturers.

1.9 INTERNAL / EXTERNAL MOISTURE
Wet area membranes under tiled areas to AS 3740, NZBC E2/AS1 (exterior), NZBC E3/AS1 (interior) and to BRANZ Good Practice Guide: Tiling.

2. PRODUCTS

Materials

2.1 TILES
Refer to SELECTIONS for product selection.

Materials - preparation & underlays

2.2 FIBRE CEMENT TILE UNDERLAY
6mm or 9mm thick sheet of Portland cement, sand, fine cellulose fibre and water, with a smooth finish. Underlays to AS/NZS 2908.2 Cellulose-cement products Part 2: Flat Sheets.

2.3 FLOOR LEVELLING COMPOUND
Proprietary floor levelling compound. Refer to SELECTIONS for details.

Materials - waterproofing

2.4 LIQUID WATERPROOFING MEMBRANE
To AS 3740. Refer to SELECTIONS for details.

Materials - adhesive and grout

2.5 TILE ADHESIVE
To AS ISO 13007.1.

2.6 SAND AND CEMENT GROUT
1 part Portland cement to 2-3 parts fine, washed sand, mixed to a paste consistency with a minimum of clean, potable water.

2.7 PROPRIETARY GROUT
Cement based, compressible and to suit particular location/use. To AS ISO 13007.3.

Components

2.8 MOVEMENT JOINT SEALANT
To BRANZ Good practice guide: Tiling, section 5.0.
- Neutral cured sealant for areas where waterproof membranes are used or where used against aluminium.
- Acid cured sealant except for areas where waterproof membranes are used or where used against aluminium.

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Note: Check compatibility of membrane and sealant, use bond breaking tape to separate them if required.

3. EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING
Take delivery of materials and goods and store on site and protect from damage.
Protect finished surfaces, edges and corners from damage.
Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish

3.2 CHECK TILES
Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT
Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT
Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

3.5 GENERALLY
Prepare surface and complete tiling work in accordance with AS 3958.1, as modified by BRANZ Good practice guide: Tiling.

Conditions

3.6 INSPECT BACKGROUND CONDITIONS
Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

Inspect background and substrate materials for any conditions unsuitable for tiling over. Substrate material must be even and true with a maximum variation in plane of no greater than 4mm in every 2m, in accordance with AS 3958.1, section 4.

Do not commence work until the affected area is rectified. Commencement of installation constitutes acceptance of site conditions.

3.7 SUBSTRATE TEMPERATURE
Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.8 MOISTURE CONTENT
Ensure concrete floors & concrete and/or concrete block walls are cured and dry. Ensure moisture content is such that shrinkage is complete and thermal movement has been accommodated.

If in doubt check for moisture content by hygrometer. Do not proceed with tiling work until readings for the whole area show 75% relative humidity or less.

3.9 LIGHTING
Light the tile work as closely and clearly as possible to that of the finished lighting, to ensure that differences in plane surface are highlighted during installation.

Application - preparation

3.10 PREPARE SUBSTRATES
Prepare backgrounds as described in AS 3958.1, Section 4 as modified by BRANZ Good practice guide: Tiling. All surfaces to be structurally sound, dry, clean and free from

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movement, dirt, dust, oil, grease, wax, curing compounds, release agents and any other loose or contaminating materials.

Ensure surfaces are flat and true to a tolerance of ± 4mm in 2 metres from the required plane. Remove projections, unevenness and loose material to leave a clean dust and dirt free surface.

Suitably prepare backgrounds and substrates in accordance with the manufacturer's instructions of the tiling installation products for the relevant substrate type.

3.11 PRIME SUBSTRATES
Surfaces should be primed as per manufacturer's instructions for the selected products and substrate types. Refer to SELECTIONS.

Application - movement joints

3.12 FORM MOVEMENT AND EXPANSION JOINTS
Install movement joints to go right through the tile and bed to the background, maintaining any waterproofing. Ensure any slip layer backing (bond breaker) required, is installed.
Joint width minimums:
- 4-6mm interior tiles on concrete (with low moisture content)
- 6-8mm interior tiles on dry timber structure
- 8-10mm exterior tiles on concrete (with low moisture content)
- 10-12mm exterior tiles on dry timber structure
- To match grout width, if equal/larger than above
- Larger to suit joint infill requirements (preformed jointers)

In wall tiling provide joints at; internal vertical corners, as well as joints at, floors, columns/beams, nibs, hobs and similar. Provide joints around sanitary fixtures, around fixtures interrupting the tile surface, at junctions with joinery fixtures, including window and door frames and built in cupboards, and at changes in substrate or background. In large area wall tiling provide vertical joints at not more than 3.6 metres spacing along the length of a wall and horizontal joints at each storey rise in the height of a wall, and over all existing substrate expansion joints.

In large areas of floor tiling provide joints at not more than 4 metres spacing in both directions and 3.6 metres externally. Provide expansion joints, at the perimeter of tile floors, at changes of level or slope, around structural features, changes in substrate, around sanitary fixtures and other fixtures interrupting the tile surface, and over all existing substrate expansion joints.

3.13 MOVEMENT AND EXPANSION JOINTS, INSTALL COMPOUND/SEALANT FILL
Carefully clean out the joint, insert the backing rod if required and fill with compound/sealant placed by gun. After the correct interval, finish the surface off smooth, and flush on flat areas or concave in corners, to the compound/sealant manufacturer's requirements.

Application - waterproofing

3.14 INSTALL WATERPROOFING MEMBRANE - INTERIOR WET AREAS
Install waterproofing membrane to manufacturers requirements and in accordance with AS3740 and BRANZ Good Practice Guide, Tiling 6.0 Wet area tiling and 7.0 Waterproofing interior wet areas. Reinforce all junctions of the waterproofing membrane to BRANZ Good practice guide: Tiling; 7.0 Waterproofing interior wet areas. Unless otherwise specified or shown on the drawings, install minimum areas of waterproof membrane as follows:

Enclosed shower cubicle
- Up wall to 300mm above fixed shower rose or to ceiling for flexible rose, must be at least 1800mm above base.
- Along all tiled walls and sealed to shower screens.
- To tiled shower base and hobs (upstands).

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Unenclosed shower cubicle
- Up wall to 300mm above fixed shower rose or to ceiling for flexible rose, must be at least 1800mm above base.
- Along walls at least 1500mm from fixed shower rose and plus hose length for flexible rose.
- To the floor within 1500mm of fixed shower rose and plus hose length for flexible rose.

Bath with a shower over
- Up wall to 300mm above fixed shower rose or to ceiling for flexible rose, must be at least 1800mm above floor.
- Along walls the greater of, bath length plus 300mm, or 1500mm from fixed shower rose, and 1500mm plus hose length for flexible rose.
- To the floor, waterproof under the bath and match the extent of the wall waterproofing..

Bath (no shower over)
- Around the bath to 300mm away from the bath in all directions, also waterproof under the bath.

Splashback to a vanity
- Up wall from floor and behind the vanity, to 150mm above and beyond each side of vanity.
- To floor under the vanity to match wall waterproofing and at least 600mm from wall.

Application - floor underlays and screeds

3.15 FIBRE CEMENT TILE UNDERLAY TO TIMBER FLOORS
Cover timber floors with selected fibre cement sheet tile underlay on the flooring and across the joists, glued and nailed with relief joints, to the overlay manufacturer's requirements.

3.16 FLOOR LEVELLING
Ensure all existing surfaces are smooth and level. If levelling is required, prepare for and apply floor levelling compounds to manufacturer’s instructions.

Application –tile installation generally

3.17 FITTING TILES
Setting out, cutting and fitting of tiles to be as described in AS 3958.1. Ensure cut edges are smooth and installed without jagged or flaked edges. Always use whole tiles or if tiles have to be cut the largest portion of a cut tile possible. Maintain the heights of wall tile work in full courses to the nearest dimension. Within allowed tolerances, ensure corners of tiles are flush and level with corners of adjacent tiles. Keep joint lines, including mitres, straight and of an even width. Fully bed trim units, moulded or shaped pieces and other accessories with an appropriate bedding material. Fix accessories level, plumb and true to the designated projection at detailed locations and heights.

3.18 TILE FINISH AND JOINTS
Ensure finished surfaces are flat and true to a tolerance of ±4mm in 2 metres from the required plane. Clean surplus bedding material from joint spaces and tile surface. Ensure joint widths are consistent throughout the installation, measured at the tile face. Ensure joint alignment is consistent throughout the installation and to a tolerance of ±4mm in 2 metres from the detailed joint alignment.

3.19 ADHESIVE APPLICATION
Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Ensure that the whole of the back of the tile is in good contact with the adhesive with no voids. Remove a tile periodically during installation to ensure correct coverage. Do not fix tiles over skinned adhesive. If required, mix adhesive to manufacturer's instructions.

Notched trowel method
- Adhesive application to be as described in AS 3958.1, clause 5.6.2(a). Notched trowel sizes shall be 4.5mm x 4.5mm x 4.5mm (mosaics) 6mm x 6mm x 6mm, 10mm x 10mm

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x 10mm, 12mm x 12mm x 12mm. Use an appropriately notched trowel to achieve full coverage.

Buttering method
- Adhesive application to be as described in AS 3958.1, Clause 5.6.2(c).

Tiles in awkward locations
- The buttering method may be required, or fixing might be necessary to achieve full bedding, even though the notched trowel method is used generally.

Application - grouting

3.20 APPLY GROUTING
Grout tiling to AS 3958.1, clause 5.7. Remove spacers. Apply grouting mix to as large an area as can be worked before setting commences. Work with a grouting tool back and forth until joints are completely filled with no adhesive showing. Avoid damage to the surface of tiles, using masking tape where necessary. Finish to depth of cushion and flush with surface to cushion edge and square-edge tiles. Remove surplus grout with a damp sponge and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

3.21 APPLY PROPRIETARY GROUTING
Remove spacers. Prepare joints, mix and apply grout and finish off to the grout manufacturer's requirements, to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

Cleaning

3.22 CLEAN TILES
Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

Completion

3.23 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.24 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked tiles. Replace damaged or marked tiles where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures. Ensure tiles are not disturbed by foot traffic for at least 24 hours after laying and after grouting.

3.25 PROTECTION
Provide the following temporary protection of the finished work:
Provide protection to floor tiles by laying sheet material such as insulating board for the period between completion of laying and completion of the contract works.

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6221A ARDEX TILING SOLUTIONS

1. GENERAL

This section relates to the preparation of floor and wall surfaces for tiling systems with ARDEX Tiling Solutions:
- Acoustic underlays
- Levelling screeds
- Primers
- Undertile heating
- Waterproofing systems
- Adhesives
- Sealants
- Grouts

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

DTA	DTA New Zealand

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC D1/AS1	Access routes
AS CA27	Code of recommended practice for internal plaster on solid backgrounds
AS 1315	Portland Cement
AS 3740	Waterproofing of domestic wet areas
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
AS/NZS 4671	Steel reinforcing materials

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.3 MANUFACTURER'S DOCUMENTS
Manufacturer's and supplier's documents relating to work in this section are:

ARDEX Tiling Solutions
BRANZ Appraisal 472 - ARDEX Undertile Internal Liquid Waterproofing Membranes
BRANZ Appraisal 473 - ARDEX Undertile External Liquid Waterproofing Membranes
BRANZ Appraisal 727 -ARDEX Undertile Sheet Membrane (WPM 750 and WPM 1000)

DTA New Zealand - Architectural Trims catalogue. Refer to www.dtanz.co.nz

Copies of the above literature are available from ARDEX

Web:	www.ardex.co.nz
Email:	specification@ardexnz.com
Telephone:	0800 227339

Warranties - waterproofing

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

15 years	For materials

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- Provide this warranty on the ARDEX standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
15 years For execution

- Provide this warranty on the installer/applicator standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Warranties - tiling

1.6 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
10 years For materials

- Provide this warranty on the ARDEX standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.7 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
5 years For execution

- Provide this warranty on the installer/applicator standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)

- Commence the warranty from the date of practical completion of the contract works.
Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.8 NO SUBSTITUTIONS
Substitutions are not permitted to any specified ARDEX materials, or associated products, components or accessories.

1.9 QUALIFICATIONS
Waterproofing work to be carried out by an ARDEX approved waterproofing applicator. Tiling to be carried out by competent workers experienced with the materials and in the techniques specified.

1.10 DEFLECTION CRITERIA FOR SUSPENDED FLOORS
Check that the floor is rigid enough for the tiling. Deflection of suspended floors should not exceed 1/360th of the span under dead load and live load.

1.11 SYSTEMS ARDEX PROJECT
Contact ARDEX with any relevant key dates and for a list of approved applicators. The contractor is to contact ARDEX prior to starting the contract.
Web: www.ardex.co.nz
Email: ardexspec@ardexnz.com
Telephone: 0800 2 ARDEX (27339)

Performance

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1.12 SLIP RESISTANCE - SURFACES EXEMPT FROM TESTING
Walking surfaces comply with NZBC D1/AS1, Table 2 for slip resistance requirements and are exempt from testing.

1.13 QUALITY ASSURANCE
Follow and complete ARDEX QA documents and submit to ARDEX on completion with request for warranty.

2. PRODUCTS

Materials

2.1 FLOORING UNDERLAY
Fibre cement, 6mm to 10mm thick sheet of Portland cement, sand, fine cellulose fibre and water, with a smooth finish specifically intended as an underlayment for tiles.

2.2 ARDITEX NA
ARDITEX NA is a self-smoothing, latex levelling compound with improved flow and excellent adhesion, flexibilty and moisture resistance for levelling over timber substrates.

2.3 ARDEX A48 SCREED
ARDEX A 48 is a premixed, rapid-set, cement screed preparation that has been designed for all types of floor coverings and is especially effective when installing moisture sensitive coverings and ARDEX undertile waterproofing systems.

2.4 ARDEX P51 PRIMER
P51 is a water based, primer, pre-coat, and bonding agent for porous substrates such as concrete and timber flooring. For use under ARDEX floor levelling products, waterproofing membranes and tile adhesives.

Materials - Waterproofing

2.5 INTERNAL WATERPROOFING SYSTEM
Refer to SELECTIONS for option.
- ARDEX WPM 002 is a BRANZ Appraised, two-part liquid waterproofing membrane specifically designed for use under tiles especially in external applications. Suitable for permanent immersion.
- ARDEX WPM 750 is a BRANZ Appraised sheet waterproofing membrane for internal use under tiles.
- ARDEX WPM 155 is a BRANZ Appraised, rapid-drying, liquid waterproofing membrane for internal or external use.

Materials - Tile adhesives

2.6 ARDEX X 56
A highly-flexible, rubber-modified, acoustic tile adhesive that is also fast setting. Increased flexibility makes ARDEX X 56 suitable for tiling directly to timber and over heated slabs, and ARDEX acoustic membranes. Suitable for early age concrete/screeds and use with ceramic, porcelain and mosaic tiles, where movement is anticipated.

Materials - Sealants - grouts

2.7 ARDEX SEALANTS
ARDEX SE acetic cure silicone is ideal for movement joints within a tiling system.
ARDEX ST neutral cure silicone is ideal for bond breakers or movement joints within a tiling system.
Sealants and back-up materials as described in clause 2.7 of AS 3958.1 and clause 2.6 of AS 3740.
Colours match some grout colours

2.8 ARDEX GROUTS
ARDEX FG 8 cement-based grout for joints 1mm to 8mm wide. Ideal for wet areas when mixed with ARDEX Grout Booster additive.

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ARDEX FS DD cement-based, fine sanded grout for joints 1mm - 4mm.
ARDEX EG 15 epoxy grout with excellent stain and chemical resistance for joints 1.5mm to 15mm wide.

2.9 ARDEX GROUT BOOSTER
A water-based, synthetic polymer grout additive formulated for use with cement-based grouts for improved adhesion strength, flexibility and abrasion resistance.

3. EXECUTION

General

3.1 HANDLING AND STORAGE
Take delivery of packets of tiles undamaged and dry. Handle tiles with care to avoid chipping, soiling and damage. Store on hard level standings in non-traffic, non-work areas that are enclosed, clean and dry.

3.2 CHECK TILES
Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT
Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT
Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

3.5 PREPARATION OF BACKGROUNDS
Prepare backgrounds in accordance with AS 3958.1, section 4 and to the manufacturer's instructions for the selected substrate. See also the ARDEX Flooring manual by visiting www.ardex.co.nz/

Conditions

3.6 SERVICES AND ACCESSORIES
Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

3.7 DO NOT START
Do not start laying tiles until concrete floors are cured, moisture content of floors is such that shrinkage is complete, thermal movement has been accommodated and the levels and surface finish will allow for tile laying of the required standard.

3.8 SUBSTRATE TEMPERATURE
Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.9 MOISTURE CONTENT
Ensure the floor is dry and if in doubt check for moisture content by hygrometer. Do not proceed with tiling work until readings for the whole area show 75% relative humidity or less. Alternatively, see ARDEX moisture barriers.

Application

3.10 APPLICATION GENERALLY
Prepare backgrounds as described in AS 3958.1, Section 4. Suitably prepare backgrounds and substrates to the manufacturer's instructions to receive the bedded finish. Remove all dirt, dust, grease, oil, loose particles and any other form of contamination or deleterious material. Ensure that substrates are sound and dry.

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Installation to be in accordance with AS 3958.1, Section 5, including setting out, fitting, movement joints, sealants, tile finish and joints, and grouting.

3.11 BACKGROUND MATERIALS

Ensure that the installation of background materials and substrate materials meets relevant standards and the manufacturer's instructions. Inspect background and substrate materials for any conditions unsuitable for tiling over. Do not commence work until the affected area is rectified. Confirm any specific preparation required for the adhesive being used.

3.12 FLOORING UNDERLAY

Underlay material: CFC sheet 6mm to 10mm

Locations: In internal locations apply underlay over the following flooring backgrounds subject to movement - strip timber flooring (T&G); particleboard sheet flooring.

Installation: Supply and install CFC to the manufacturer's recommendations.

Waterproofing

3.13 WET AREA WATERPROOFING

Provide waterproofing to wet areas as described in AS 3740.

Material: Refer to SELECTIONS

Locations: Extent of wet areas as described in AS 3740 and as shown on the drawings.

Installation: Supply and install waterproofing membrane to the manufacturer's recommendations by an approved ARDEX installer.

Screed / Cement Render

3.14 APPLY ARDEX SCREED

Prepare and apply screed system as per ARDEX requirements and instructions, including substrate preparation, mixing, applying, number of coats, finishing and curing. Protect from damp, condensation and water for at least 24 hours once application is completed.

Tiling

3.15 ADHESIVE APPLICATION METHODS

Ensure that the whole of the back of the tile is in good contact with the adhesive with no voids. Remove a tile periodically during installation to ensure correct coverage. Do not fix tiles over skinned adhesive.

Notched trowel method

- Adhesive application to be as described in AS 3958.1, clause 5.6.2(a). Notched trowel sizes shall be 4.5mm x 4.5mm x 4.5mm (mosaics) 6mm x 6mm x 6mm, 10mm x 10mm x 10mm, 12mm x 12mm x 12mm. Use an appropriately notched trowel to achieve full coverage.

Buttering method

- Adhesive application to be as described in AS 3958.1, Clause 5.6.2(c).

Tiles in awkward locations

- The buttering method may be required, or fixing might be necessary to achieve full bedding, even though the notched trowel method is used generally.

3.16 SETTING OUT

Setting out, cutting and fitting of tiles to be as described in AS 3958.1, clauses 5.4.2 and 5.4.3. Set out tiling as shown on the drawings. Confirm bond and pattern before installing. Provide even and correct falls to floor tiles where required, including falls to floor wastes. Ensure that a level finish is provided at wall lines. Where falls are not required ensure that the tiles are laid level.

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3.17 TILE FINISH AND JOINTS
Provide tile finish and joints, including tolerances, as described in AS 3958.1, clause 5.4.6. Joint widths to be suited to tile and to the manufacturer's instructions.

3.18 MOVEMENT JOINTS
Provide movement joints as described in AS 3958.1, clause 5.4.5 and AS 3740, clause 3.13.7.

Depth:	Movement joints to go right through the tile and bed to the background.
Width:	Minimum 6mm.
Corner locations:	In wall tiling at internal vertical corners; in floor tiling at walls, columns, nibs, hobs and similar.
Interruptions:	Around sanitary fixtures, around fixtures interrupting the tile surface; at junctions with joinery fixtures, including window and door frames and built in cupboards; at changes in substrate or background.
Large areas:	In floor tiling provide joints at not less than 4.5 metres spacing in both directions and 3.5 metres externally. In wall tiling provide vertical joints at not less than 3.5 metres spacing along the length of a wall. In wall tiling, provide horizontal joints at each story rise in the height of a wall. Over all existing expansion joints.

3.19 GROUTING
Grout tiling to AS 3958.1, clause 5.7.

3.20 SILICONE
Apply ARDEX SE acetic cure or ARDEX ST neutral cure silicone to movement joints between tiles, and at junctions to tiled walls and tiled floors. The silicone should only be fixed to two surfaces to allow movement. On flat joints use a polyethylene tape or release agent and on floor to wall joints greater than 10mm deep use a backing rod.

Completion

3.21 REPLACE
Replace damaged tiles or elements.

3.22 CLEANING
Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

3.23 LEAVE
Leave work to the standard required by following procedures.

3.24 REMOVE
Remove debris, unused materials and elements from the site.

3.25 PROTECT TILES
Protect tiles from damage. Ensure tiles are not disturbed by foot traffic for at least 24 hours after laying and after grouting. Provide protection to tiles by laying sheet material such as insulating board for the period between completion of laying and completion of the contract works.

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6511 CARPETING

1. GENERAL

This section relates to the supply and installation of carpet laid conventionally (stretched), direct stuck or double bonded (double direct stuck).
It includes:
- carpet underlay
- woven sheet carpet

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
AS/NZS 2270	Plywood and blockboard for interior use
AS/NZS 2455.1	Textile floor coverings - Installation practice - General

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
1 year: For materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
1 year: For execution

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS
Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS
Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

1.6 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

2. PRODUCTS

Materials

2.1 UNDERLAY
To AS/NZS 2455.1 Soft underlay and underlays manufacturer's requirements.
Refer to SELECTIONS for product selection.

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2.2 CARPET
To AS/NZS 2455.1 Textile floor coverings.
Refer to SELECTIONS for product selection.

Components

2.3 BINDER BARS
Anodised aluminium section with fluted face.

2.4 DIVIDER STRIPS
Hardwood strips 20mm x 15mm or as specified. Refer to SELECTIONS for type and size.

2.5 EDGE GRIPPER
Timber/plywood to AS/NZS 2270 with steel grippers to carpet manufacturer's requirements, constructed of sufficient pins and nails so as to withstand a minimum stretching force of 6580N over a 1220 mm length.

2.6 STAIR NOSING
Refer to SELECTIONS for type.

Accessories

2.7 ADHESIVE, UNDERLAY
To AS/NZS 2455.1, clause 1.5.3. and underlay manufacturer's requirements.

2.8 ADHESIVE, CARPET
To AS/NZS 2455.1, clause 1.5.3. and carpet manufacturer's requirements.

2.9 TAPE
To carpet manufacturer's requirements.

3. EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

Handle carpet on flat dollies using carpet cradles, with probes on fork- lifts and without sharp bending or folding. Store carpet in flat bins with a maximum height of three rows. Keep dry. Protect from damage.

3.2 PRE-INSTALLATION REQUIREMENTS
Check work previously carried out and confirm it is of the required standard for this part of the work. Ensure all fittings and fixtures around which the carpet is to be scribed are in place. Carry out such additional preparatory work as required in bringing the substrate to suitable condition.

Confirm moisture content of substrate in accordance with AS/NZS 2455.1. Appendix B
Do not commence laying carpet until readings for the whole area are within acceptable levels as follows:

Moisture Content:	Timber substrate - 8 -12% for air conditioned buildings - 10 -14% for intermittently heated buildings - 12 -16% for unheated buildings
	Concrete substrate 75%RH

3.3 PROTECTION
Protect adjoining work surfaces and finishes during the carpet installation.

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3.4 TAPE
Tape for binding and seaming using type and width required by the carpet manufacturer to suit the specified carpet and the standard of performance required.

3.5 LAYOUT
Plan the general layout so that:
- seams run lengthways
- traffic runs along the seam
- light from windows is not across the seam
- pile faces away from the light source.

3.6 TEMPERATURE
Acclimatise carpet to a room temperature above 15°C through the whole of the installation.

Application - general / substrate preparation

3.7 PREPARING NEW CONCRETE FLOOR
To be level, smooth, clean, cured and dry. Remove loose material and dust.

3.8 PREPARING NEW WOOD PRODUCT FLOOR
To be level, sanded smooth and dry with loose material and dust removed.

3.9 PREPARING EXISTING CONCRETE FLOOR
Remove existing coverings completely including adhesives, bituminous materials and paints. Patch cracks and depressions with compatible latex patching compound to the carpet manufacturer's requirements. Seal large areas of patching. Leave surface level, smooth and clean with loose material and dust removed. Seal powdery surfaces.

3.10 PREPARING EXISTING TIMBER OR WOOD PRODUCT FLOOR
Remove existing coverings completely including tacks, adhesives, bituminous materials, waxes and paints. Check for soundness, replace any substandard boards or panels and nail down loose boards. Sand smooth and remove loose material and dust.

3.11 SHEET UNDERLAYS FOR EXISTING TIMBER OR WOOD PRODUCT FLOORS
Refer to 6192 FLOORING SUBSTRATE PREPARATION for hard sheet underlays on existing floors.

Application - carpet laying

3.12 INSTALLATION, UNDERLAY
Installation to underlay manufacturer's requirements. Lay at right angles to the carpet direction.

3.13 INSTALLATION, CONVENTIONAL SYSTEM
Tape carpet joints, fix grippers to floor and install underlay and carpet to AS/NZS 2455.1, section 3. Stretch carpet tight in both width and length evenly without bowing, square with walls.

3.14 INSTALLATION, DIRECT STICK SYSTEM
Direct stick install to AS/NZS 2455.1, section 3. Apply adhesive evenly over the entire substrate surface to the carpet manufacturer's requirements. Lay carpet with all edges, selvages and joins tightly butted and completely bonded to the floor surface. Roll the carpet with a clean 25 kg roller and ensure complete contact with adhesive.

3.15 INSTALLATION, DOUBLE BOND SYSTEM
Double bond install to AS/NZS 2455.1, section 3. Apply adhesive on the underlay to the carpet manufacturer's requirements. Lay carpet with edges, selvages and joins tightly butted and completely bonded to the underlay surface.

3.16 LAYING TO STAIRS
Install on stairs in accordance with AS/NZS 2455.1.

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3.17 FIXING TRIMS

Fix binder bars, carpet to carpet bars, and trims to all junctions with other materials and to carpet edges, to the carpet manufacturer's requirements. Ensure that junctions with other materials are neatly formed, with bars and trim securely fastened to the substrate, 20mm from each end and at a maximum of 100mm centres.

Completion

3.18 PROTECTION

Provide temporary protection of the finished work

3.19 SPECIAL PROTECTION

Self Adhesive carpet protective film

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6700 PAINTING GENERAL

1. GENERAL

This section relates to the general matters related to painting work

1.1 ABBREVIATIONS

The following abbreviations are used throughout this part of the specification:

APAS	Australian Paint Approval Scheme
MPNZA	Master Painters New Zealand Association Inc.
VOC	Volatile organic compound

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC C/AS2	Protection from fire
AS/NZS 2311	Guide to the painting of buildings
AS/NZS 2312.1	Guide to the protection of structural steel against exterior atmospheric corrosion by the use of protective coatings - Paint Coatings
AS/NZS 5131	Structural steelwork - Fabrication and erection
AS/NZS ISO 9001	Quality management systems - requirements
SNZ TS 3404	Durability requirements for steel structures and components
WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe	Guidelines for the management of lead-based paint
MPNZA	Specification manual
MPNZA	Health and Safety Programme
Health and Safety at Work Act 2015	

Requirements

1.3 NO SUBSTITUTIONS

Substitutions are not permitted to any specified manufacturer's system, or associated components and products.

1.4 QUALIFICATIONS

Painters to be a member of MPNZA and experienced competent workers, familiar with the materials and the techniques specified.

1.5 HEALTH AND SAFETY

Refer to the requirements of the Health and Safety at Work Act 2015 and WorkSafe: Guidelines for the provision of facilities and general safety in the construction industry. If the elimination or isolation of potential hazards is not possible then minimise hazards in this work on site by using the proper equipment and techniques as required in the MPNZA Health and Safety Programme. Supply protective clothing and equipment. Inform employees and others on site of the hazards and put in place procedures for dealing with emergencies.

Refer to WorkSafe: Guidelines for the management of lead-based paint for the required procedures and precautions when:

- treating/removing lead-based paint
- burning off paint
- sanding off paint
- using solvent based paint removers.

1.6 MATERIAL SAFETY DATA SHEET

Obtain from each paint manufacturer the material safety sheet for each product used. Keep sheets on site and comply with the required safety procedures.

Warranties

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1.7 WARRANTY
Warrant this work under normal environmental and use conditions against failure.
2 years: Warranty period

Refer to the general section 1237WA WARRANTY AGREEMENT for the required format and details of when completed warranty must be submitted.

Performance

1.8 MANUFACTURER'S INSPECTION
Allow the paint manufacturers to inspect the work in progress and to take samples of their products from site if requested.

1.9 INSPECTION OF WORK
Inspection of the whole of the work at each of the stages scheduled may be made. Agree a programme that will facilitate such inspection, including notification when each part and stage of the work is ready for inspection.

2. PRODUCTS

Materials

2.1 PAINT TYPES
Use the manufacturer's complete system and only the products specified.

2.2 MATERIALS GENERALLY
Use only the Manufacturer's products which are guaranteed for their consistency and performance under AS/NZS ISO 9001 and APAS approval, prepared, mixed and applied as directed in the Manufacturer's specification sheets, specification manuals and product data sheets.

2.3 THINNERS AND ADDITIVES
Only use thinners or additives within the stated limits for the particular situations specified.

Accessories

2.4 FILLERS
For recommendations on; fillers, stopping, paint strippers, cleaning agents, etching solutions, mould inhibitors, rust inhibitors, knotting and other commodities used for the surface preparation, refer to the manufacturer of the specified coating.

3. EXECUTION

Conditions

3.1 EXECUTION
To conform to manufacturer's requirements and those methods, practices and techniques contained in AS/NZS 2311, the MPNZA Specification manual, and WorkSafe: Guidelines for the provision of facilities and general safety in the construction industry.

3.2 PREPARE
Prepare surfaces to the coating manufacturer's requirements.

3.3 COATED SURFACES
Ensure that substrate surfaces are able to achieve the specified finish.

3.4 PRE-PRIMED SURFACES
Sand down any breakdown or damage of the primer to a sound surface and immediately re-prime.

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3.5 BRUSH DOWN
Brush down surfaces immediately before application, to remove dust, dirt and loose material.

3.6 COMPATIBILITY
Check that materials are as required by the paint manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other. Use paint from the same manufacturer for each paint system. If not compatible, obtain instructions before proceeding.

3.7 TREATED SURFACES
Where surfaces have been treated with preservatives or fire retardants, check with the treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance. If they are not compatible, obtain instructions before proceeding.

3.8 BACK PAINTING
Co-ordinate with cladding and/or lining installer as to who will do the work and timing.

Exterior
For exterior cladding and trim that require on site finishing, paint the back and exposed bottom edges at the base of the cladding (generally, bottom plate overhang and horizontal flashings) to the manufacturer's requirements, but at least to 150mm up from base. Coating to match front finish, generally apply 2 coats or 1 coat if pre-primed.
Refer to appropriate exterior paint sections SELECTION clauses for claddings to be back painted.

Interior
For lining and trim that require on site finishing and/or back painting (usually wet areas), paint the back and exposed bottom edges at the base of the lining, to the manufacturer's requirements, but at least to 150mm up from base. Coating to match front finish, generally apply 2 coats or 1 coat if pre-primed, or if no front finish seal to manufacturer's requirements.
Refer to appropriate interior paint sections SELECTION clauses for linings to be back painted.

3.9 ANCILLARY SURFACES
The coatings listed in schedules and elsewhere are of necessity simplified. Coat ancillary exposed surfaces to match similar or adjacent materials or areas, except where a fair-faced natural finish is required or items are completely prefinished. In cases of doubt obtain instructions before proceeding.

3.10 HARDWARE
Do not paint hinges or hardware that cannot be removed. If items can be removed, carefully remove hardware, fixtures and fittings before commencing work. Set aside where they cannot be damaged or misplaced and replace on completion.

3.11 PROTECTION
Use dropsheets, coverings and masking necessary to protect adjoining fixtures, fittings and spaces from paint drops, spots, spray and damage.

Preparation - unpainted and pre-primed timber and wood based products

3.12 MOISTURE CONTENT
Ensure moisture content at the time of application is near to the equilibrium moisture content pertaining to the particular locality in which the timber is used, without any excessive moisture content gradient between core and surface.

3.13 PREPARING DRESSED TIMBER
Ensure dressed timber is smooth, free from raised or woolly grain, planing burrs or other machining defects. Slightly round or ease sharp edges to ensure they can be properly coated. Sand timber to bring up to a smooth finish along the direction of the grain. Sand timber back to new condition timber that has been weathered.

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3.14 PREPARING ROUGH SAWN TIMBER
Thoroughly brush along the direction of the grain to remove dust and dirt.

3.15 PREPARING PRE-PRIMED TIMBER
Check pre-prime coat for damage, powdering, weathering or loss of adhesion. Where primer is sound, thoroughly brush along the direction of the grain to remove dust and dirt. If there is doubt, sand back and re-prime.

3.16 TIMBER SPECIES
Check that the preparation and paint system is suitable for the timber species.

3.17 PREPARING DAMAGE AND DEFECTS
Scrape clean loose or soft material holes, depressions, resin or gum pockets, knot holes, surface splits, checks, or any localised decay. Apply primer and/or sealer specified and fill these areas with linseed oil putty or other appropriate filler.

3.18 FIXINGS
Take timber fixings below the painted or clear finished surface. Leave corrosion resistant timber fixings flush with clear finished surfaces.

3.19 CLEANING
Remove grease and oil by wiping down with solvent or water-based degreasing agent. Remove resin by wiping down with solvent or water-based degreasing agent or heating and scraping. Remove sanding dust. Bad staining may be untreatable and require replacement of timber, discuss with paint manufacturer and main contractor.

Preparation - gypsum plaster

3.20 PREPARING GYPSUM PLASTER
Fill and sand small crevices and cracks. Surface moisture content not to exceed 12% at time of coating.

Preparation - unpainted linings

3.21 PREPARING FIBROUS PLASTER
Check for and remove release agents and other contaminants by washing with clean water or solvent and allow to dry. Fill cracks and surface imperfections with patching plaster and lightly sand smooth. Remove dust.

3.22 PREPARING PLASTERBOARD
Check that joints are prepared to a smooth level surface finish. Fill cracks and surface imperfections with the sheet manufacturer's required stopping compound and lightly sand smooth. Remove dust.

Preparation - unpainted plastics

3.23 PREPARING POLYESTERS (GRP) AND PHENOL FORMALDEHYDES
Wipe surfaces with methyl ethyl ketone or other suitable solvent. Lightly abrade with sandpaper and dust off. Proceed immediately with priming.

3.24 PREPARING UNPLASTICISED POLYVINYL CHLORIDE (UPVC)
Wipe surfaces with mineral turpentine, methylated spirits or white spirit. Lightly abrade with sandpaper and dust off. Proceed immediately with topcoats applicable for walls or timber finishes.

Preparation - painted surfaces generally

3.25 SURFACE PREPARATION
Refer to the Manufacturer's specification sheets and product data sheets. Carry out the preparatory work required by them for each of the substrates.

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For interior surfaces such as paper faced plasterboard use the Manufacturer's recommended finishing compound as an aid to achieving a Level 5 finish.

3.26 MOULD

Sterilise surface mould by washing or sponging the whole surface with a one part sodium hypochlorite household bleach to three parts clean water solution. Allow bleach to act for 30 minutes and wash off with clean water. Wash cloths and sponges regularly in clean water. Reapplication may be necessary. Treat with anti-mould solution to the treatment manufacturer's requirements.

3.27 GAP FILLING

Fill cracks, holes, indented and damaged surfaces with putty, plaster filler, wood filler, or plastic wood, as appropriate and in accordance with the paint manufacturer's requirements. Allow to dry or set before sanding back level with the surface. Prime coat or seal the timber before using putty. Wet cement or gypsum base plasters before applying filler. Use only Portland cement base types, or water-insoluble organic-based gap fillers in exterior or wet areas.

Preparation - painted surfaces in good condition

3.28 PREPARING SURFACES

Wash down surfaces with either:
- a chlorine based solution; or
- 5-10 millilitres of ordinary household detergent to 1 litre of warm water; or
- a solution of 30 grams of trisodium phosphate to 1 litre of water

Replace solutions frequently and finally wipe over a second time with a clean absorbent cloth.

For surfaces containing heavy smoke and grease deposits, wash down with either:
- mineral turpentine; or
- a 5% solution of ammonia; or
- a 1:40 solution of sugar soap and water

as necessary to remove the deposits. Wipe over with a clean absorbent cloth.

Prepare coatings which have chalked by sanding, brushing, waterblasting or other methods as appropriate.

Lightly sand glossy surfaces to ensure good adhesion of the coatings.

Preparation - painted surfaces in poor condition

3.29 PREPARING PAINTED TIMBER

Completely remove blistered, flaked, excessively chalked and cracked (due to exposed end grain and knots) paint to give a sound base for repainting. Scrape out damaged or decayed timber and where the area is extensive, arrange to cut out and replace with treated timber, primed (including end grain) before fixing.

Scrape clean loose or soft material, holes and depressions in timber due to damage or defects such as resin or gum pockets, knot holes and surface splits. Remove and replace sprung or loose corroded nails.

Where necessary strip paint back to the original timber surface, using the most appropriate of the following methods:
- burning off using a blowtorch to soften paint without charring, before scraping off with a broad knife
- using an electrically heated hot air stream to soften paint, before scraping off with a broad knife
- sanding using orbital and/or belt sanders
- paint removers used to the manufacturer's requirements
- hand scraping.

Follow WorkSafe guidelines for minimising the hazards of stripping.

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3.30 PREPARING PAINTED GYPSUM PLASTER
Remove flaked paint completely from powdery, loose and other unsatisfactory plaster surfaces. Treat powdery surfaces with a solution of 150 millilitres of concentrated phosphoric acid and clean water to make 1 litre. Apply the solution, allow to stand 10 minutes and wash down with clean water. Remove loose, weak and drummy plaster and replaster. Allow to cure before proceeding with coatings as for unpainted work.

Confirm that the cause of any efflorescence has been eliminated before wiping it away with a dry rag and making good the damaged surface.

Fill small cracks and damaged surfaces with gypsum plaster or cellulose gypsum compound to just proud of the surface and lightly sand smooth and flush when dry.

3.31 PREPARING PAINTED PLASTERBOARD AND FIBROUS PLASTER
Fill cracks, pores, irregularities and damaged surfaces with the appropriate filler to the paint manufacturer's requirements, trowelled smooth, allowed to dry and lightly sanded to a smooth flush surface. Treat any staining of paint films on plaster as required by the coating manufacturer.

3.32 PREPARING PAINTED CEMENT PLASTER, CONCRETE AND MASONRY
Remove the fine white powder of efflorescence by brushing and then wiping with a clean cloth. Remove faulty mortar by wire-brushing. Make good with fresh mortar to match.

Confirm that the cause of any dampness has been eliminated and that the substrate is dry before applying any coating.

Wire brush moss or lichen affected areas to remove loose, powdery growth. Treat the affected areas with a solution of 200 millilitres of formalin (40% solution) to 800 millilitres of water. Apply the solution and leave for 3 days, or until the moss and lichen turns brown. Scrub off with a hard bristle brush and hose down liberally with water. Swab the affected area using a solution of 1 volume of household bleach to 2 volumes of water. After 30 minutes wash down with clean water.

Remove grease by continued washing with a 1:40 solution of sugar soap and water until completely removed, wash with clean water and allow to dry.

Where necessary strip paint back to the original surface by water or abrasive blasting. Remove chalk dust and dirt when dry by stiff bristle brushing.

3.33 PREPARING PAINTED METALWORK
Remove corrosion in whatever form. Sand edges to form a smooth surface with surrounding areas unaffected by corrosion. Use a chemical pre-treatment to remove the last traces of and to inhibit future, corrosion. Clean down completely before spot priming to suit the coating system specified.

Application - before applying final coatings

3.34 OFF-SITE WORK
Carry out off-site preparation and coating under cover, in a suitable environment and with adequate lighting. Store items both before and after coating in a clean, dry area, protected from the weather and mechanical damage, properly stacked and spaced to permit air circulation and to prevent sticking of surfaces.

3.35 PRIMING JOINERY
Before priming preservative treated timber ensure that any cut surfaces have been retreated. Liberally coat end grain, allow to soak in and then recoat. Ensure LOSP. treated joinery has dried sufficiently to lose odour.

3.36 CONCEALED JOINERY SURFACES
Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.

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3.37 CONCEALED METAL SURFACES
Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.

3.38 DOORS
Prime or seal and paint all six faces of doors before hanging.

3.39 BEAD GLAZING
Before glazing apply the first two coats, or the primer and one undercoat, to rebates of stained, varnished or painted joinery and beads.

3.40 PUTTY GLAZING
Follow putty manufacturers recommendations for application, drying, and painting. Ensure that the putty is fully protected by the coating system as soon as it is sufficiently hard.

Application - generally

3.41 PAINTING GENERALLY
Comply with the paint manufacturer's requirements and any additional requirements in this specification.

3.42 MIXING
Thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.

3.43 ENVIRONMENT
Paint exterior surfaces only in favourable weather conditions:
- warm dry days without frost or heavy dews
- avoid painting in direct sunlight any surfaces that absorb heat excessively
- as far as possible apply paint in the temperature range 15°C to 25°C
- do not paint if temperatures fall outside the range of 10°C and 35°C unless paints with the necessary temperature tolerance have been specified
- do not apply solvent borne paint if moisture is present on the surface

3.44 SEQUENCE OF OPERATIONS
Painting work to generally follow the following sequences:
- back painting and pre-installation painting, then post-installation exposed-face painting
- complete surface preparation before commencing painting
- apply paint in the specified sequence using the specified paint
- allow full drying time between coats to the paint manufacturer's requirements
- do not expose primers, undercoats and intermediate coats beyond manufacturers stated instructions before applying the next coat
- finish broad areas before painting trim
- ensure batch numbers of tins are matched for whole areas
- internally, paint ceilings before walls and walls before joinery, trim and other items

3.45 PAINT APPLICATIONS
Select brush, roller, or pad and apply paint to the requirements of the paint manufacturer and to obtain a smooth even coating of correct thickness, uniform gloss and colour.

3.46 DRYING TIME
Before handling or applying the next coat of paint, give each coat the full drying time as required by the paint manufacturer. Ensure that surfaces are dry and that condensation does not occur before the paint reaches surface-dry condition.

3.47 LIGHTLY SAND
Lightly sand primers, sealers, undercoats and intermediate coats to remove dust pick-up, protruding fibres and coarse particles. Remove dust immediately before applying the next coat.

3.48 DEFECTIVE WORK
Correct defective work immediately and re-coat as required, following precisely the paint system specified.

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3.49 EACH COAT

Each coat of paint and the completed paint system to have the following qualities and properties:

- uniform finish, colour, texture, sheen and hiding power
- the specified number of coats applied
- no blemishes such as runs, sags, crinkling, fat edges, entrained paint skins, hairs, dust, bare or starved patches, cracks, brush marks, ladder marks and blistering
- proper covering of corners, crannies, thin edges, cracks, end grain and other difficult places of application

Completion

3.50 CLEAN

Clean adjoining surfaces, glass and fittings of any paint contamination. Clean off glass indicators at completion of the building works. Clean glass inside and out to a shining finish.

3.51 CLEAN EQUIPMENT

Use the Manufacturer's environmental wash system for the cleaning of water-based paint and plasters from brushes, rollers, plastering or spray equipment to separate the solids from the water component for safe disposal.

3.52 LEAVE

Leave the whole of this work uniform in gloss and colour, of correct thickness, free from painting defects, clean and unmarked and to the standard required by following procedures.

3.53 REMOVE

Remove dropsheets, coverings and masking to leave surrounding surfaces and areas clean, tidy and undamaged. Remove debris, unused materials and elements from the site.

3.54 REPLACE HARDWARE

Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

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7112 WATER STORAGE TANKS

1. GENERAL

This section relates to the installation of water storage tanks for potable or non-potable water.

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
NZBC E1/AS2	Surface water
NZBC G1/AS1	Personal hygiene
NZBC G2/AS1	Laundering
NZBC G3/AS1	Food preparation and prevention of contamination
NZBC G12/AS1	Water Supplies
NZBC G13/AS1	Foul water
NZBC G13/AS3	Foul water
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent application
AS/NZS 1546.1	On-site domestic wastewater treatment units - septic tanks
AS 2070	Plastic materials for food contact use
AS/NZS 2845.1	Water supply - Mechanical backflow prevention devices - materials, design and performance requirements
AS/NZS 3000	Electrical installations (Known as the Australian/New Zealand Wiring Rules)
AS/NZS 3500.1	Plumbing and drainage - water services
AS/NZS 3500.2	Plumbing and drainage - sanitary plumbing and drainage
AS/NZS 3500.3	Plumbing and drainage - stormwater drainage
AS/NZS 4020	Testing of products for use in contact with drinking water
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
AS/NZS 4671	Steel for the reinforcement of concrete
AS/NZS 4766	Polyethylene storage tanks for water and chemicals
NZS 3104	Specification for concrete production
NZS 3106	Design of concrete structures for the storage of liquids. - SPONSORED
NZS 3109	Concrete construction
NZS 7601	Specification for polyethylene pipe (Type 3) for cold water services
NZS 7602	Specification for polyethylene pipe (Type 5) for cold water services
NZS 7610	Specification for blue polyethylene pipes up to nominal size 63 for below ground use for potable water
HB 230	MPMSAA Rainwater Tank Design and Installation Handbook (Standards Australia)
HE4602	Household water supplies: The selection, operation, and maintenance of individual household water supplies
HE10148	Water collection tanks and safe household water (Ministry of Health)
SNZ PAS 4509	New Zealand Fire Service Firefighting Water Supplies Code of Practice
Ministry of Health	Guidelines for drinking-water quality management for New Zealand

Electricity (Safety) Regulations 2010 (Reprint as at 21 January 2019).

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.2 HEALTH REQUIREMENTS

Refer to HE4602 for guidance.

1.3 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

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Performance

1.4 DESIGN AND INSTALLATION
To HB 230 Rainwater Tank Design and Installation Handbook, to AS/NZS 3500.1, AS/NZS 3500.3 (as modified by NZBC E1/AS2) and to NZBC G1/AS1 and NZBC G12/AS1.

1.5 TESTING OF PRODUCTS
Materials used in the manufacture of rainwater tanks to be tested to AS/NZS 4020.

2. PRODUCTS

Components

2.1 ABOVE GROUND WATER STORAGE TANK
Tank generally to NZBC G12/AS1, AS/NZS 3500.1, section 2 and 8, AS/NZS 4020 and:
- Above ground tank manufactured from polyethylene to AS/NZS 4766 and to AS 2070.
- Above ground tank manufactured from precast concrete to NZS 3104, NZS 3106, NZS 3109 and AS/NZS 4671.
- Above ground tank manufactured from precast ferro-cement or reinforced plaster to AS/NZS 1516 and AS/NZS 4671.
- Above ground tank manufactured from hot dip galvanized corrugated steel sheet to AS 1445. Internal surface coated with food-grade polymer film.

Tanks to be fitted with a secure fitting lid to provide internal access for cleaning or inspection.

Accessories

2.2 TANK FITTINGS
Fittings kit supplied with the tank for complete installation.

2.3 PVC-U PIPES AND FITTINGS
Unplasticised PVC pipe and fittings to AS/NZS 1260.

2.4 POLYETHYLENE PIPES AND FITTINGS
High density polyethylene pipe and fittings to AS/NZS 4130.

2.5 WATER PRESSURE PUMP
Pump designed to pressurise water supply from tank into the building.

2.6 TANK VENT
Vent with insect proof stainless steel mesh fitted on top of the tank.

2.7 FIRST FLUSH WATER DIVERTER
Wall mounted or underground system specific to installation. To prevent the first flow of water from the roof entering the water storage tank.

2.8 FILTER SYSTEM
Inline cartridge filter housing fitted between the first flush diverter and the inlet, or a 955 micron filter tank screen system fitted within the tank.

2.9 TANK VACUUM SYSTEM
Designed to suck from the bottom of the tank when the tank is full to overflowing. System to include anti siphon device.

2.10 WATER TREATMENT (UV)
Combination filtration and UV disinfection system.

2.11 SEALS
Uniseals for pipe connections to the top of the tank.

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3. EXECUTION

Conditions

3.1 SITE ACCESS
Transportation on site to the position of the tank is at the risk and responsibility of the contractor. Make provision for manoeuvring and unloading of tank.

Installation - site

3.2 LAYING AND JOINTING
Lay in straight lines between changes of line or grade from the lower end of the drain with sockets pointing uphill. Set each pipe true to line and grade and each joint completed before the next pipe is laid.

Installation - fittings

3.3 WATER PUMP INSTALLATION
Install pump on a solid base bolted down through base plate. Place weather tight housing over the pump and secure to base. Connect to water supply and power supply.

3.4 WATER TREATMENT SYSTEM INSTALLATION
Install ultraviolet light radiation treatment unit between pump and house to manufacturer's specifications. Connect to power supply provided.

3.5 BACK FLOW PREVENTION DEVICES
Install to AS/NZS 2845.1, to AS/NZS 3500.1 and to NZBC G12/AS1.

Installation - connections

3.6 FIRST FLUSH WATER DIVERTER
Install either adjacent to the tank or underground, first flush water diverter. Connect downpipes from the roof gutter to the first flush water diverter. Connect the first flush diverter to the top of the tank. Refer to manufacturer's installation details.

3.7 FILTER INSTALLATION
Install proprietary in-line filter before the inlet connection.

3.8 INLET CONNECTION
Install inlet pipe into top of tank at manufacturer's designated mounting area using a Uniseal type connection.

3.9 OUTLET CONNECTION
Install pipe to manufacturer's installation details. To the outlet connect a floating arm draw-off to deliver water from 100mm below the surface. From the base connection run a flexible hose to the pump. Install ball valve in line between base connection and water pump. Support all pipework at outlet.

3.10 OVERFLOW PIPE
Install pipe to manufacturer's installation details and connect to approved discharge point or as detailed.

3.11 PIPE SEALS
Insert Uniseals in clean cut holes of the correct size. Insert Uniseal into hole with widespread facing the pipe to be inserted. Lubricate the pipe with detergent and push through the Uniseal. Use only on top of tank connections.

3.12 ELECTRICAL CONNECTION
Installation to Electricity (Safety) Regulations 2010, and AS/NZS 3000. Allow to connect up water pump and water treatment unit to the power supply as provided.

Completion & commissioning

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3.13 POST INSTALLATION TESTING

Test and commission the completed system to manufacturer requirements and AS/NZS 3500.1, section 16.5 Testing and Commissioning a Rainwater System . At the completion and testing of the water service, check all valves and other components to confirm their correct performance.

3.14 LEAVE

Leave work to the standard required by following procedures.

3.15 CLEAN

Clean and flush out the whole installation. Remove silt and debris.

3.16 REMOVE

Remove debris, unused materials and elements from the site.

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7120 HOT & COLD WATER SYSTEM

1. GENERAL

This section relates to piped potable water supply systems from the network utility supply authority water main to designated points and appliances, the installation of hot water heating appliances, distributing piped hot water to other appliances, and the installation of valves.

1.1 RELATED WORK
Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures and tapware selections.

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC C/AS1-AS2	Protection from fire
NZBC G4/AS1	Ventilation
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC H1/AS1	Energy Efficiency
AS/NZS 2492	Cross Linked Polyethylene (PE-X) pipe for pressure applications
AS/NZS 2537.2	Mechanical joining fittings for use with crosslinked Polyethylene (PE-X) for pressure applications - Plastics piping systems for hot and cold water installations - Crosslinked Polyethylene (PE-X) - Fittings
AS/NZS 2642.1	Polybutylene pipe systems - Polybutylene (PB) pipe extrusion compounds
AS/NZS 2642.2	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
AS/NZS 2642.3	Polybutylene pipe systems - Mechanical jointing fittings for use with polybutylene (PB) pipes for hot and cold water applications
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design and performance requirements
AS 2845.3	Water supply - Backflow prevention devices - Field testing and maintenance
AS/NZS 3500.1	Plumbing and drainage - Water services
AS/NZS 3500.4	Plumbing and drainage - Heated water services
NZS 3501	Specification for copper tubes for water, gas and sanitation
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
NZS 4305	Energy efficiency domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4607	Installation of thermal storage electric water heaters: valve-vented systems
NZS 4617	Tempering (3-port mixing) valves
AS/NZS 5601.1	Gas installations - general installations
DIN 8077	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - Dimensions
DIN 8078	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - General quality requirements and testing.

Gas (Safety and Measurement) Regulations 2010
Plumbers, Gasfitters and Drainlayers Act 2006
NZ Backflow Testing Standard: NZ Backflow Testing Standard 2011, Field testing of backflow prevention devices and verification of air gaps

Warranties

1.3 WARRANTY
Provide warranty for:
2 years: For the supply and installation of the plumbing system and fixtures

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- Provide the warranty in the standard form in the general section 1237WA WARRANTY AGREEMENT.
- Commence the warranty from the date of practical completion of the contract works.

Requirements

1.4 QUALIFICATIONS
Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.5 INFORMATION FOR OPERATION AND MAINTENANCE
Provide general operation and maintenance information as electronic PDF format documents

Provide this information prior to practical completion.

1.6 HOT WATER TEMPERATURES
To NZBC G12/AS1, 6.14

Storage water heaters to store water at not less than 60ºC.

Hot water piping system, with temperature controls where necessary (tempering valve etc), to provide water at the outlet at the following temperatures:

For personal hygiene fixtures (showers, baths, wash hand basins etc) temperatures to be close to but not to exceed:
- 45ºC - for early child hood centres, schools, elderly facilities, hospitals, psychiatric or disabled institutions.
- 55ºC - for personal hygiene fixtures in all other buildings.

For non-personal hygiene fixtures (kitchen sinks and equipment, laundry tubs, cleaners sinks, industrial fixtures etc) temperatures are:
- Unrestricted - direct from water heater, approx. 60°C, must be less than 65°C (for kitchen sinks and equipment, laundry tubs, cleaners sinks etc) - in all buildings.
- Unrestricted - direct from water heater not tempered (for industrial fixtures and specific items etc) - in all buildings.

This clause excludes boiling units.

Performance

1.7 TESTING - TO NZBC G12/AS1
Test to NZBC G12/AS1, 7.5, **Watertightness**, for hot and cold water.
- Test to a pressure of1500 kpa for period not less than 15 minutes.

Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed.
Slowly fill service pipes with water to exclude air. Test and ensure there is no measurable loss of pressure for the minimum period. Slowly fill distribution pipes with water to exclude air. Ensure that with draw-off taps closed the system must remain water-tight.

1.8 GAS CERTIFICATE OF COMPLIANCE
Provide a Certificate of Compliance (CoC) as required by the Gas (Safety and Measurement) Regulations 2010 to the owner, and when required provide a copy to the energy supplier before connection.

1.9 GAS SAFETY CERTIFICATION
Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the owner and when required the BCA. To be provided at completion of the work, prior to Practical Completion.

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1.10 GAS APPLIANCE COMPLIANCE
Supplier to provide a Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

2. PRODUCTS

Materials

2.1 WATER METER
To the requirements of the network utility operator.

2.2 VALVES
Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief or temperature valve, pressure relief valve and isolating valves to NZBC G12/AS1.

2.3 TEMPERING VALVE
Tempering valve to NZS 4617 to NZBC G12/AS1.

Materials - Hot water heating appliances

2.4 GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE
Continuous flow unit with an integral gas burner and flue to NZS 4305.

2.5 PROTECTIVE TAPE
Plasticised PVC tape system with primer, mastic fixing and outer coating.

3. EXECUTION

3.1 EXECUTION GENERALLY
Generally carry out the whole of this work and tests to NZBC G12/VM1 or NZBC G12/AS1.

3.2 HANDLE AND STORE
Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress.

Store tapware in a shelved, dry and securely locked area. Retain tapware in the manufacturer's original packaging, complete with all fixings and installation instructions. Label each unit separately with its space/fixture number to match.

3.3 CORE HOLES AND SLEEVES
Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.

3.4 CONCEAL
Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.

3.5 CORROSION
Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

3.6 THERMAL MOVEMENT
Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.

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3.7 PIPE SIZE
Flow rates to each outlet to be no less than those given in NZBC G12/VM1 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures. Pipe size as determined in NZBC G12/AS1, table 4, Tempering valve and nominal pipe diameters.

3.8 ELECTROLYTIC ACTION
Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.

3.9 EXCAVATE
Excavate for the water main to a firm, even trench base in straight runs. Allow to backfill.

Application - Pipework installation

3.10 WATER SUPPLY CONNECTION
Arrange with the network utility operator for a connection to the water main and from there through a water meter and gate valve. Provide back flow prevention to NZBC G12/AS1.

3.11 POTABLE WATER SUPPLY PIPEWORK INSTALLATION
From connection point, run pipes complete with all fittings, support and fixing, joins and install to manufacturers specifications. Size the pipes and branches in straight runs to deliver the acceptable flow rate to NZBC G12/VM1 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures and size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Pipework support spacing to be firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with machine made 3 diameter bends, complete with necessary valves and fittings. Conceal pipework and pressure test before the wall linings are fixed.

3.12 HOT WATER PIPEWORK
Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to NZBC G12/VM1 or NZBC G12/AS1, table 7 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, and preformed 3 diameter bends, complete with all necessary valves and fittings

Lag all pipes with rigid insulation to the manufacturer's requirements and G12/VM1 or G12/AS1.

3.13 EQUIPOTENTIAL BONDING METALLIC WATER SUPPLY PIPES
If it is an electrical requirement, before enclosing, ensure metallic water supply pipes and metallic sanitary fixtures are equipotential bonded (or at least conductor cable attached) to NZBC G12/AS1, 9.0.

3.14 IN-LINE FILTER
Install an in-line filter immediately adjacent to the main isolating valve at the point of entry to the building, in an accessible position to allow for easy cleaning.

Application - Hot water systems

3.15 SEISMIC RESTRAINTS - GAS WATER HEATING APPLIANCES
Gas appliances to be restrained to manufacturer's requirements, AS/NZS 5601.1 and NZBC C/AS1-AS2, 7.2 Gas-burning Appliances.

3.16 INSTALL ELECTRIC HOT WATER CYLINDERS AND BOILING CYLINDERS
Install where shown complete with all the necessary fittings to the cylinder manufacturer's requirements and in accordance with NZBC G12/AS1: 6.11. Valve-vented systems to NZS 4607.

3.17 INSTALL GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE
Install complete with the necessary fittings to the manufacturer's requirements and in accordance with NZBC G12/AS1, 6. 11, Water heater installation. Install flue in

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accordance with the manufacturer's details and requirements and, AS/NZS 5601.1 (for internal or external appliances) or NZBC G4/AS1 (internal appliances). Also refer to section 7221 GAS APPLIANCES for installation of gas appliances.

3.18 INSTALL TEMPERING VALVE
Install 1 metre minimum from outlet of hot water cylinder and to manufacturer's instructions. Install copper pipework for 1 metre minimum downstream of tempering valve prior to connection of non-metallic pipework.

3.19 PENETRATIONS
Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

3.20 INSTALLING BELOW GROUND ISOLATING VALVE
Install all below ground items such as main isolating valves and water meters in preformed concrete pits or approved equivalent.

3.21 INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED
Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.

Completion

3.22 LABEL
Label all pipework with permanent adhesive markers at 3 metre minimum intervals.

3.23 CLEAN IN-LINE FILTER
Clean all in-line filters on completion of works.

3.24 REPLACE
Replace damaged or marked elements.

3.25 LEAVE
Leave work to the standard required by following procedures.

3.26 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

Hot water systems

4.1 GAS HOT WATER HEATER, CONTINUOUS FLOW TYPE
Brand: Rinnai
Gas type: LPG

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7212 GAS SYSTEM LPG CYLINDERS

1. GENERAL

This section relates to Installation and maintenance of a 45kg LPG twin cylinder system and associated piping systems.

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

WorkSafe:	WorkSafe New Zealand.
HSNO:	Hazardous Substances and New Organisms Act 1996.
LPGA	LPG Association of New Zealand Inc.

The following definitions apply specifically to this section:

Condensate:	The liquid that separates from the gas downstream of any regulator due to the reduction in temperature resulting from pressure reduction.
Condensate trap:	(also known as a drip leg or tailpipe) a device installed in a gas line to trap the condensate liquid
Enclosure:	A compartment, an enclosed area or a partitioned-off space primarily used for the installing of a gas cylinder meter, or gas pressure regulator.
LAB number:	Number allocated by WorkSafe when a cylinder is approved.
POL fitting:	(Prest-O-Lite) The common name given for a standard union with left hand thread, used for connection to a 45kg cylinder.
Pigtail:	A short length of flexible tube or copper pipe completed with end couplings. Use for connecting the cylinder to the manifold or the changeover valve.
Twin cylinder installation:	A cylinder installation where two cylinders are connected separately to the system. Each cylinder is connected to a change over valve that can be operated manually or automatically, to change over the cylinder which is supplying LPG to the installation. Connection may be made using flexible rubber or copper pigtails, or pipe fittings.

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC G10/AS1	Piped services
NZBC G11/AS1	Gas as an energy source
AS 4176	Polyethylene/aluminium and cross linked polyethylene/aluminium macrocomposite pipe systems for pressure applications
AS/NZS 1596	The storage and handling of LPG.
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 4129	Fittings for polyethylene pipes for pressure applications
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
AS/NZS 5601.1	Gas Installations - general installations
LPGA CoP No.2	Installation and maintenance of twin 45kg cylinder systems

Electricity (Safety) Regulations 2010 (Reprint as at 21 January 2019)
Gas (Safety and Measurement) Regulations 2010
Plumbers, Gasfitters and Drainlayers Act 2006.

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Warranties

1.3 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years:	For the complete gas system

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- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 COMPLY
Comply with the Gas (Safety and Measurement) Regulations 2010, Electricity (Safety) Regulations 2010, and AS/NZS 3000.

1.5 QUALIFICATIONS
Work to be carried out by gasfitters experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying gasfitter under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.6 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS
Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

1.7 AS BUILT DOCUMENTS
Refer to the general section 1238 AS BUILT DOCUMENTATION for the requirements for submission and review of as built documents and records.

Provide the following as built documents and records:
1:100 scale as-built plan of the gas pipe runs, sizes componentry and fittings.

Provide as built information prior to practical completion.

1.8 DESIGN
Design the piping system to AS/NZS 5601.1, with pipe sizes to give a minimum pressure at any appliance inlet, to AS/NZS 5601.1, Table 5.1, of 2.75 kPa for LPG. Include pressure regulators if required.

1.9 LOCATION OF CYLINDERS
Cylinders and associated equipment to be installed external to buildings, except where AS/NZS 1596 permits. Location and clearances to AS/NZS 5601.1. Ensure location allows good accessibility for cylinder replacement to AS/NZS 5601.1. Coordinate with electrical installations to ensure clearances are maintained.

Compliance information

1.10 INFORMATION REQUIRED FOR CODE COMPLIANCE
Provide the following compliance documentation:
Manufacturer, importer, or distributor warranty
- Installer / applicator warranty
- Gasfitting Certificate of Compliance - from the installer

1.11 GAS CERTIFICATE OF COMPLIANCE
Provide a Certificate of Compliance (CoC) as required by the Gas (Safety and Measurement) Regulations 2010 to the owner, and when required provide a copy to the energy supplier before connection.

1.12 GAS SAFETY CERTIFICATION
Provide a Gas Safety Certificate (GSC) as required by the Gas (Safety and Measurement) Regulations 2010 and provide a copy to the owner and when required the BCA. To be provided at completion of the work, prior to Practical Completion.

1.13 GAS APPLIANCE COMPLIANCE
Supplier to provide Supplier Declaration of Compliance (SDoC) in accordance with the requirements of the Gas (Safety and Measurement) Regulations 2010.

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2. PRODUCTS

Materials

2.1 PIPEWORK GENERAL
Pipework requirements to AS/NZS 5601.1, particularly AS/NZS 5601.1, Section 4, **Means of compliance - materials fittings and components**.

2.2 COPPER PIPE
Complete with fittings to AS/NZS 5601.1. Range of use to AS/NZS 5601.1, table 4.1 **Consumer Piping Materials**.

2.3 MACROCOMPOSITE PIPE
Polyethylene/aluminium/cross linked polyethylene combination (PE/AL/PE, PE-X/AL/PE-X or PE-X/AL/PE) macrocomposite pipe systems for pressure applications to AS 4176. Range of use to AS/NZS 5601.1, table 4.1 **Consumer Piping Materials**. Used for general pipework, can also be used in ground beneath a building.

2.4 POLYETHYLENE PIPE
Polyethylene pipes to AS/NZS 4130 Series two, or AS/NZS 4130 Series three. Fittings to AS/NZS 4129. Range of use to AS/NZS 5601.1, table 4.1 **Consumer Piping Materials**. For use in ground but not beneath a building.

2.5 ISOLATING VALVES
Manual shut-off valves to AS/NZS 5601.1.

2.6 CYLINDERS
Full 45kg cylinders to be supplied by the LPG supply company.

Components

2.7 AUTOMATIC CHANGEOVER REGULATOR
To the requirements of AS/NZS 5601.1.
Automatic changeover regulator including a gas pressure regulator and non-return valve on each pigtail connection. The valve must comply with the requirements of HSNO and WorkSafe.

Changeover valves may be comprised of a first and second stage regulator system in a single body, or as a combination of separate component items.

Changeover valves complete with all components necessary for the operation of the bottle gas system including: -
- Flexible Pigtails
- Regulators
- Condensate trap
- Over pressure shut off
- All required valves

Protect from weather.

Accessories

2.8 ANCHORS AND CHAINS
To the requirements of LPGA COP No.2.
All cylinders larger than 25 litres capacity shall be securely held in place by galvanized chains and brackets. The brackets shall be fastened to a wall or similar robust anchorage. The cylinder(s) fastenings must be capable of withstanding a steady applied load equal to four times the weight of the filled cylinder(s).

3. EXECUTION

Conditions

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3.1 GENERALLY

Carry out the whole of this work to the requirements of NZBC G10/AS1, NZBC G11/AS1 and AS/NZS 5601.1.

3.2 BURIED PIPES

Pipes to be bedded in a trench, backfilled, marker taped and separated from other services, to AS/NZS 5601.1, 5.4 **Installation of consumer piping underground.**

Application

3.3 INSTALL PIPING

Run the system, completely concealed, in the most suitable type of pipe for each part of the installation, bent, supported, jointed and complete with all fittings to AS/NZS 5601.1. Confirm the type of pipe and its location. Label pipework to distinguish it from other services to AS/NZS 5601.1, 5.1.12 **Identification of pipework.**

3.4 PRESSURE TEST

Pressure test the system for leakage to AS/NZS 5601.1 before pipework is concealed by linings.

3.5 LOCATION OF CYLINDERS

Cylinders and associated equipment to be installed external to buildings, except where AS/NZS 1596 permits. Location and clearances to AS/NZS 5601.1, Appendix J, **LP Gas cylinder locations.**

Installation of cylinders

3.6 GENERAL

Cylinders shall be installed upright with the valve uppermost to ensure the inlet to the safety valve remains in the vapour space clear of the liquid content of the cylinder.

- Clearances around cylinders shall comply with CLEARANCES AROUND CYLINDER clause.
- Where two or more exchange cylinders are installed, a manual or automatic changeover valve shall be fitted immediately upstream of the regulator. This valve may be an integral part of an automatic changeover regulator.

3.7 SUPPORT

Cylinders shall not be supported by other cylinders.

Cylinders shall be installed on supporting bases that are firm, level, of non-combustible material, and with a finished surface that prevents ponding of water and at least 50mm above the surrounding surface. Soil is not considered an acceptable supporting base.

All cylinders to be securely held in place by galvanized chains and anchor brackets. The brackets shall be fastened to a wall or similar robust anchorage. Fixings shall be galvanised or stainless steel.

3.8 CYLINDER CONNECTION

Cylinders should be connected directly to the changeover valve assembly by flexible pigtails.

An excess flow valve, to prevent cylinder venting if hose fails, shall be fitted immediately upstream of the piping or hose assembly. This excess flow valve may be an integral part of the POL fitting.

Pigtails connecting cylinders to changeover valves or manifolds should not exceed 1 metre in length.

A non-return valve must be fitted in the supply between each cylinder and the changeover valve, or in a manifold system, between each cylinder and its manifold connection, to prevent flow across the changeover system to AS/NZS 5601.1.

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3.9 CYLINDERS IN AN ENCLOSURE OR RECESS
To AS/NZS 5601.1, Appendix J, **LP Gas cylinder locations.**

3.10 CYLINDERS UNDER BUILDINGS
To AS/NZS 5601.1, Appendix J, **LP Gas cylinder locations.**

3.11 CLEARANCES AROUND CYLINDER
Cylinders should be installed with clearances complying with the AS/NZS 5601.1, Appendix J, **LP Gas cylinder locations**, figure J3 **Minimum clearance to ignition sources**, and figure J4 **Minimum clearance to a drain or opening into a building**, and at least 1 metre from any readily ignitable material. Readily ignitable materials include paper, dry grass or oily substances.

3.12 CYLINDER SAFETY VALVE DISCHARGE
The discharge point of the cylinder safety valve shall be directed away from any other cylinder, piping, building, drain, approach path to cylinders and any opening into or under a building.

3.13 TEST POINTS
A pressure test point should be installed immediately downstream of each second stage regulator. Such test point may be an integral part of the regulator.

Completion

3.14 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused materials and elements from the site.

3.15 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

3.16 PROTECTION
Provide temporary protection of the finished work

Commissioning

3.17 FINAL INSPECTION AND TESTING
Check cylinders are working and ensure all connected appliances are operating correctly. Carry out final inspections and testing, pressure test the system for leakage to AS/NZS 5601.1. Leave system shut off at the cylinders until practical completion.

3.18 HANDOVER
Provide a copy of the system operating and maintenance instructions.

Completion

3.19 REPLACE
Replace damaged, cracked or marked elements.

3.20 LEAVE
Leave appliances clean and in full working order to the standard required by following procedures.

3.21 REMOVE
Remove debris, unused materials and elements from the site.

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7411M METALCRAFT ROOFING RAINWATER SPOUTING SYSTEMS

1. GENERAL

This section relates to **Metalcraft Roofing** rainwater disposal systems including gutters fascias and downpipes.

1.1 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
Gutter	In this section includes spouting

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E1/AS1	Surface water
NZBC E1/AS2	Surface water
AS 1273	Unplasticised PVC (uPVC) downpipe and fittings for rainwater
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
Are available on the website or by contacting Metalcraft Roofing.

For technical assistance contact **Metalcraft Roofing**
Web: www.metalcraftroofing.co.nz

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Warrant this work under normal environmental and use conditions against:

10 years:	Failure of coating adhesion (manufacturer's standard warranty)
10 years:	Weatherproofing failure caused by material penetration as a result of corrosion (manufacturer's standard warranty)
3 years:	Weatherproofing failure caused by substandard workmanship

From: Date of completion of installation

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 NO SUBSTITUTIONS
Substitutions are not permitted to any specified system, or associated components and products.

1.6 QUALIFICATIONS
Installers to be experienced competent gutter installers, familiar with the **MetalcraftRoofing** materials and the techniques specified.

1.7 INFORMATION FOR OPERATION AND MAINTENANCE
Provide one copy of all relevant **Metalcraft Roofing** maintenance information on completion of the roofing work.

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Performance

1.8 TEST - NZBC E1/AS1
Test the completed rainwater disposal system with water to ensure gutters are laid to correct falls, that both spouting and downpipes are unobstructed and that no ponding occurs in gutters. Comply with NZBC E1/AS1.

2. PRODUCTS

Materials

2.1 GUTTERS
Complete with matching brackets with fixing screws to suit the gutter / fascia. Refer to SELECTIONS for type.

2.2 DOWNPIPES
To AS 1273 Unplasticised PVC (uPVC) downpipe and fittings for rainwater. Complete with stand-off brackets, galvanized screw fixed. Refer to SELECTIONS for type.

Components

2.3 DROPPERS
Steel or plastic droppers, sized to fit inside the downpipe.

2.4 DOMES
Wire mesh in round form with legs to clip inside the outlet opening to the downpipe.

2.5 GUTTER MESH
Flexible plastic mesh fitted into the gutter to the mesh manufacturer's requirements.

3. EXECUTION

Conditions

3.1 HANDLE AND STORE
Handle and store downpipes, spouting and accessories to avoid damage. Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Avoid exposure to sunlight if strippable film is still on the product.

3.2 SUBSTRATE
Check that fascia, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

3.3 THERMAL MOVEMENT
Make adequate provision in the fixing and jointing of the spouting for thermal movement in the length of the spouting. Provide an expansion joint in spouting over 12 metres in length for steel gutter.

3.4 CORROSION
Separate metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

Check compatibility of metals used for rainwater goods, against the materials being used for roofing and flashings.

Application - metal

3.5 INSTALL METAL GUTTER AND FASCIA
Establish minimum falls necessary (minimum 1:500) to outlets to prevent ponding and screw fix brackets true-to-line at 900mm centres maximum. In areas where snow fall is possible and or high wind areas, the centres should be reduced to 600mm. Lap spouting

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joints in direction of flow, a minimum of 40mm to seal between and over the top of joint and seal with silicone sealant and fix with rivets. Ensure the joint is fixed over its full girth. Cut out neatly for and fit the pre-formed downpipe dropper and rivet and seal around the joint. All installation to **Metalcraft Roofing** details and NZMRM CoP recommendations.

3.6 INSTALL PVC DOWNPIPES
Install downpipes complete with 115 degree angle bends as needed with all joints lapped and glued. Galvanize screw fix with PVC pipe clips to rigidly stand 40mm off the wall plumb and discharging into stormwater gully or inlet pipe. All installation to **Metalcraft Roofing** details and NZMRM CoP recommendations.

3.7 INSTALL RAINWATER HEADS
Install using rivets where required to detail as shown on drawings. Ensure colour matched blind aluminium rivets are used when joining metal surfaces.

3.8 INSTALL OVERFLOWS
Install as close as practical to downpipe locations, at a height allowing water to discharge to the outside and not into the building.

3.9 INSTALL PROTECTION
Fit wire mesh domes to downpipe outlets and plastic mesh to spouting to the spouting manufacturer's requirements.

Completion

3.10 REPLACE
Replace damaged or marked elements.

3.11 LEAVE
Leave the whole of this work discharging completely and freely into the stormwater system and free of all debris. Leave work to the standard required by following procedures.

3.12 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS
For further details on selections go to www.metalcraftroofing.co.nz

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7411MA MARLEY RAINWATER DISPOSAL SYSTEMS

1. GENERAL

This section relates to **Marley** rainwater disposal systems.
It includes;
- uPVC spouting and downpipes
- Stratus Design Series® spouting and downpipes
- associated accessories necessary to complete the installation

Documents

1.1 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E1/AS1	Surface water
NZBC E2/AS1	External moisture
AS/NZS 3500.3	Plumbing and Drainage - Stormwater drainage
AS/NZS 4020:2005	Testing of products for use in contact with drinking water

1.2 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
Marley Rainwater Sales Brochures
Marley Product Catalogue
Marley - Spouting and Downpipe DIY Installation Guide
Marley Stratus Design Series® Sales brochure
Marley Stratus Design Series® - Design and installation guide

Manufacturer/supplier contact details

Company:	**Marley New Zealand Limited**
Web:	www.marley.co.nz
Email:	info@marley.co.nz
Telephone:	0800 MARLEY (0800 627 539)

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier Guarantee:

15 years:	Against defects in material and manufacture

- Commence the guarantee from the date of purchase
- Refer to Marley NZ Guarantee available at www.marley.co.nz

Refer to the general section 1237 WARRANTIES for additional requirements.

1.4 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:

~ years:	For installation

- When installed to Marley's published installation instructions at time of installation.
- Provide this warranty on the installer/applicator standard form.
- Workmanship warranty to be issued separately by the installer
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS
Installers to be experienced, competent workers familiar with the materials and techniques specified.

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1.6 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified Marley systems, components and associated products listed in this section.

Performance

1.7 TEST
Test the completed Marley rainwater disposal system with water to ensure, spouting is laid to correct fall, that both spouting and downpipes are unobstructed and that no ponding occurs in spouting.

1.8 DESIGN - NZBC E1/AS1
Layout, falls and capacity of spouting to falls and the size and position of downpipes to comply with NZBC E1/AS1.

1.9 DRINKING WATER
All Marley spouting and downpipe systems are tested for the collection of rainwater and drinking purposes to AS/NZS 4020. Care should be taken to ensure water is not contaminated by other sources.

2. PRODUCTS

Materials

2.1 UPVC SPOUTING/DOWNPIPES
Marley uPVC spouting and downpipe systems in white and grey uPVC.

2.2 STRATUS DESIGN SERIES® SPOUTING/DOWNPIPES
Marley Stratus Design Series® spouting and downpipe systems in co-extruded colour outer layer with grey uPVC internal layer.

Products

2.3 MARLEY SPOUTING - NZBC E1/AS1
Marley spouting system, complete with Marley fittings including jointers, brackets, expansion outlets, end caps and corners supplied by Marley. Spouting to be sized to comply with NZBC E1/AS1 and installed to NZBC E2/AS1 8.1.6, **Gutters**. Refer to SELECTIONS for type.

2.4 MARLEY DOWNPIPES
Marley downpipe system, complete with Marley fittings including bends, clips, joiners and junctions supplied by Marley. Refer to SELECTIONS for type.

Components

2.5 MARLEY MCS SOLVENT WELDING CEMENT
Only Marley MCS® Solvent Welding Cement to be used in conjunction with the spouting and downpipe systems to manufacturer's instructions. Colour match to spouting or downpipes.

2.6 EXPANSION OUTLET/DROPPERS
Marley expansion outlet/droppers, compatible with spouting and downpipe profile.

2.7 SCREW FIXINGS - TIMBER FASCIA
Stainless steel, grade 304 finish, self tapping screws 6g x 20mm pan head or wafer head.

2.8 NAIL FIXINGS - TIMBER FASCIA
Marley galvanised nails (MCNAILS).

2.9 SCREW FIXINGS - METAL FASCIA
Self drilling tek screws 6g pan head or wafer head.

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2.10 FABRICATION
Special items can be fabricated by Marley to specific dimensions on request including but not limited to angle flats, angle rakes, outlets and adaptors.

3. EXECUTION

Conditions

3.1 HANDLING AND STORAGE
Handle and store Marley downpipes, spouting and accessories to avoid damage. Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Store out of direct sunlight. Refer to Marley installation guides for further details.

3.2 SUBSTRATE
Check that fascias, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

3.3 THERMAL MOVEMENT
Make adequate provision in the jointing of the spouting for thermal movement in the length of the spouting by using Marley expansion joiners and/or expansion outlets. Refer to Marley expansion technical information.

3.4 ENVIRONMENTAL
Marley Spouting and Downpipe systems are suitable for most environmental conditions and will never rust, rot or corrode.

3.5 RECYCLING
All Marley manufactured spouting and downpipe systems are 100% recyclable and Marley operates recycling programs with industry suppliers where uPVC pipes can be returned from site for recycling at Marley.

Application

3.6 INSTALL MARLEY SPOUTING
Install to Marley's current published installation instructions available at www.marley.co.nz. Ensure only Marley MCS® Solvent Welding Cement to be used in conjunction with the spouting systems to manufacturer's instructions. From high points fix brackets true-to-line to give a fall of 5mm every 10 metres to outlets. Set spouting brackets at 500mm centres; reduce to 300mm spacing for high wind zones or areas subject to occasional snowfalls. Make adequate provision for thermal movement.

3.7 INSTALL MARLEY DOWNPIPES
Install to Marley's current published installation instructions available at www.marley.co.nz. Ensure that all joints are sealed properly using Marley MCS® Solvent Welding Cement. Assemble downpipes, solvent cement jointed complete, fit to outlets, fix with pipe clips every 1.2 metres, fix pipe clips with 304 stainless steel screws, plumb and discharging into the stormwater gully or pipe inlet to the Marley required practice.

Painting Marley uPVC spouting/downpipes

3.8 PAINTING
After installation use a mineral based undercoat and two coats of 100% weatherable acrylic paint. Do not paint the inside of spouting or internal brackets.

Completion

3.9 REPLACE
Replace damaged or marked elements.

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3.10 LEAVE
Leave the whole of this work discharging completely and freely into the stormwater system and free of all debris. Leave work to the standard required by following procedures.

3.11 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS
For further details on selections go to www.marley.co.nz

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7420 SANITARY SYSTEMS

1. GENERAL

This section relates to above ground gravity flow sanitary systems;
- for foul water
- from sanitary fixtures to first underground drain connection
- including system wastes, floor wastes, floor waste gullies, traps, vents and valves
- with associated components and accessories to make the system work

1.1 RELATED SECTIONS
Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures tapware and accessories.
Refer to 7430 DRAINAGE for underground drains.

1.2 DOCUMENTS
Documents referred to in this section are:

NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - Sanitary plumbing
NZBC G13/AS3	Foul water - Sanitary plumbing and drainage
AS 2887	Plastic waste fittings
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage

Plumbers, Gasfitters and Drainlayers Act 2006

1.3 QUALIFICATIONS
Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

2. PRODUCTS

2.1 PVC-U WASTE, DISCHARGE AND VENT PIPES
PVC-U pipe to AS/NZS 1260 complete with fittings brand-matched to the pipe manufacturer's requirements.

2.2 EXPOSED PIPES AND TRAPS
Chrome plate on copper pipes and associated copper and brass fittings.
White polybutylene or PVC, including all associated fittings.

3. EXECUTION

3.1 EXECUTION GENERALLY - NZBC G13/AS1
Carry out this work to NZBC G13/AS1 and NZBC G1/AS1 and complete all tests to G13/AS1, 7.1 **Test Methods**.

3.2 ELECTROLYTIC ACTION
Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

3.3 INSTALL TRAPS, WASTE AND VENT PIPES - NZBC G13/AS1
Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to NZBC G13/AS1 and AS/NZS 2032. Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

3.4 INSTALL ELECTRIC PAN VENTS
Install electric pan vents to manufacturers' requirements. Leave ready for electrical connection by electrician.

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3.5 PENETRATIONS

At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

3.6 TEST

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to NZBC G13/AS1 or AS/NZS 3500.2, 15 as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

3.7 CLEAN UP

Remove labels and clean fittings. Remove unused materials from the site.

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7430 DRAINAGE

1. GENERAL

This section relates to the supply and laying of gravity foul water (sewage), stormwater and groundwater drainage.

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC B1/AS1	Structure
NZBC E1/AS1	Surface water
NZBC E1/AS2	Surface water
NZBC E1/VM1	Surface water
NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - sanitary plumbing
NZBC G13/AS2	Foul water - drainage
NZBC G13/AS3	Foul water - sanitary plumbing and drainage
AS/NZS 1254	PVC-U pipes and fittings for Stormwater and Surface Water applications
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of polyethylene pipe systems
AS 2439.1	Perforated Plastics Drainage and Effluent Pipes and Fittings - Perforated drainage pipe and associated fittings
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZS 3104	Specification for concrete production
NZS 3111	Method of test for water and aggregate for concrete
AS/NZS 3500.2	Plumbing and drainage - sanitary plumbing and drainage
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4402 (set)	Method of testing soils for civil engineering purposes
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications
NZCMM	NZ Concrete Masonry Manual section 6.1 Masonry Retaining Walls
NZTA F2	Specification for pipe subsoil drain construction

Plumbers, Gasfitters and Drainlayers Act 2006

1.2 AS BUILT DOCUMENTS

Supply a 1:100 scale as-built drawing of drains and fittings to the territorial authority and to the owner on completion.

1.3 QUALIFICATIONS

Drainlayers to be experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006.

2. PRODUCTS

2.1 CONCRETE

17.5 MPa prescribed mix to NZS 3104.

2.2 REINFORCEMENT

Plain round and/or deformed steel bars, Grade 300 to AS/NZS 4671.

2.3 PVC-U PIPES

PVC-U pipes bends, junctions, fittings and joints to AS/NZS 1254 and AS/NZS 1260.

Underground PVC-U pipe to be classified as follows:

Classification:	Use:
SN4 - SN6	Domestic & light load areas

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SN8 - SN10	Commercial & Industrial medium load areas
SN16	Public roads & high load areas

2.4 POLYETHYLENE PIPES
Polyethylene pipes and fittings to AS/NZS 5065.

2.5 PERFORATED PIPE - SUBSOIL DRAINAGE
Perforated corrugated coil high density polyethylene subsoil drainage pipe to AS 2439.1 with polypropylene filter sock over, for groundwater drainage.

2.6 GULLY TRAPS - NZBC G13/AS2
To NZBC G13/AS2: 3.3 Gully traps, complete with grating.

2.7 SURFACE WATER SUMP GRATINGS
Cast iron frame with lift-up grating.

2.8 STRIP DRAIN CHANNEL
Proprietary, modular, variable invert, plastic, steel (various types), or polymer concrete drainage channel sections and drainage sump, embedded in site concrete and fitted with selected metal gratings.

2.9 INSPECTION COVERS
Cast iron frame with screw-down cover.

2.10 TRENCH BACKFILLING MATERIAL, FOUL WATER - NZBC G13/AS2
Bedding and backfilling material to NZBC G13/AS2, 2.0 **Materials,** for methods shown in NZBC G13/AS2, figure 7, **Bedding and backfilling**.

2.11 DRAINAGE MATERIAL - SUBSOIL DRAINAGE
Free draining crushed stone, 7 mm to 20 mm in size.

2.12 FILTER FABRIC
Polymeric fabric formed from a plastic yarn or a long chain synthetic polymer composed of at least 85% by weight of propylene, ethylene, amide, ester or vinylidene chloride. Fibres to be rot proof, chemically stable and have low water absorbency. The filter network, (woven or non-woven) must be dimensionally stable and resistant to delamination.

3. EXECUTION

3.1 EXCAVATE
Excavate for drains to a firm even base with correct gradients set in straight runs. Trenches running parallel, below and close to foundations of buildings to NZS 3604 or NZS 4229 to be separated to:
- NZBC E1/AS1, 3.9.7, **Proximity of Trench to Building**, for stormwater and subsoil drains.
- AS/NZS 3500.3, 6.2.8, **Installation near and under buildings**, as modified by NZBC E1/AS2.
- NZBC G13/AS2, 5.6, **Proximity of Trench to Building**, for foul water drains.

3.2 MANUFACTURER'S REQUIREMENTS
All drainage installations to the pipe and fitting manufacturer's requirements.

3.3 FOUL WATER DRAINAGE GENERALLY - NZBC G13/AS2
Carry out foul water drainage work to NZBC G13/AS2 and NZBC G1/AS1 and complete all tests to NZBC G13/AS1, 7.1 Test Methods.
Lay uPVC pipe systems to relevant sections of AS/NZS 2032, AS/NZS 2566.1 and AS/NZS 2566.2. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033 and AS/NZS 2566.1.

3.4 LAY FOUL WATER DRAINS
Lay drains in straight runs to correct gradients, to discharge into the network utility operator's sewer. Set inspection fittings on a concrete base.

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3.5 CONSTRUCT GULLY TRAPS - NZBC G13/AS2
Set in a minimum 75mm thick concrete with top surround 25mm above paving and 100mm above other surfaces, to NZBC G13/AS2, 3.3 Gully traps.

3.6 LAY STORMWATER DRAINS
Confirm the required location of downpipes and finished ground levels before commencing pipework. Set downpipe bends in concrete with the concrete brought up to protect the top of the bend from damage. Lay drains in straight runs to correct gradients to discharge into the on site stormwater system.

3.7 FILTER FABRIC TO DRAINAGE MATERIAL - SUBSOIL DRAINAGE
Where details require drainage material to be encapsulated in filter fabric to prevent fines from blocking the aggregate. Place fabric and carefully hold in place by pinning and/or by controlled use of aggregate as ballast. After drain installation and required backfilling, complete encapsulation with fabric. Ensure filter fabric is correctly placed, sufficiently overlapped and pinned and/or secured.

3.8 LAY PERFORATED PIPING - SUBSOIL DRAINAGE
Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. Lay in straight runs to discharge into surface water drainage system. The pipe must not excessively elongate during installation. Carry drainage material up and over the pipes without disturbing them. Extend the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.9 INSTALL STRIP DRAIN CHANNEL
Excavate trench and form site concrete base to fall. Set interlocking channel sections, sumps and accessories in place, all in accordance with the channel manufacturer's requirements. Check falls and install gratings and covers.

3.10 INSTALL SURFACE WATER SUMP
To NZBC E1/AS1 or to AS/NZS 3500.3 section 7 as modified by NZBC E1/AS2, complete with ceramic half-siphon pipe and cast iron frame with a lift out grating.

3.11 INSTALL STORMWATER INSPECTION CHAMBERS
Construct as detailed on a poured concrete footing to NZBC E1/AS1, 3.7, **Access for maintenance**, or to AS/NZS 3500.3 section 7 as modified by NZBC E1/AS2. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.12 INSTALL FOUL WATER INSPECTION CHAMBERS - NZBC G13/AS2
Construct as detailed on a poured concrete footing to NZBC G13/AS2, 5.7 **Access points**. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.13 SOAKHOLES OR TRENCHES
Dispose of stormwater on site as shown on the drawings, by soakage, to suit local geology and soil structure; all as directed by the territorial authority.

3.14 CONCRETE ENCASEMENT
Concrete encase shallow drains and drains under driveways, on a 100mm deep 17.5 MPa concrete bed reinforced with three 10mm mild steel bars. Surround pipes with a polythene membrane to allow movement and encase in 100mm 17.5 MPa concrete.

3.15 TESTING - FOUL WATER
Confirm timing before carrying out any tests. Supply potable water and apparatus needed.
Test to NZBC G13/AS1 or AS/NZS 3500.2, 15 as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

3.16 TRENCH BACKFILLING GENERALLY - FOUL WATER
Granular bedding and selected fill shall be placed in layers no greater than 100 mm loose thickness and compacted. Base bedding (beneath the pipe) shall be placed and compacted before pipes are laid. Up to 300mm above the pipe, compaction shall be by tamping by hand tool over the entire surface of each layer to produce a compact layer

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without obvious voids, without disturbing or distorting the drain. Run marker tape along line of the pipe on top of the bedding.

Up to 300mm above the pipe, compaction shall be by tamping by hand using a rod with a pad foot (having an area of 75 ± 25 mm by 75 ± 25 mm) over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing the drains.

More than 300 mm above the pipe, compaction shall be by at least four passes of a mechanical tamping foot compactor (whacker type) with a minimum weight of 75 kg. For plastic based pipes, ensure care taken to avoid impact loading of the pipe.

3.17 CLEAN OUT SUBSOIL DRAIN INSTALLATION

Clean and flush out the whole subsoil drain installation and remove silt and debris before handing over.

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7701 ELECTRICAL BASIC

1. GENERAL

This section relates to the wiring for domestic and small scale commercial installations, including:
- power
- lighting
- electrical automation
- security system
- complete with componentry
- electrically-powered fittings
- fire rated sealers, liners and accessories

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

AFDD	Arc Fault Detection Device
ELV	Extra Low Voltage
GLS	general lighting service
IP	international (ingress) protection classification
NUO	Network Utility Operator
PCB	printed circuit board
PIR	passive infrared
SIA	security integration architecture
TPS	tough plastic sheathed
TCF	Telecommunications Carriers' Forum

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F6/AS1	Visibility in escape routes
NZBC F7/AS1	Warning systems
NZBC G4/AS1	Ventilation
NZBC G9/AS1	Electricity
AS/NZS 1125	Conductors in insulated electric cables and flexible cord
AS/NZS 1768	Lightning protection
AS/NZS 2201.1	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
AS 2293.1:2005	Emergency escape lighting and exit signs for buildings - System design, installation and operation
AS 2293.3:2005	Emergency escape lighting and exit signs for buildings - Emergency escape luminaires and exit signs
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.2	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand installation conditions
AS/NZS 3100	Approval and test specification-general requirements for electrical equipment
AS/NZS 3112	Approval and test specification - Plugs and socket-outlets
AS/NZS 3113	Approval and test specification - Ceiling roses
AS/NZS 3190	Approval and test specification - Residual current devices (current-operated earth-leakage devices)
AS/NZS 3439.3	Low-voltage switchgear and controlgear assemblies - Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use - Distribution boards

AS 3786	Smoke alarms using scattered light, transmitted light or ionization
NZS 4514:2009	Interconnected smoke alarms for houses
NZS 4246	Energy Efficiency - Installing bulking thermal insulation in residential buildings
AS/NZS 5000.2	Electric cables - Polymeric insulated - for working voltages up to and including 450/750v
AS/NZS 60335.1	Household and similar electrical appliances - Safety - General requirements
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance.
AS/NZS 61439.3	Low-voltage switchgear and controlgear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons (DBO).
IEC 61643	Components for low voltage surge protection devices

Electricity (Safety) Regulations 2010 (Reprint as at 21 January 2019).
TCF Premises Wiring Cable Installers Guidelines for Telecommunication Services

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Warranties

1.3 WARRANTY
Warrant the complete electrical installation under normal environmental and use conditions against failure of materials and execution.
1 year: Warranty period

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

1.4 COMPLY
Comply with the Electricity (Safety) Regulations 2010, AS/NZS 3000, AS/NZS 3008.1.2, and TCF Premises Wiring Cable Installers Guidelines for Telecommunication Services for listed and prescribed work and with the utility network operator's requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

1.5 QUALIFICATIONS WORKERS – LICENSED UNDER STATUTE
Workers and supervisors to be appropriately qualified to applicable legislative requirements.
Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.6 QUALIFICATIONS - SECURITY SYSTEM
Installation by an installer licensed under the Private Investigators and Security Guards Act. Installation of all security equipment to comply with AS/NZS 2201.1 Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance.

1.7 SAFETY OF INSTALLATION - DESIGN BY ELECTRICAL ENGINEER
Before installation work commences obtain from the electrical engineer a Certified Design. The Certified Design is to comply with the Electricity (Safety) Regulations (2010), regulation 58.

1.8 SAFETY OF INSTALLATION - DESIGN BY ELECTRICIAN
Before installation work commences provide a Certified Design. The Certified Design is to comply with the Electricity (Safety) Regulations (2010), regulations 58. It must be signed by the designer of the installation.

1.9 ELECTRICAL CERTIFICATE OF COMPLIANCE
Supply a certificate of compliance (CoC) to the owner, and if required the NUO, as required by the Electricity (Safety) Regulations 2010, prior to connection.

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- Arrange for the NUO to inspect before the meter installation, listed work inspection, polarity check and supply becoming live.
- Arrange for an inspector to inspect high risk electrical work as required by regulation 70.

1.10 ELECTRICAL SAFETY CERTIFICATE

Provide an Electrical Safety Certificate (ESC), as required by the Electricity (Safety) Regulations 2010, Reg 74A, to the owner and when required the BCA. To be provided no later than 20 working days after connection and prior to Practical Completion.

2. PRODUCTS

2.1 MAINS SUPPLY

Tough plastic sheathed neutral screened cable to AS/NZS 5000.2 and AS/NZS 3008.1.2, with a minimum rating of 60 amps per phase. Include pilot cable where required by network utility company.

2.2 CABLES

Tough plastic sheathed copper conductors to AS/NZS 5000.2, stranded above 1.0mm², and to AS/NZS 3008.1.2. Minimum sizes as below. Increase sizes if the method of installation, thermal insulation, cable length or load will reduce the cable rating below that of the MCB rating, or produce an excessive voltage drop.

Lighting circuits:	Domestic: 1.5mm² on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm² on 16 amp MCBs
Power circuits:	2.5mm² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction 2.5mm² on 16 amp MCBs for domestic insulated construction, or filled cavity 2.5mm² on 20 amp MCBs for unenclosed or unfilled cavity construction 2.5mm² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres
Hot water cylinder circuits:	Single phase: 2.5mm² on 20 amp MCBs
Range/oven/hob circuits:	Single phase: 6mm² high temperature cable on 32 amp MCBs

Heat resistant cable for final connections to all heated appliances, and high temperature cable in ambient conditions that may be above 35°C (roof spaces above insulation etc).

2.3 METER BOX

Proprietary manufactured, zinc plated powder coated metal case, or ABS plastic, with glazed panel door, weatherproof where mounted outdoors, and complete with meter mounting, main switch and fuse.

2.4 DISTRIBUTION BOARD

Flush surface mount boards manufactured to AS/NZS 3439.3, or AS/NZS 61439.3, and installed in accordance with AS/NZS 3000. Manufactured from engineering grade resin with a glow wire rating of 850°C, complete with neutral and earth busbars, and insulated comb phase bar. Distribution boards to have 20% spare capacity for future additions and alterations.

2.5 CIRCUIT PROTECTION

General requirements including main switch 63A or 100A. Residual current protection 30mA, ensure RCCBs' meet Type A and comply with AS/NZS 3190. MCBs to 4.5kA or 6kA rated.

2.6 WALL BOXES

Standard grid size or equivalent to be manufactured from plastic or metal, with 2 or more gang size to be metal with steel inserts for accessory securing screws. Screw fixed.

2.7 SWITCH UNITS

Single pole switches to be 16 amp minimum rated, double pole or intermediate to be 16 amp minimum rated. All switches to be 230 volt a.c. polycarbonate flushplate units.

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Label all switch units that control electrical equipment or special lighting circuits by proprietary engraved switch mechanisms where applicable.
Refer to drawings/schedules for number of switches per unit, dimmer units, neon (indicator or toggle) units and 2 way units.
Refer to SELECTIONS.

2.8 HOT WATER SYSTEM SWITCH
One way 20 amp switch complete with cable clamp for flexible PVC conduit to element enclosure.

2.9 SWITCHED SOCKET UNITS
10 amp, 230 volt flat 3 pin socket outlets fitted with safety shutters and manufactured to AS/NZS 3100, AS/NZS 3112 and AS/NZS 3113, single or multi gang as detailed.

2.10 SMOKE ALARMS
Type 1 domestic smoke alarm to NZBC F7/AS1. 1.2 **Descriptions of alarm systems**. Alarm to AS 3786. A wired 230 volt ionised smoke detector type.

2.11 SURGE PROTECTION
Protection for the homes appliances with IEC 61643 Class ll surge protection devices fitted to the switchboard. For variable electronic equipment fit IEC 61643 Class lll surge protection to switched socket outlets.

2.12 CEILING ROSES
White plastic mounting base with screwed cover, manufactured to AS/NZS 3113. Terminal type. Suspended fittings to have sheathed round flexible cord to AS/NZS 3008.1.2. Refer to SELECTIONS.

2.13 BATTEN HOLDERS
Standard white plastic bayonet cap, with cap angled where wall mounted. Brass liners.

2.14 DOOR BELL SYSTEM
Complete with transformer for mounting on distribution board.

2.15 LIGHT FITTINGS
Fluorescent and High Intensity Discharge fittings with low loss control gear and power factor corrected to 0.95 minimum. Control gear suitable for dimming if this is required. All fittings complete with lamps; Incandescent GLS lamps pearl, coiled-coil 230v rated, bayonet cap; Fluorescent triphosphor 2700K; CFL; halogen ELV 12v dichroic reflector with cover glass unless detailed otherwise; integral/non-integral LEDs, reflectors, lenses, heatsinks and drivers - 3,000K to 4,000K, CRI >80, L70.

2.16 EMERGENCY LIGHT FITTINGS
Emergency escape lighting and exit signs for buildings to AS 2293.3. Exit, recessed, ceiling or wall mounted. Refer to SELECTIONS.

2.17 SPACE HEATERS
Fixed wired room heaters radiant or convector, and compliant with AS/NZS 60335.1. Flush or surface mount, fitted with safety cut-outs.

2.18 EXHAUST FANS
Ceiling, wall or duct mounted exhaust fans for ventilation to NZBC G4/AS1, and compliant with AS/NZS 60335.1.

2.19 HEATED TOWEL RAILS
Fixed wired heated towel warmers, double insulated, IPX4 splash-proof, compliant with AS/NZS 60335.1, scratch resistant powdercoated or chrome finish.

2.20 EXTERIOR SWITCHES AND SWITCHED SOCKET UNITS
Using materials with superior UV protection, impact strength, and addition chemical resistance when compared with interior polycarbonate fittings. Weather protected, switches and sockets to IP56 minimum. Sockets fitted with safety shutters behind socket pins, and all products able to be padlocked off or on.

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Electrical automation system

2.21 ELECTRICAL AUTOMATION SYSTEM
Electrical automation system designed to enable if required:
- Lighting - automated control and dimming timer control.
- Heating including heated towel rails and ventilation systems.
- Security - programmable to simulate lights and other devices to give appearance home is occupied - ability to interface with security system and smoke detectors to activate lights.
- Energy efficiency - automatically switch circuits off when not required or on during low tariff times.
- Appliances.
- Spa pools.
- Irrigation systems.

Security system

2.22 CONTROL PANEL
Control panel system with a minimum of one installer code, one master code, 6 zones minimum and 6 user codes. The installer to select codes to suit installation.

2.23 DETECTORS
There are two main types of detectors:
- Standard passive infrared sensors: Install in stable environments with no wind flow and no direct bright sunlight.
- Passive infrared/ microwave sensors: Install in area where environmental stability is an issue.

2.24 AUDIBLE DEVICES
Internal sirens can be either a 12V Piezo Siren or a Horn speaker with a sound pressure level of no less than 95dB.
External siren can be either a stainless steel design or have hardened plastic casing. Both designs to be fully weatherproof but not limited to IP66 Rating. The siren box to contain a strobe diffuser in either blue or red. The siren shall contain a horn speaker, 12v speaker or an electronic siren. The external siren box to have both a cover and rear wall tamper mechanism.

2.25 CABLING
Security alarm wiring to NZS/AS 1125 for cables.
Security alarm wiring to be multi stranded and not single stranded, minimum 0.5mm^2.

2.26 PERIPHERALS
Fit anti-tamper devices to detectors, control panels and equipment housings, programmed to give a tamper indication when the system is unset and a tamper alarm when the system is set.
Standard keypad manufactured of moulded hardened plastic with either a LED or LCD screen, to match the style of the wiring accessories in diameter, colour and aesthetics.

2.27 COMMUNICATIONS
Digital dialler to be built into the PCB of all control panels, with the options for both monitoring and remote dial in windows based software. Digital dialler to comply with all the industry standard communication formats including contact I.D and SIA, and NZ Telepermit certification.
Remote software able to upload / download programming changes and or history events and change status of the security alarm with the ability to be turned off if required.

3. EXECUTION

Fire rated sealers and liners

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3.1 MAIN SUPPLY
Lay underground mains to the NUO requirements. Excavate trench, install cable and marker tape and backfill.

3.2 METER BOX
Fit to meter box manufacturer and Electricity Retailer requirements. Recess into external wall in sheltered area and flash to weatherproof to NZBC E2/AS1 fig 69. Arrange for meter installation and connection.

3.3 DISTRIBUTION BOARD
Fit to AS/NZS 3000 and board manufacturer requirements. Recess into wall or surface mount and ensure fire containment properties of the enclosure are maintained.

3.4 CIRCUIT PROTECTION
Install MCBs at distribution board to AS/NZS 3000 to protect each final sub circuit.

3.5 MAIN EARTH
Provide a plastic toby box to contain and protect the earth electrode. Fix the connecting earth wiring closely and securely against wall surfaces.

3.6 EARTH LEAKAGE PROTECTION
Install RCD protection to AS/NZS 3000.

3.7 RCD - RESIDENTIAL INSTALLATIONS
Install 30mA RCD protection at the switchboard for all final sub circuits to control outlets and lighting except for fixed or stationary cooking equipment, to AS/NZS 3000.

3.8 RCD - SPECIFIC INSTALLATIONS
Install fixed wired RCD protected outlets (SRCD) in the following higher risk areas:
- Wet areas: bathrooms, laundries, kitchens.
- Near pools and water features.
- Where intended for use with cleaning equipment.
- Hand-held tools subject to movement in use, i.e. work-shops, garages.

3.9 SET-OUT
The position of outlets and equipment shown on drawings is indicative of requirements. Confirm documents and site conditions are not in conflict with other services or features. Resolve conflicts and discrepancies before proceeding with work affected. Confirm on site the exact location, disposition and mounting heights of all outlets, fittings, equipment, penetrations, and use of exposed wiring. Fix outlet items level, plumb and in line.

3.10 CABLING
Install wiring systems to AS/NZS 3000. All cabling run concealed. No TPS cable laid directly in concrete. Locate holes in timber framing for the passage of cables at the centre line of the timber member. Install cable in conduits where required to pass through concrete or underground. In walls run cabling horizontally and vertically in straight lines. In ceilings either run cabling along ceiling framing or attached to catenary wires. Clip cabling to ceiling framing/catenary wires.

3.11 CABLING CIRCUITS
Install all circuits with the appropriately rated cable and circuit protection. Install with a maximum of 8 light switch units or 4 double or single switched socket units on any circuit. Minimum 2 lighting circuits per floor. Separate circuits for all electric heating appliances. Kitchen sockets to be on at least two different circuits.

3.12 WALL BOXES
Mount flush in cavity construction size to fit products selected. Fix vertically mounted wall boxes to studs. Screw fix horizontally mounted switched socket outlet wall boxes to solid blocking or nogs. Fix switch panel wall boxes to solid blocking.

3.13 ISOLATING SWITCHES
Locate isolating switches in positions as confirmed by the owner, when not specifically shown on the drawings.

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3.14 LIGHT FITTINGS

Install light fittings in locations and at heights specified and confirmed by the owner, in accordance with the fitting manufacturer requirements.

3.15 EXTRA LOW VOLTAGE LIGHTING

Use electronic, transformers (halogen) or drivers (LED) for ELV lamps, one transformer/driver per lamp. Locate to manufacturer requirements and as close as practicable to the lamp. Ensure transformers/drivers and rear of light fittings are adequately ventilated and appropriately clear of any building elements, to AS/NZS 3000.

3.16 EMERGENCY LIGHTING

Emergency escape lighting and exit signs for buildings to AS 2293.1 and NZBC F6/AS1. Fit emergency light fittings to manufacturer specifications. Refer to plans for position of fittings.

3.17 SPACE HEATERS

Install to the heater manufacturer requirements, and to AS/NZS 3000. Fit neatly and without damage to surrounding finishes. Ensure control switches and thermostats are fitted to appliance, or otherwise connect to a control switch located adjacent to the heater and a remote thermostat.

3.18 SMOKE ALARMS

Install Type 1 domestic smoke alarm system to NZBC F7/AS1 3.0 **Domestic smoke alarms**, NZS 4514 and to the alarm manufacturer requirements. Fit neatly and without damage to the surrounding finish.

3.19 SURGE PROTECTION

Install surge protection devices to manufacturer requirements and in accordance with AS/NZS 3000 and AS/NZS 1768. When fitting IEC 61643 Class ll protection at the switchboard, protect the device by a dedicated MCB.

3.20 ELECTRIC POWERED FITTINGS AND EQUIPMENT

Install and wire fittings and equipment to individual fittings and equipment manufacturer requirements. Refer to the drawings for required layouts and locations for equipment. Refer to SELECTIONS for schedules of fittings.

3.21 BATHROOM ELECTRICAL FIXTURES

Install all electrical fixtures. Connect the following bathroom and toilet electrical items:

- Heated towel rails: Install to manufacturers requirements and installed in accordance with AS/NZS 3000
- Mirror demisters: Locate centrally above the wash hand basin(s). Connect wiring to room lighting unless specified otherwise.
- Exhaust fans: Install exhaust fans to manufacturer requirements. Installed in accordance with AS/NZS 3000 and NZBC G4/AS1.

3.22 OUTDOOR/EXTERIOR SERVICES

Install all wiring systems in accordance with AS/NZS 3000 and in accordance with the manufacturer recommendations:
Provide circuits and connections for exterior installations, including ELV 12/24 Volt path lighting and electronic irrigation systems. Refer to drawings for connection points. Where underground, ensure appropriate protection, such as thickness of sheathing, conduit, depth of cabling, and proximity to other services.

Use the appropriate rated fittings for power control and power supply. Weather protected switches and sockets to IP56. Install to manufacturer specifications using recommended fittings and sealants to maintain the products integrity.

Earth leakage protection to be provided for in areas where there is increased risk to human safety in the form of either RCDs at the distribution board, or socket outlet. RCDs are recommended for visible awareness of protection.

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iDesign Architecture Donnelly 233011

3.23 ELECTRICAL AUTOMATION SYSTEM
Fit distribution cabinet in wall, cut-out to finish flush with the wall surface, or surface mounted. Configure installation to manufacturer instructions. Provide adequate user training and operating manual to the owner.

3.24 LABELLING
Include label under each controller, switch and circuit breaker on distribution boards. Include a warning notice if light dimmers are used in the installation. List the rating of each circuit.

Security system

3.25 SECURITY SYSTEM
Install to the system manufacturer requirements, control panel, detectors and associated equipment fitted neatly and without damage to surrounding finishes. Installation of security equipment to AS/NZS 2201.1 Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance. All 230v mains power connections to the security panel are to be in accordance with AS/NZS 3000. The 230V power is to be switched using a dedicated single gang Isolator switch or similar.

Fire rated sealers and liners

3.26 SEAL ALL PENETRATIONS
Seal all penetrations, including in and around conduits and sleeves, in accordance with manufacturer instructions. For fire and/or acoustic rated elements, maintain the rating with the seal systems.

3.27 PROVIDE CABLE SLEEVES
Provide PVC sleeves formed from pipe sections, unless fire and/or acoustic systems require sleeves for other building elements and/or different material for the sleeve.

Fire rated accessories

3.28 INSTALL WALL BOXES AND SWITCH UNITS - FIRE RATED
Install proprietary fire rated wall boxes and switch units in accordance with manufacturer instructions.

Completion & Commissioning

3.29 COMPLETION MATTERS
Refer to 1270 CONSTRUCTION for completion requirements and if required commissioning requirements.

3.30 FIRE RATED SEALERS AND LINERS
Sealants, collars, wraps, expanding foam, mortars and liners, used to seal around pipe, conduit and sleeve penetrations through fire and acoustic walls and floors. Refer to SELECTIONS for type.

Fire rated accessories

3.31 WALL BOXES AND SWITCH UNITS - FIRE RATED
Proprietary intumescent pad for plastic electrical sockets installed in plasterboard lined fire rated partitions providing an acoustic barrier and fire protection. Refer to SELECTIONS for type.

4. SELECTIONS

Materials

4.1 SELECTIONS - FITTINGS AND HARDWARE
Confirm selections of all outlet fittings and hardware with the owner in writing before ordering.

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iDesign Architecture Donnelly 233011

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-8816 | Fax 03 314-9181 | Email info@hurunui.govt.nz
Web hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil
Skype hdc_customer_services | twitter.com/hurunuidc

FORM 2
APPLICATION FOR PROJECT INFORMATION MEMORANDUM AND / OR BUILDING CONSENT

Section 33 or Section 45, Building Act 2004

APPLICATION

I request that you issue a:

- Building Consent (including Project Information Memorandum)
- Project Information Memorandum only (PIM)
- Building Consent only — The existing PIM No. (if applicable) is: .....
- Amendment to an existing Building Consent — The existing BC No is: .....

for the building work described in this application:

THE BUILDING

Street Address: (or rapid number if applicable) :
(for structures that do not have a street address, state the nearest street intersection and the distance and direction form that intersection)

153 INNES ROAD, AMBERLEY

Legal description of land where building is located :
(state legal description as at the date of application and, if the land is proposed to be subdivided, include details of relevant lot numbers and subdivision consent)

Building Name if applicable :

Location of building within site/block number:
(include nearest street access)

Number of levels:
(include ground level and any levels below ground)

Level/Unit No: 0

Floor Area (all floors included):

Total / Existing : _____ m^2

New / Additional : _____ m^2

Affected / Altered : _____ m^2

(indicate area affected by the building work if less than the total area)

Year first constructed:
For dwelling alterations/additions put year first constructed. If unknown put approx. decade.

Current lawfully established use:
(include number of occupants per level and per use if more than 1. If use was changed by the building work this application relates to, state previous use)

THE PROJECT

Description of building work:
(Provide sufficient information for scope of work to be fully understood, e.g. "3 bedroom dwelling with attached garage and wood burner" or " 3 bay domestic farm shed" or "Commercial shop fit-out")

4 bedroom dwelling with attached garage and wood burner

Intended use : family home

Will the building work result in a change of use of the building? Yes (No)
(Refer to Building (Specified Systems, Change of Use, and Earthquake-prone Buildings) Regulations 2005 if in doubt)

If "Yes", provide details of the new intended use:

Water requirements:

- New connection to Hurunui District Council Supply (if available)
- ✓ Existing connection to Hurunui District Council Supply
- Own private supply (well or community scheme)

Intended life of the building:

- ✓ Indefinite but not less than 50 years
- or specified as _____ years

List building consents previously issued for this project (if any): *(ie, is this project being constructed in stages? Is this consent for a relocated or transportable building?)*

Estimated Value of the building work (inc GST):
$ 350,000.00
on which building levy will be calculated (including GST). State estimated value as defined in section 7 of the Building Act 2004.

If this is an application to amend a building consent, advise the estimated value of amended work (inc GST):
$_____

Is this in addition to, or reduction from, what was stated with the original application?

Addition Reduction No change

THE OWNER	AGENT – APPLICANT: ☐ N/A
Owner's Name: BRYAN & PHILIPPA DONNELLY	Agent's Name:
Contact Person: (if owner is not an individual) BRYAN	Contact Person:
Mailing Address:	Mailing/Billing Address:
176 KIVERS ROAD, BURNHAM	
Postcode: 7677	Postcode:
Street Address/Registered Office:	Street Address/Registered Office:
Postcode:	Postcode:
Mobile Phone: 027 375 1899	Mobile Phone:
Phone:	Phone:
After Hours Phone:	After Hours Phone:
Landline:	Landline:
Daytime:	Daytime:
Fax Number:	Fax Number:
E-mail Address: bryanvizbuilt@gmail.com	E-mail Address:
Website:	Website:
The following evidence of ownership is attached to this application: ✓ Certificate of Title Sale and Purchase Agreement (only if new purchase)	Relationship to owner: (State details of authorisation from the owner to make the application on the owner's behalf)
	All consent related invoices/refunds to be addressed to: Owner Agent Note - The Agent will be the first point of contact for communications with the Council/Building Consent Authority regarding this application / Building Work and will receive all correspondence

RESTRICTED BUILDING WORK

Will the building work include any restricted building work (Yes) No

If yes, provide the following details of all licensed building practitioners who will be involved in the carrying out or supervising the restricted building work - *[if these details are unknown at the time of the application, they must be supplied before the work begins]*

Not known at moment.

Licensing Class	Name and address	Licensed practitioner number (or registration number treated as being licensed under section 291 of the building Act 2004)
Foundations		
Carpentry		
Exterior Plasterer		
Brick-layer		
Block-layer		
Roofer		

REQUIRED ATTACHMENTS

Complete and attach the following checklist (tick to confirm item/form completed), and provide an electronic copy of all information an plans requested on that checklist: Form T-02-PS-01

Application Fee (Deposit): Application Fee of $ 1,500-00 (refer to fees and charges sheet)

SIGNATURE

Signature of owner/agent on behalf of and with the authority of the owner Roy Ronald Tay Jones

Owner Agent Date: 27-09-2021

Note: If acting "for and on behalf", please read the following declaration before signing:
"I hereby declare that I am authorised to act as Agent of the Owner"

KEY PERSONNEL

Name of Builder:	Phone Number:
Postal Address:	
	Registration Number:
E-mail Address:	
Name of Craftsman Plumber:	Phone Number:
Postal Address:	
	Registration Number:
E-mail Address:	
Name of Craftsman Gasfitter:	Phone Number:
Postal Address:	
	Registration Number:
E-Mail Address:	
Name of Registered Drain-layer:	Phone Number:
Postal Address:	
	Registration Number:
E-mail Address:	
Name of Designer: AJ Homes	Phone Number:
Postal Address: 42 Sherborne Street, Edgeware.	377 9051
	Registration Number:
E-mail Address: adam.edwards@ajhomes.co.nz	
Name of Engineer:	Phone Number:
Postal Address:	
	Registration Number:
E-mail Address:	
Name of Electrician:	Phone Number:
Postal Address:	
	Registration Number:
E-mail Address:	

BUILDING CODE ASSESSMENT (Not required for PIM only applications)

Producer Statements: It is intended that the following Producer Statement(s) will be relied upon to certify or verify compliance of the plans, specifications or completed works with the Building Code. **Note:** Applications including a PS 1 or PS 2 must be supplied with a copy of any design calculations.

✔ **PS 1 (Design)** **PS 2 (Design Review)** **PS 3 (Construction)** **PS 4 (Construction Review)**

The building work will comply with the building code as follows:

Building Code Clause (Identify which clauses will be involved in the building work)		Means of Compliance (note that a project may include both Acceptable and Alternative solutions)		
		Acceptable Solution / Verification Method (AS1, AS2, VM1, VM2 etc)	Alternative Solution (details verifying compliance required)	Waiver/ Modification (Provide sep. details for justification of acceptance)
B1	Structure	N/A ✔AS1 VM1 AS2 VM2 AS3 VM3 AS4 VM4	YES	YES
B2	Durability	N/A ✔AS1 VM1	YES	YES
C1-6	Protection from fire	✔N/A AS1 AS2 AS3 AS4 AS5 AS6 AS7 C/VM2	N/A	YES
D1	Access Routes	_ N/A ✔AS1 _ VM1	YES	YES
D2	Mechanical Installations for Access	✔N/A _ AS1 _ VM1 _ AS2 _ VM2 _ AS3 _ VM3	_ YES	_ YES
E1	Surface water	_ N/A ✔AS1 _ VM1	YES	YES
E2	External moisture	_ N/A ✔AS1 _ VM1 _ AS2 _ AS3	_ YES	_ YES
E3	Internal moisture	_ N/A ✔AS1 _ VM1	YES	YES
F1	Hazardous agents on site	✔N/A VM1	YES	YES
F2	Hazardous building materials	N/A ✔AS1	YES	YES
F3	Hazardous substances and processes	✔N/A VM1	YES	YES
F4	Safety from falling	N/A ✔AS1 VM1	YES	YES
F5	Construction and demolition hazards	N/A ✔AS1 VM1	YES	YES
F6	Lighting for emergency	✔N/A AS1 VM1	YES	YES
F7	Warning systems	N/A ✔AS1 VM1	YES	YES
F8	Signs	✔N/A AS1 VM1	YES	YES
F9	Fencing of swimming pools	✔N/A AS1 AS2	YES	YES
G1	Personal hygiene	N/A ✔AS1 VM1	_ YES	_ YES
G2	Laundering	_ N/A ✔AS1 _ VM1	YES	YES
G3	Food preparation and prevention of contamination	N/A ✔AS1 VM1	YES	YES
G4	Ventilation	_ N/A ✔AS1 _ VM1	YES	YES
G5	Interior environment	_ N/A ✔AS1 _ VM1	YES	YES
G6	Airborne and impact sound	N/A ✔AS1 VM1	_ YES	_ YES
G7	Natural light	N/A ✔AS1 VM1	YES	YES
G8	Artificial light	N/A ✔AS1 VM1	YES	YES
G9	Electricity	N/A ✔AS1 VM1	YES	YES
G10	Piped services	N/A ✔AS1 VM1	YES	YES
G11	Gas as an energy source	N/A ✔AS1 VM1	YES	YES
G12	Water supplies	N/A ✔AS1 AS2 VM1	YES	YES
G13	Foul water	N/A ✔AS1 VM1 AS2 VM2 AS3 VM4	YES	YES
G14	Industrial liquid waste	✔N/A AS1 VM1	YES	YES
G15	Solid waste	✔N/A AS1 VM1	YES	YES
H1	Energy efficiency provisions	_ N/A ✔AS1 _ VM1	YES	YES

COMPLIANCE SCHEDULE (Inspection, Maintenance and Reporting Procedures)

Do not fill in this section if this application is only for a project information memorandum

Are there specified systems in the building? Yes (No)

(If there are no specified systems, move on to section 8)

If existing building, please state the Building Warrant of Fitness Number:

Are any specified systems affected by this application? Yes No

(If yes, continue completing this section of the form, if no move on to section 8).

Total Occupancy Numbers:

Purpose Group *(select all relevant)*

CS	CL	CO	CM	SC	SD	SA	SR	SH	WL	WM	WH	WF	IA	ID

The following systems are existing, being altered, added to, or removed in the course of the building work	Existing	New	Altered	Removed	Inspection performance standards	Maintenance performance standards	Reporting frequency
1: Automatic Systems For Fire Suppression							
2: Automatic Or Manual Emergency Warning Systems							
3/1: Electromagnetic Or Automatic Doors Or Windows							
3/2: Access Control Doors							
3/3: Automatic Fire Doors Or Windows Forming Part Of Firewall							
4: Emergency Lighting Systems							
5: Escape Route Pressurisation Systems							
6: Riser Mains For Use By Fire Services							
7: Automatic Backflow Preventers							

8: Lifts, Escalators							
9: Mechanical Ventilation Or Air Conditioning Systems							
10: Building Maintenance Units							
11: Laboratory Fume Cupboards							
12: Audio Loops Or Other Assistive Listening Systems							
13: Smoke Control Systems							
14/1: Emergency Power Systems							
14/2: Signs Relating To A System Or Feature Specified In Any Clauses Above.							
15/1: Systems For Communicating Spoken Information Intended To Facilitate Evacuation							
15/2: Final Exits And Other Exit Doors							
15/3: Fire Separations Protecting A Means Of Escape							
15/4: Signs For Communicating Information Intended To Facilitate Evacuation							
15/5: Smoke Separations							
16: Cable cars							

Form 2A

Memorandum from licensed building practitioner: Certificate of design work

Section 45 and section 30c , Building Act 2004

The building

Street address of building: ***153 Innes Road***

Suburb: ***Amberley, HURUNUI***

Town/City: ***CHRISTCHURCH***

The owner

Name(s): ***Bryan & Philippa Donnelly***

Address: 176 Kivers Road, Burnham, CHRISTCHURCH

Telephone number: 027 375 1899

Email address: ***bryanvizbuilt@gmail.com***

Basis for providing this memorandum

I am providing this memorandum in my role as the:

() **Sole** designer of all 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 and 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

I ***AW Carleton*** carried out or supervised the following design work that is restricted building work:

Design work that is restricted building work	**Description**	**Carried out/ supervised**	**Reference to plans and specifications**
[Tick]	*[If appropriate, provide details of the restricted building work]*	*[Specify whether you carried out this design work or supervised someone else carrying out this design work]*	*[If appropriate, specify references]*
Primary structure – B1			
ALL RBW design work relating to **B1** (✓)	***EXCEPT TRUSS DESIGN***	() Carried out () Supervised	
Foundations and subfloor framing (✓)	***FIRTH RIB RAFT FLOOR***	() Carried out (✓) Supervised	***FIRTH & NZS 3604:2011 Section 3,4,5,6,7***
Walls (✓)	***Timber framed***	() Carried out (✓) Supervised	***NZS 3604:2011 Section 8,9,10,11***
Roof (✓)	***Timber trusses- PRECUT***	() Carried out (✓) Supervised	***Design & PS1 by PLACEMAKERS pre-cut attached***
Columns and beams (✓)	***Lintels & Beams- PRECUT SPECIFIED***	() Carried out (✓) Supervised	
Bracing (✓)	***GIB bracing***	() Carried out (✓) Supervised	***NZS 3604:2011 Section 4,5. GIB EZY BRACE***
Other ()		() Carried out (✓) Supervised	
External moisture management systems – E2			
ALL RBW design work relating to E2 (✓)		() Carried out (✓) Supervised	
Damp proofing (✓)		() Carried out (✓) Supervised	
Roof cladding or roof cladding system (✓)	***METALCRAFT LONGRUN COLORSTEEL ROOFING***	() Carried out (✓) Supervised	
Ventilation system *(for example, subfloor or cavity)* (✓)	***Ventilated cavity***	() Carried out (✓) Supervised	
Wall cladding or wall cladding system (✓)	***J/HARDIE AXON PANEL CAVITY FIXED***	() Carried out (✓) Supervised	***Full product specs attached. NZS3604:2011 section 11***

Waterproofing (✓)	***As per E2/AS1***	(✓) Carried out (✓) Supervised	
Other ()	***N/A***	() Carried out () Supervised	
Fire safety systems			
Emergency warning systems, evacuation and fire service operation systems, suppression or control systems, or other ()	***N/A***	() Carried out () 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.*

Note: continue on another page if necessary.

Are waivers or modifications of the building code required? () Yes (✓) No

If Yes, provide details of the waivers or modifications below:

Clause	**Waiver/modification required**

Note*: continue on another page if necessary.*

Issued by

Name:	***AW Carleton***			
LBP or registration number: ***BP110082***				
The practitioner is a:	(✓) Design LBP	( ) Registered architect	( )	Chartered professional engineer
Mailing address: ***P.O. Box 3011, Tauranga***				
Street address or registered office: ***459 Glue Pot Road, Tauranga***				
Phone number:	Landline:	Mobile:	***021 446 999***	
	Daytime:	After hours:		
Fax number:				
Email address: ***easylivingdesign@outlook.com***				
Website:				

Declaration

I ***Alastair W Carleton***

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:

(a) complies with the building code; or

~~(b) complies with the building code subject to any waiver or modification of the building code recorded on this form.~~

Signature:

Date: ***02 September 2021***

HURUNUI
District Council

Planning Check or Project Information Memorandum Declaration

In order for the Council to undertake a planning check or project information memorandum (PIM) to identify any restrictions that relate to the proposed building project, the Council requires basic information with respect to the requirements of the District Plan. As such the applicant (or agent) is required to complete the relevant sections of this declaration form. Please note that it is important that the applicant provide correct information in order for the Council to provide an accurate planning check or issue a PIM.

Applicant's Name	BRYAN AND PHILIPPA CONNELLY
Project Location	153 INNES ROAD
Proposal	BUILDING / DWELLING CONSENT

Please answer the following questions by marking the relevant box.

1. Will the proposed building be located within **50 metres of a forestry plantation** on a separate lot under different ownership?

   Yes ☐ No ☑

2. Will the proposed building require **earthworks** to be carried out within **20 metres** of any river, **50 metres** of any wetland, or **100 metres** from any lake?

   Yes ☐ No ☑

3. Will the proposed building be located:

   a. within **500 metres** of an intensive farming activity on a separate property?
      Yes ☑ No ☐
   b. within **500 metres** of a sewage treatment facility, including effluent ponds for on-farm waste disposal and land based effluent disposal areas on a separate property?
      Yes ☐ No ☑
   c. within **500 metres** of the operational area of a quarry or mine (excluding riverbed or on farm gravel extraction) on a separate property?
      Yes ☐ No ☑
   d. within **1km** of any frost control fan?
      Yes ☑ No ☐

4. Will the building be **closer than 100 metres** from a dwellinghouse or principal building on a separate property?

   Yes ☐ No ☑

5. Will the building be located on a **ridgeline**, where it will be visible against a backdrop of sky when viewed from any strategic arterial, district arterial, collector or Lake Sumner Road (including unformed sections), that are **within 1km** of the proposed building? (*Strategic arterial, district arterial and collector roads are listed overleaf.*)

   Yes ☐ No ☑

6. Is there an existing **accessway**, which will be used for this building, which complies with the District Plan standards? (An accessway is the area **between** the edge of the road formation and the boundary to the property)

   Yes ☑ No ☐ Not sure ☐

7. Is the site currently, or previously, or more likely than not to have been used for an activity on the Hazardous Activities and Industries List (HAIL) as attached to this form?

   Yes ☐ No ☐

8. Please complete this question if the building is to be located within the **Hanmer Basin Management Area**

   Cladding materials _____

   Walls Colour _____

   Roof Colour _____

   Trim Colour _____

DECLARATION

I declare that the information provided on this form is correct. I understand that if I provide false or misleading information, then the planning check undertaken by the Council may provide incorrect information with respect to compliance of the project with the District Plan.

Signature _____ Date 27-09-2021

Strategic arterial, District arterial & Collector roads within the Hurunui District:

Allandale Road, Amberley Beach Road, Ashworths Road (SH1), Balcairn Amberley Road, Balmoral Station Road, Claverley Rd (between SH1 Conway Flat Rd), Culverden Road (SH7), Domett Road (SH1), Douglas Road, Flintoff Mouse Point Road, Gemmells Road, Glasnevin Road (SH1), Gore Bay Road, Greta Road (SH1), Hanmer Springs Road (SH7A), Hawarden Waikari Road, Horsley Downs Road, Hundalee Road (SH1), Hursley Terrace Road, Inland Road, Karaka Road (SH7), Kings Road, Lake Sumner Road (between Horsley Downs Rd and Powers Road), Lawcocks Road, Leader Road East, Leader Road West, Leithfield Road, Leslie Hills Road, Lewis Pass Road (SH7), Motunau Beach Road, Mouse Point Road (SH7), Mt Brown Road, Mt Palm Road, Munro Road, Omihi Road (SH1), Parnassus Road (SH1), Pyramid Valley Road, Ram Paddock Road (between the Mt Brown Rd and Georges Rd), Rotherham Road North (SH7), Rotherham Road South (SH7), Scargill Valley Road, School Road, St Leonards Road, Stonyhurst Road (between SH1 and Blythe Rd), Station Road, Top Pahau Ford Road, Waikari Valley Road, Waipara Flat Road (SH7).

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**819722**
Land Registration District	**Canterbury**
Date Issued	22 June 2021

Prior References
754318

Estate	Fee Simple
Area	4.5694 hectares more or less
Legal Description	Lot 4 Deposited Plan 520186

Registered Owners

Bryan Donnelly and Philippa Anne Donnelly

Interests

Subject to Sections 6 & 8 Mining Act 1971

Subject to Section 3 Petroleum Act 1937

Subject to Section 3 Geothermal Energy Act 1953

Subject to Section 8 Atomic Energy Act 1945

Subject to Part IV A Conservation Act 1987

Subject to Sections 5 & 261 Coal Mines Act 1979

Land Covenant in Easement Instrument 10342105.1 - 11.8.2016 at 2:36 pm

PROPOSED NEW DWELLING

153 INNES ROAD
AMBERLEY, GLASNEVIN

For
Bryan & Pip Donnelly

ACOUSTIC REPORT

Prepared by
Earcon Acoustics Limited

For Consent

September 2021
Ref J004904

Level 26, PWC Tower - 188 Quay St – Akld 1010
Tel: 09 443 6410 **Fax:** 09 443 6415
PO Box 301561 Albany - North Shore – Akld 0752
Mob: 021 437893

QUALITY ASSURANCE

Document: **153 Innes Rd – New Dwelling**
Acoustic Report – For Consent

Contact	Issue	Date	Rev
Fadia Sami fadia.sami@earcon.co.nz 021 437893	For Consent	21-09-2021	0

Level 26, PWC Tower - 188 Quay St – Akld 1010
PO Box 301561 Albany - North Shore – Akld 0752
Tel: 09 443 6410 **Fax:** 09 443 6415 **Mob:** 021 437893

1. INTRODUCTION

This report addresses the requirements of meeting the internal noise limits within the new residential dwelling centrally on the site at 153 Innes Road, in Amberley, Glasnevin from external sources (mainly frost control fans) as required by the conditions of the Hurunui District Plan.

For this analysis, attention is confined to the building envelope construction for the purpose of meeting the internal noise limits from external sources; these being primarily Frost Control Fans

This report is based on the architectural drawings dated Jan 2019 by Trident Homes.

2. SITE

The proposed dwelling is to be located at 153 Innes Rd in Amberley, Glasnevin – zoned in accordance with the Hurunui District Plan as *Rural Zone*. The primary source of noise originates from Frost Control Fans in the vicinity.

Figure 1: Aerial view of site

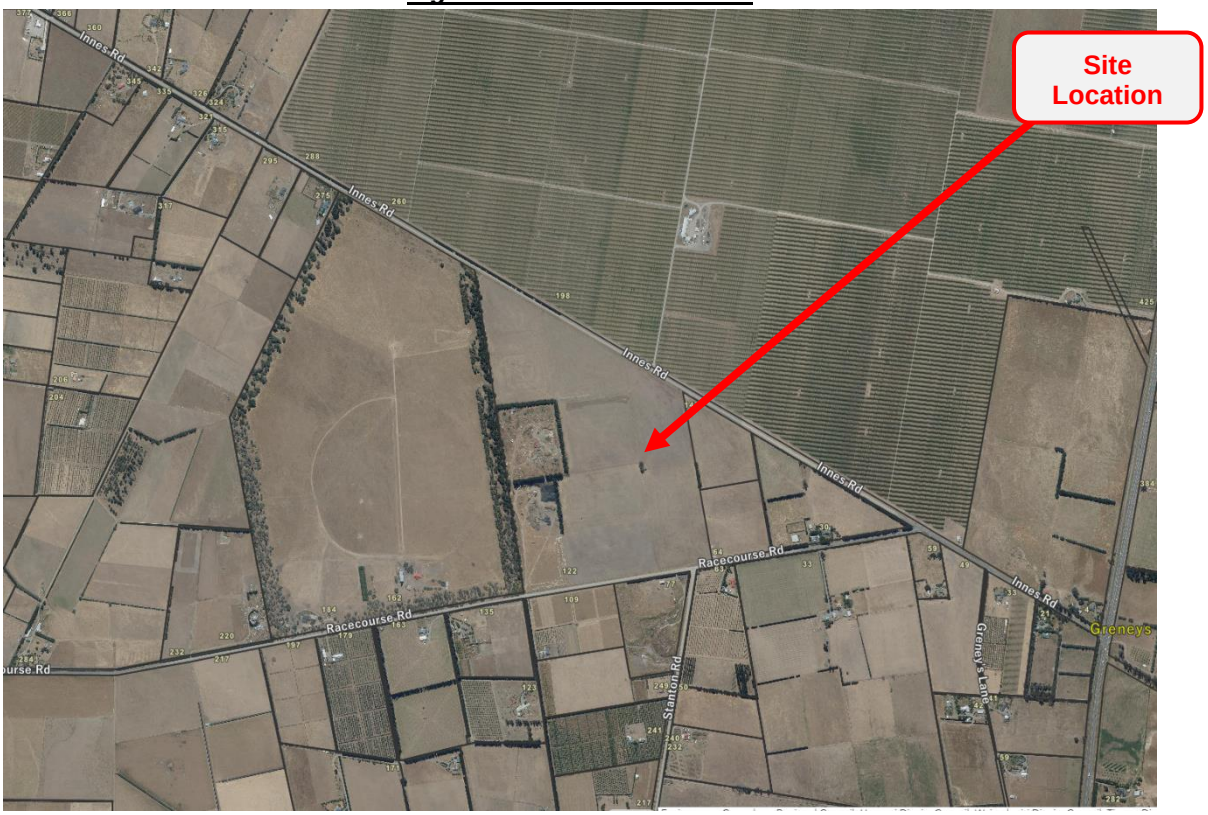
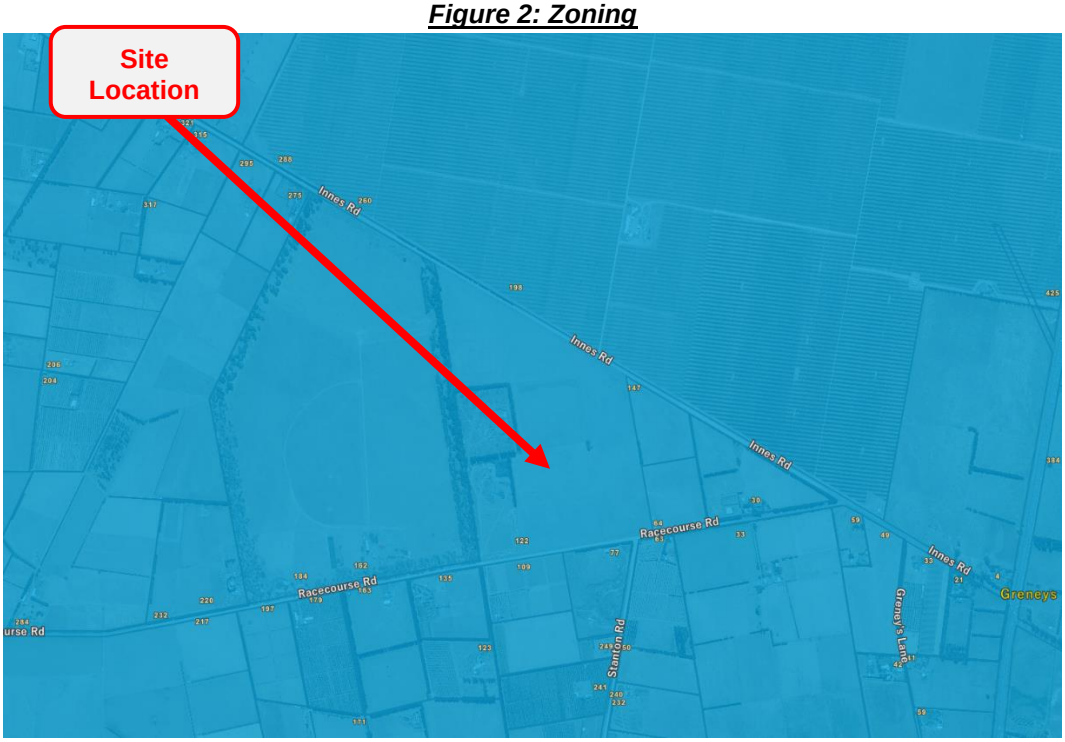


Figure 2: Zoning



3. REQUIREMENTS

The following conditions, as detailed in the Hurunui District Plan, apply:

- *Chapter 3 – Rural;*
  - *3.4 Rules*;
    - *3.4.3 Standards for permitted activities;*
      - *3.4.3.22 Acoustic insulation near frost control fans*

22. Acoustic insulation near frost control fans

(a) Any new dwelling located on a separate lot under different ownership within 1000 m of any frost control fan must be designed and constructed to ensure that the noise level inside any bedroom of the dwelling will not exceed 30 dB L_{Aeq} with all fans operating at normal duty. Compliance with this standard must be demonstrated by the production of a design certificate from an appropriately qualified and experienced acoustic engineer. The design certificate must be based either on actual noise measurements with all fans operating at normal duty, or on an assumed noise level from any one frost fan as shown below, corrected for the number of fans present at the time.

Octave centre frequency (dB)								
Hz	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**dB L_{Aeq}**
Design sound pressure level for one frost fan at 500 m	64	61	49	44	45	38	27	50

As per the requirements of the plan, it is noted that dwellings are required to comply with noise limit of **30dB L_{Aeq}** in bedrooms, with all fans operating at normal duty, as detailed in the frequency distribution Sound Pressure Levels in the rule above.

4. ENVIRONMENT

Figure 3 below, shows the locations of fans in the vicinity of the proposed dwelling

Figure 3: Locations of Fans

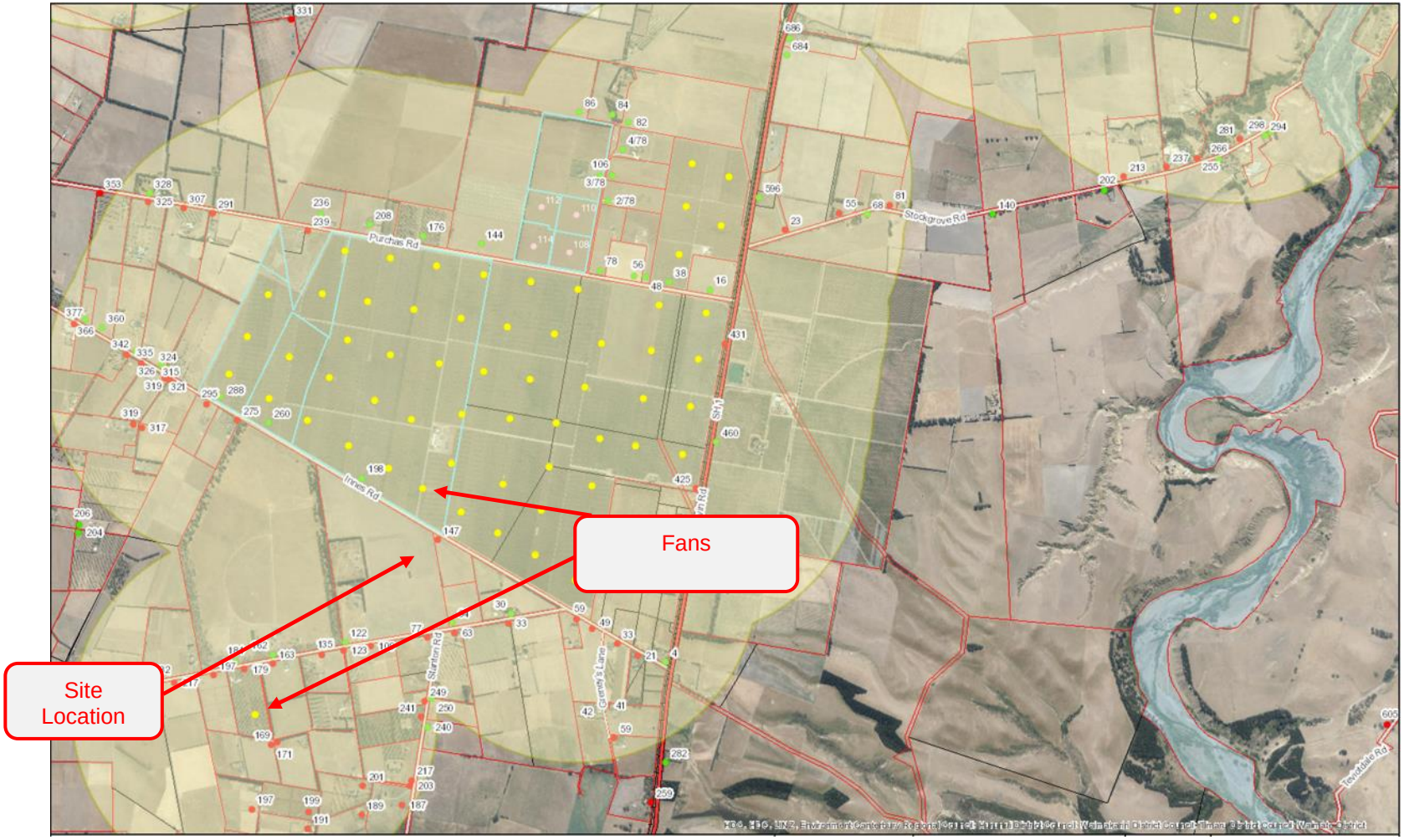
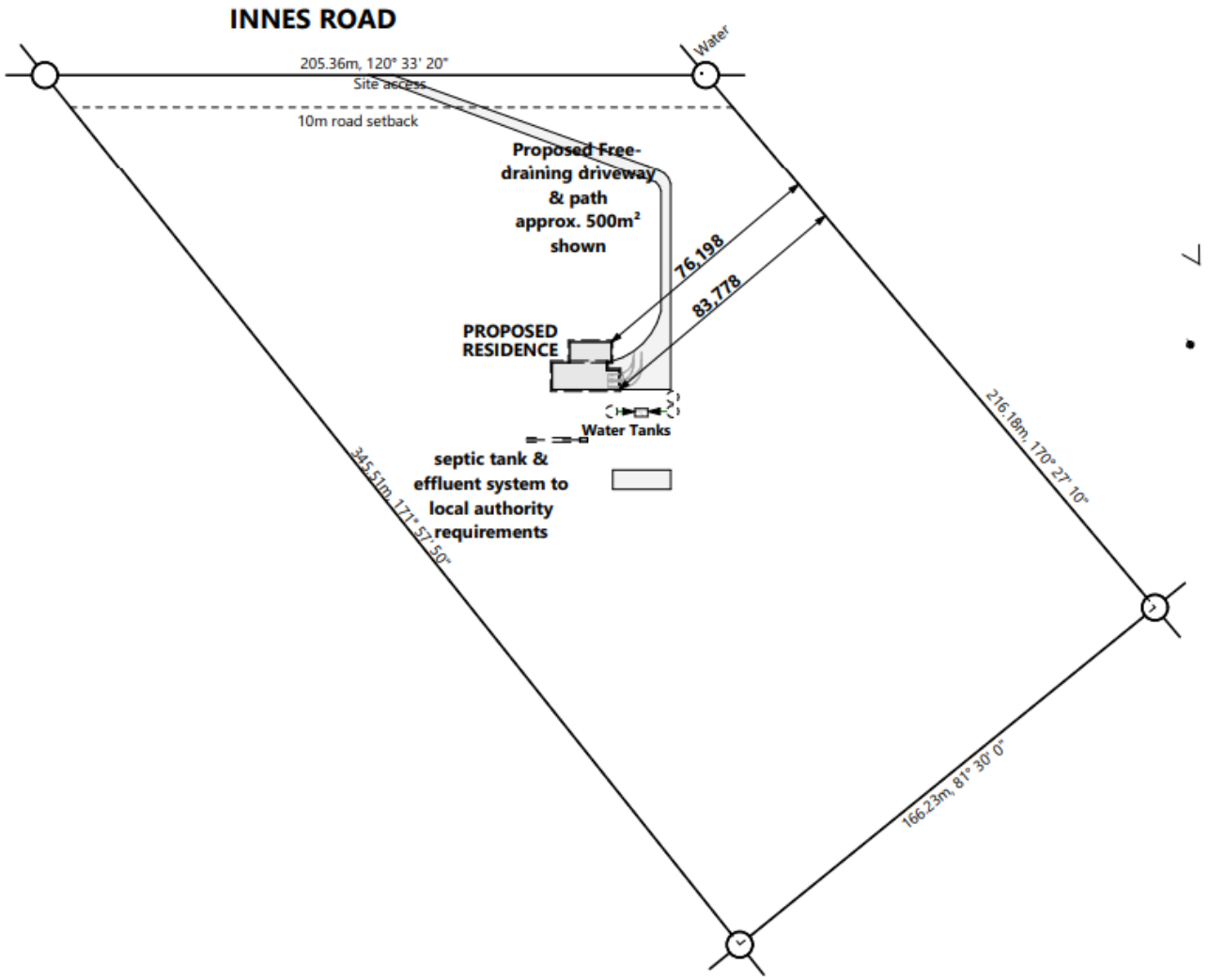


Figure 5 below, shows the location of the proposed dwelling:

Figure 4: Proposed Dwelling Location



5. NOISE MODELLING

To predict noise propagation at the subject site from the Fans, an environmental model was constructed for the area using the CadnaA version 2021 computer modelling program. The following applies to the modelling software CadnaA:

- The modelling method for noise propagation over distance is based on the international standard ISO 9613: “Acoustics – Attenuation of sound during propagation outdoors” methodology.
- The model allows importing digital ground elevation contours and data to define the topography, elevation and data for each of the noise sources, and the locations, geometry and elevations of the noise receivers.
- The program then calculates the LAeq dB level as the metric for the noise levels at the receivers for the purposes of this assessment.

The following legend identifies the colour codes of the modelled figures in the following section:

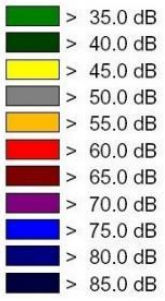


Figure 5: Predicted Noise Levels in Region

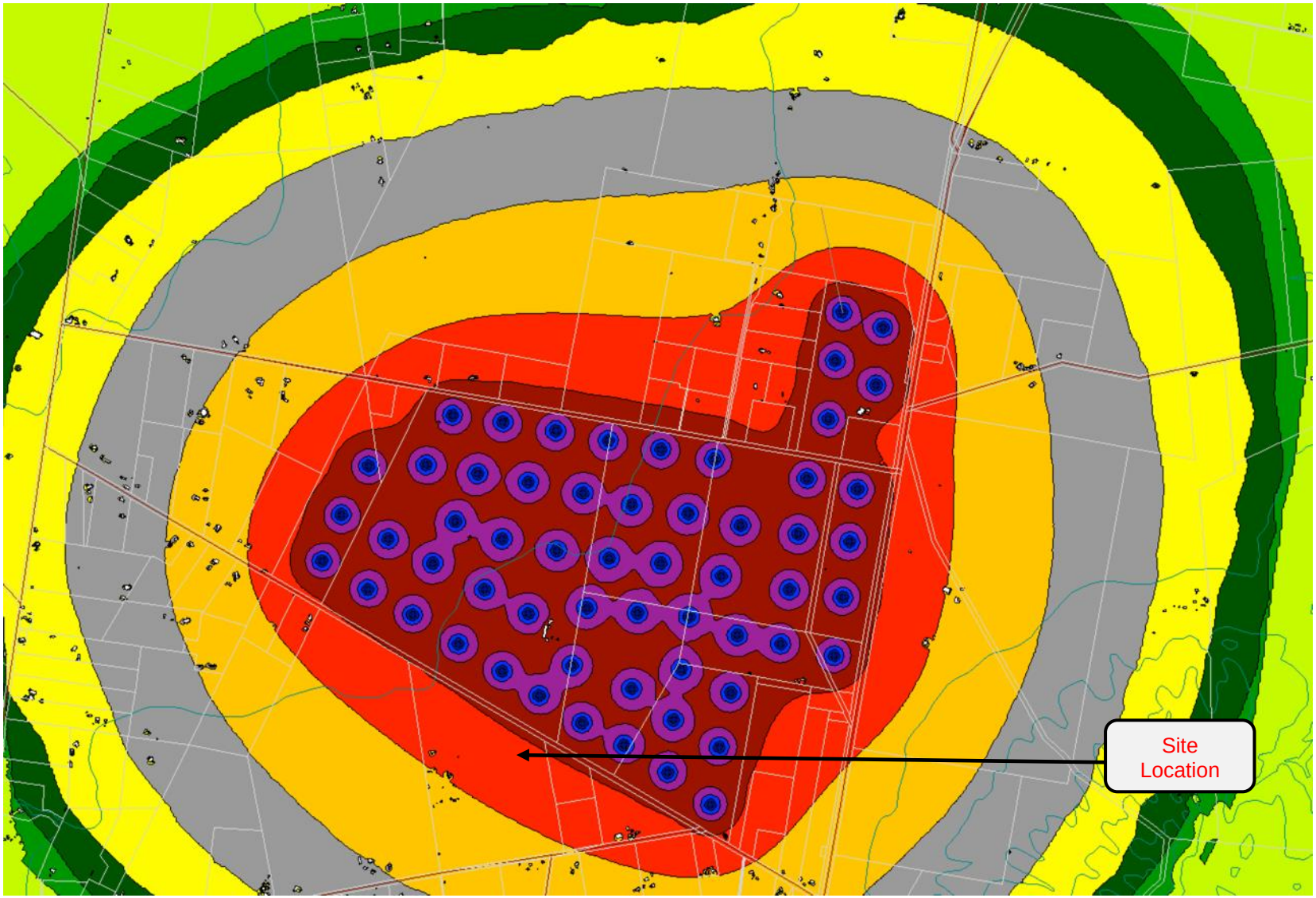


Figure 6: Predicted Noise Levels in Region – Aerial Overlay

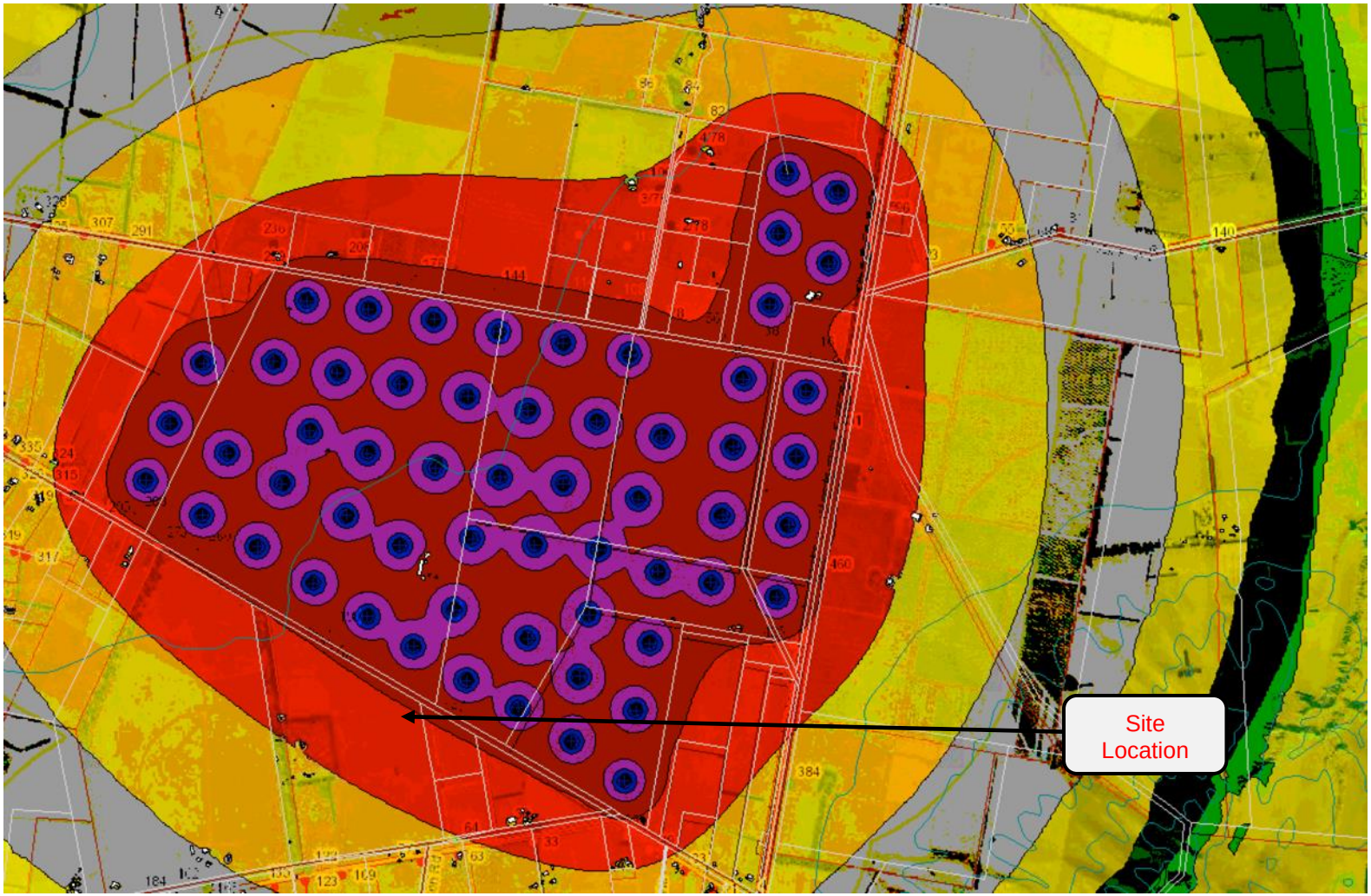
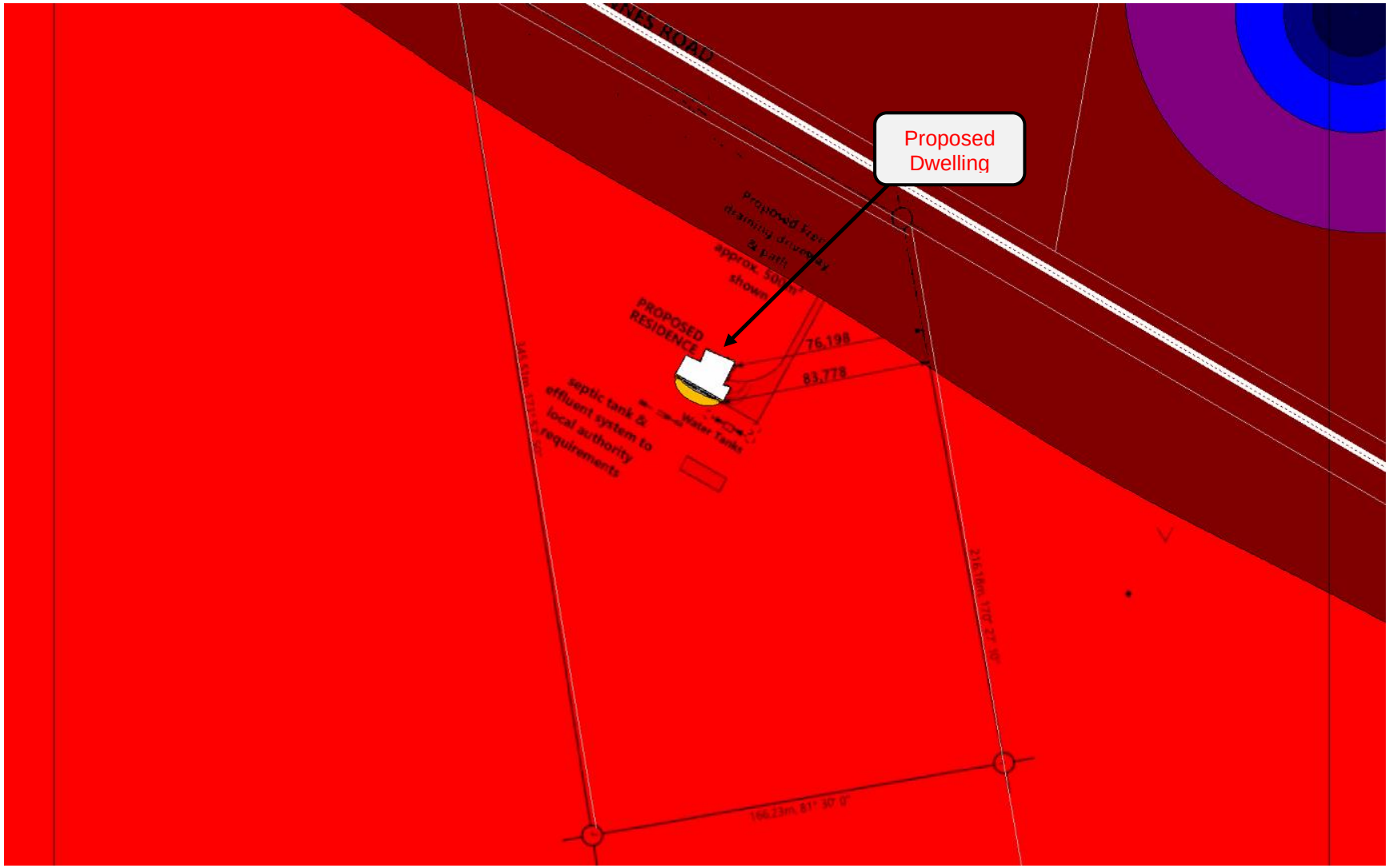


Figure 7: Predicted Noise Levels on Facades of Proposed Dwelling



6. BUILDING ENVELOPE

6.1 External Walls

Reference the architectural drawings the proposed cladding for the external walls is James Hardie Axon Panel cladding. This construction will be complete with thermal insulation (R1.8 minimum) and 13mm Gib Noiseline or equivalent plasterboard. This construction will be rated STC (Sound Transmission Class) above 45 and is acoustically suitable. The acoustic criterion requires all penetrations to be acoustically sealed.

6.2 Glazing

The following glazing systems are required in all bedrooms to maintain adequate internal noise levels, reducing the noise from the Frost Fans.

The windows to bedrooms 3 and 4 are required to have a minimum STC (Sound Transmission Class) 34 in order to meet the internal noise level. This can be achieved by a double glazed unit IGU (5mm / 14mm air space / 4mm). No minimum requirements apply to the windows of bedrooms 1 and 2.

The window suites / frames are required to match the STC ratings noted above, complete with compressible weather seals.

In order to meet the internal noise levels, windows in all bedrooms need to be closed. We would like to clarify that the windows are openable, i.e. those are not fixed windows.

6.3 Roof

The proposed roofing is Colorsteel Endura Trapezoidal Roofing. The roof system will be complete with R3.6 thermal insulation blanket and internal lining of 1x13mm Gib Noiseline or equivalent plasterboard, whereby the STC rating will be above 40.

Penetrations for light fittings in the ceiling are required to be restricted to 1x130mm diameter recessed light in the ceiling per 2m2 in order for sound insulation not to be adversely affected. The acoustic criterion requires all penetrations to be acoustically sealed.

6.4 Doors

Where external doors to bedrooms consist of glazing, the glazing shall be rated the same as the windows noted in section 5.2. External doors to be complete with compression seals.

7. CONCLUSIONS

In order to meet the internal noise levels in the new dwelling as set by the Hurunui District Plan, the requirements of section 6 must be applied

458 Manchester Street, St. Albans, Christchurch 8014
phone: 03 967 9523 | mobile: 021 804 843
email: christopher@sephira.nz
www.sephiraenvironmental.co.nz

1 August 2021

Warren Hislop
c/o Angelique Hyde
61 Watties Road
RD1
Amberley 7482

WHISLOP-A0630-002L-v0

Dear Warren

Re: Limited Detailed Site Investigation – 122 Racecourse Road, Amberley

At the advice of Angelique Hyde, you have engaged Sephira Environmental Limited (Sephira Environmental) to undertake a Limited Environmental Site Investigation on a portion of the property you own located at 122 Racecourse Road, Amberley (Figure 1, the site). The legal description of the site is Lot 3 DP 502943.

Figure 1: Site Location Map (source: mapviewer.canterburymaps.govt.nz)

Background

We understand that you own the land located at 122 Racecourse Road, Amberley (Figure 2), and that you are in the process of subdividing the land for rural residential land use. A Preliminary Site Investigation (PSI) undertaken by Fraser Thomas in 2018 found that,

Figure 2: The Full Property and Investigation Area (the Site) (source: mapviewer.canterburymaps.govt.nz)

except for a portion of land adjacent to the western site boundary that has been used as a scrap yard, no potential sources of contamination were identified, and the rest of the land was appropriate for subdivision.

However, due to a tyre fire that occurred within the scrap yard in late 2018, Hurunui District Council (HDC) has expressed concern about the potential that debris from the fire has contaminated the surrounding land with polycyclic aromatic hydrocarbons (PAH) and/or heavy metals. HDC has requested that a limited DSI be submitted with the resource consent application for the subdivision of the surrounding land, constituting proposed lots 5, 6, 7, 8, and 10. Figure 2 shows the entire property, the location of the tyre fire and the area covered by this investigation (red boundary line).

Sampling

On 22 July 2021 Sephira Environmental personnel visited the site to collect 22 surface soil samples. Surface soil sampling is considered appropriate in this case since the concern is that contaminants entrained in smoke from the fire were deposited onto the ground surface. Observations made during the sampling event indicate that the tyre fire was contained to the paddock west of the area being investigated. We observed a small soil bund on the boundary between proposed Lot 6 and the paddock to the west where the fire occurred. There was no evidence that potentially contaminated ash from the fire was physically conveyed by fire-fighting activities to the investigation area. Sample locations (S-1 to S-22) were evenly distributed across proposed Lots 5, 6, 7, 8, and the southern half of Lot 10, based on their respective proximity to the tyre fire location. All sampling locations are displayed in Figure 3. Photographs taken during the site visit are in Attachment A to this letter.

Figure 3: Approximate Sampling Locations (source: mapviewer.canterburymaps.govt.nz)

At each sampling location a pre-cleaned hand trowel was used to loosen soil to a depth of 0.15 m bgs. Freshly gloved hands and the hand trowel where then used to place a representative sample of soil into a clean, laboratory supplied glass jar. All jarred samples were labelled with a unique sample ID, the date, and the time of sampling, and then were stored in a chilly bin with freezer packs. Gloves were changed and hand tools were decontaminated with soap and water between each sample to prevent cross contamination.

On the day of the sampling event, all samples were transported under appropriate chain of custody to Analytica Laboratories in Christchurch, and then were transported by Laboratory courier to their Hamilton branch for analysis.

All samples were analysed for 10 heavy metals. The laboratory was also instructed to prepared seven (7) 2-part, 3-part or 4-part composite samples for analysis of polycyclic aromatic hydrocarbons (PAH). The composites were prepared as follows: Composite-1 had S-1, S-2, S-6 and S-7; Composite-2 had S-3, S-4, and S-5; Composite-3 had S-8, S-9, and S-10; Composite-4 had S-11, S-12, S-16, and S-17; Composite-5 had S-13, S-14, and S-15; Composite-6 had S-19 and S-20; and Composite-7 had S-21 and S-22 (Figure 3). The selection of which samples to composite together for PAH analysis was based on their proximity to the tyre fire. Additionally, sample S-18 was analysed for PAH as a discrete sample.

Results

The results of the soil metals laboratory analysis are presented in Table 1. The results of the soil PAH laboratory analysis are presented in Table 2. The results in both tables are compared to the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS 2011) Soil Contaminant Standard (SCS) applicable to rural residential land use and the regional background levels for heavy metals in soil (ECan 2007a) or the regional background levels for PAH in soil (ECan 2007b). The laboratory reports are included as Attachment B to this report.

The results indicate that, with one exception, all heavy metals concentrations in all samples were equal to or below the expected background level for the site. While boron is present at a concentration slightly higher than the expected regional background (ECan 2007a) at one location (S-1) in the southwest corner of proposed Lot 5, the consistency of all of the other heavy metals concentrations at this location and across the site at levels below the expected background concentrations indicates that this value is an outlier and not likely associated with the fire. The boron concentration at sample location S-1 is below the level that presents a risk to human health in a rural residential land use scenario (NESCS 2011).

The results of the PAH analysis on the seven composite samples and one discrete sample indicated that no PAH compound was present in any sample above their respective laboratory limit of detection. As no comparison was required, neither the applicable SCS

Table 1: Soil Metals Analytical Results

Sample Title Depth: 0.0-0.15 m bgs	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	Regional Background Soil Concentration[4]	Rural Residential / Lifestyle Block 25% Produce[3]
Arsenic	3.3	2.8	2.9	2.9	2.8	2.7	3.1	3.0	3.1	3.3	3.5	6.35	17
Beryllium	0.41	0.39	0.36	0.39	0.39	0.36	0.37	0.35	0.36	0.40	0.39	NA	60[5]
Boron	7.4	6.2	5.5	4.7	5.0	4.7	4.8	4.6	4.5	5.5	5.2	6.5	>10,000
Cadmium	0.11	0.10	0.073	0.093	0.10	0.086	0.095	0.076	0.091	0.11	0.12	0.14	0.8
Chromium	12	11	11	11	12	13.0	12	12	11	12	12.9	19.89	290
Copper	5.9	5.5	4.7	5.1	5.0	4.7	6.1	4.9	5.9	7.0	6.5	11.68	>10,000
Lead	10.3	8.87	8.80	9.98	9.30	8.51	9.55	8.96	9.27	10.1	9.75	19.75	160
Mercury	0.032	<0.025	<0.025	<0.025	<0.025	<0.025	0.026	<0.025	<0.025	<0.025	<0.025	0.07	200
Nickel	8.12	7.15	6.94	7.18	7.65	7.55	7.38	7.41	7.23	7.93	8.17	13.91	400[5]
Zinc	52.8	53.2	46.2	50.3	51.3	48.2	51.3	46.2	48.9	53.9	54.0	69.58	7,400[5]

Table 1 continued: Soil Metals Analytical Results

Sample Title Depth: 0.0-0.15 m bgs	S-12	S-13	S-14	S-15	S-16	S-17	S-18	S-19	S-20	S-21	S-22	Regional Background Soil Concentration[4]	Rural Residential / Lifestyle Block 25% Produce[3]
Arsenic	3.1	3.6	3.1	2.9	2.7	3.0	2.9	2.9	3.1	3.5	2.9	6.35	17
Beryllium	0.34	0.39	0.41	0.40	0.36	0.37	0.44	0.37	0.39	0.40	0.46	NA	60[5]
Boron	4.0	4.6	5.1	4.5	5.2	6.0	6.1	6.0	5.4	4.5	6.4	6.5	>10,000
Cadmium	0.10	0.12	0.085	0.10	0.077	0.076	0.081	0.12	0.13	0.10	0.084	0.14	0.8
Chromium	12	12	12.7	12	12	12	12	12	12	12.9	12	19.89	290
Copper	5.7	5.6	4.6	6.3	5.1	5.3	5.2	6.1	6.2	6.4	4.9	11.68	>10,000
Lead	9.62	8.94	9.17	9.09	8.29	8.72	9.85	9.10	8.89	9.64	9.32	19.75	160

Sample Title Depth: 0.0-0.15 m bgs	S-12	S-13	S-14	S-15	S-16	S-17	S-18	S-19	S-20	S-21	S-22	Regional Background Soil Concentration[4]	Rural Residential / Lifestyle Block 25% Produce[3]
Mercury	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.028	<0.025	<0.025	<0.025	0.030	0.07	200
Nickel	7.45	7.17	7.58	7.45	7.06	7.04	7.60	7.37	7.30	7.84	6.82	13.91	400[5]
Zinc	53.2	52.2	53.0	53.9	51.8	51.8	52.7	54.9	54.9	52.6	51.1	69.58	7,400[5]

Table 1 Notes:

1. All results, standard values and background concentrations presented in mg/kg.
2. **Bold Results** exceed the applicable soil contaminant standard. Underlined Results exceed the published Regional Background Concentration.
3. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS 2011), soil contaminant standards for rural residential land use.
4. ECan 2007a. Background Concentrations of Selected Trace Elements in Canterbury Soils, Addendum 1: Additional Samples and Timaru Specific Background Levels. Environment Canterbury Report R07/1/2, July 2007.
5. Guideline on the Investigation Levels for Soil and Groundwater, National Environmental Protection Measure (NEPM), Assessment of Site Contamination (National Environmental Protection Council, NEPC, Australia 1999, updated 2013).

Table 2: Soil PAH Analytical Results

Sample Title	Composite-1	Composite-2	Composite-3	Composite-4	Composite-5	Composite-6	Composite-7	S-18	Regional Background Soil Concentration[4]	Rural Residential / Lifestyle Block 25% Produce[3]
Sub-Samples	**S-1, S-2, S-6, S-7**	**S-3, S-4, S-5**	**S-8, S-9, S-10**	**S-11, S-12, S-16, S-17**	**S-13, S-14, S-15**	**S-19, S-20**	**S-21, S-22**	**Discrete Sample**		
BaP_{equiv}[9]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.922	6

Table 2 Notes:

1. All results, standard values and background concentrations presented in mg/kg.
2. **Bold Results** exceed the applicable soil contaminant standard. Underlined Results exceed the published Regional Background Concentration.
3. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS 2011), soil contaminant standards for applicable land use.
4. ECan 2007b. Background Concentrations of Polyaromatic Hydrocarbons in Christchurch Urban Soils. Environment Canterbury Report No. R07/19, July 2007.
5. For benzo(a)pyrene, the equivalent BaP concentration is calculated as the sum of each of the detected concentrations of nine carcinogenic PAHs (benzo(a)anthracene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene and indeno(1,2,3-cd) pyrene), multiplied by their respective potency equivalency factors.

nor the expected regional background concentrations were adjusted to account for the compositing.

Conclusions and Recommendations

At the advice of Angelique Hyde, you engaged Sephira Environmental Limited (Sephira Environmental) to undertake a Limited Environmental Site Investigation on a portion of the property located at 122 Racecourse Road, Amberley.

You propose to subdivide the land for rural residential land use. A PSI undertaken by Fraser Thomas in 2018 found that, with the exception of a portion of land adjacent to the western site boundary that has been used as a scrap yard, no potential sources of contamination were identified, and the rest of the land was appropriate for subdivision including the area that is the subject of this DSI.

However, Hurunui District Council has requested that a limited DSI be submitted with the resource consent application for the subdivision of the portion of land constituting proposed Lots 5, 6, 7, 8, and 10, due to their concern about a tyre fire that occurred within the scrap yard in late 2018. Their concern was about the potential that debris from fire or contaminated smoke has contaminated the surrounding land with contaminants associated with the fire (polycyclic aromatic hydrocarbons (PAH) and heavy metals).

Sephira Environmental collected 22 evenly distributed surface soil samples across proposed Lots 5, 6, 7, 8, and the southern half of Lot 10, based on their respective proximity to the tyre fire location. All samples were analysed for heavy metals. Additionally, seven 2-part, 3-part or 4-part composite samples prepared by the laboratory and one discrete sample were analysed for PAHs.

The results indicated that all metals were within the range of the expected regional background concentrations (ECan 2007a) for the site. Additionally, no PAHs were detected above the laboratory limit of detection in any sample.

Based on the sampling results it is our opinion that the land is unlikely to present a risk to human health if the subdivision were to proceed. Furthermore, if any soil must be removed from proposed Lots 5, 6, 7, 8 and 10 as part of any future development works, it can be considered cleanfill for off-site disposal purposes.

In accordance with Canterbury Regional Land and Water Plan Rule 5.185, a copy of this investigation report will be provided to Environment Canterbury.

SQEP Declaration

Christopher and Helen Mongillo oversaw the sampling, data interpretation and preparation of this report. They are suitably qualified and experienced professionals (SQEPs) as required by Regulation 3 (a) of the NESCS (2011) and as defined in Section 2.1.1 of the Draft Users' Guide, NESCS, November 2011. They are recognised by multiple regional and district

councils as SQEPs. They each have relevant tertiary degrees and over 30 years of contaminated land and water investigation, risk assessment and site remediation experience, which includes decades of hands-on field experience overseen by experts in these disciplines.

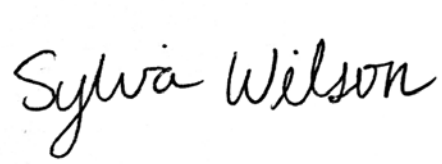
Report Limitations

1. The document was prepared based on a site-specific scope agreed between the client and Sephira Environmental Limited which has a specific purpose and it is not intended to be used for any other purpose. These purposes were outlined in the proposal to the client.
2. The methods used are those described in the report and methods not specified cannot be assumed to have been undertaken.
3. The results are based on published information and data from the site and we provide no warrantee that the conditions will be exactly as represented in the report. Due to the variability of site conditions the document cannot be held to represent a complete understanding of the conditions of a site and we assume no responsibility for unexpected conditions which may be discovered.
4. The document only describes the site conditions at the time the report was prepared. Changes to the site or near the site due to the effects of time or changes in legislation may occur which render the report conclusions as inapplicable.
5. The document was prepared with the standard of care generally accepted at the time it was prepared and no other warrantee is expressed or implied in regard to the conclusions of this report.
6. We accept no responsibility for the information provided to us for use in the document. It is assumed to be accurate as received regardless of the source. We have made no independent verification of the data received, beyond the agreed scope of the work.
7. We accept no responsibility to any third party or their actions related to reliance on this document. We prepared the document for the client only or for specific third parties who are authorised in the report.
8. This report should be read in full and we accept no responsibility for use of any part of the report.
9. This report does not include legal advice which should be gained from professional practitioners.

Closure

Sephira Environmental appreciates the opportunity to provide you with these environmental consulting services. If you have any questions or comments regarding this letter report please do not hesitate to contact me at your convenience, otherwise I look forward to working with you again in the near future.

Kind regards,



Sylvia Wilson
Environmental Scientist
Letter reviewed by:

Christopher B. Mongillo
Director, Principal Environmental Scientist
Suitably Qualified and Experienced Environmental Practitioner
Sephira Environmental Limited
www.sephiraenvironmental.co.nz

References:

ECan 2007a. Background Concentrations of Selected Trace Elements in Canterbury Soils, Addendum 1: Additional Samples and Timaru Specific Background Levels. Environment Canterbury Report R07/1/2, July 2007.

ECan 2007b. Background Concentrations of Polyaromatic Hydrocarbons in Christchurch Urban Soils. Environment Canterbury Report No. R07/19, July 2007.

MfE 2011. Contaminated Land Management Guidelines No. 1 - Guidelines for Reporting on Contaminated Sites in New Zealand. Ministry for the Environment (MfE) 2011.

NESCS 2011. Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. Came in force on 1 January 2012.

Attachments:

A: Site Photos
B: Laboratory Results

Attachment A – Site Photos

Photo A2: Looking west from earthen bund separating tyre fire from Proposed Lot 6. Fire remnants under plastic sheeting in mid-background. Note approximately 20 m gap between paddock boundary where photographer is standing and nearest edge of fire.

Photo A2: Looking east across proposed Lot 6 from same location as Photo A1 (above). No evidence of ash, debris or staining observed on the ground surface at this location or in any other portion of the investigation area.

Photo A3: General condition of Proposed Lots 5, 6, 7, 8 and 10 on day of site visit.

Attachment B – Laboratory Report

Analytica Laboratories Limited
Ruakura Research Centre
10 Bisley Road
Hamilton 3214, New Zealand
Ph +64 (07) 974 4740
sales@analytica.co.nz
www.analytica.co.nz

Certificate of Analysis

Sephira Environmental
458 Manchester Street, St Albans
Christchurch 8014

Attention: Christopher Mongillo
Phone: 021 804 843
Email: christopher@sephira.nz

Sampling Site: 122 Racecourse Road

Lab Reference: 21-32436
Submitted by: Christopher Mongillo
Date Received: 23/07/2021
Testing Initiated: 23/07/2021
Date Completed: 28/07/2021
Order Number: A0630
Reference: A0630

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

		Client Sample ID	S-1 0-150	S-2 0-150	S-6 0-150	S-7 0-150	S-3 0-150
		Date Sampled	22/07/2021	22/07/2021	22/07/2021	22/07/2021	22/07/2021
Analyte	Unit	*Reporting Limit*	21-32436-1	21-32436-2	21-32436-3	21-32436-4	21-32436-5
Arsenic	mg/kg dry wt	*0.125*	3.3	2.8	2.7	3.1	2.9
Beryllium	mg/kg dry wt	*0.013*	0.41	0.39	0.36	0.37	0.36
Boron	mg/kg dry wt	*1.25*	7.4	6.2	4.7	4.8	5.5
Cadmium	mg/kg dry wt	*0.005*	0.11	0.10	0.086	0.095	0.073
Chromium	mg/kg dry wt	*0.125*	12	11	13.0	12	11
Copper	mg/kg dry wt	*0.075*	5.9	5.5	4.7	6.1	4.7
Lead	mg/kg dry wt	*0.25*	10.3	8.87	8.51	9.55	8.80
Mercury	mg/kg dry wt	*0.025*	0.032	<0.025	<0.025	0.026	<0.025
Nickel	mg/kg dry wt	*0.05*	8.12	7.15	7.55	7.38	6.94
Zinc	mg/kg dry wt	*0.05*	52.8	53.2	48.2	51.3	46.2

Heavy Metals in Soil

		Client Sample ID	S-4 0-150	S-5 0-150	S-8 0-150	S-9 0-150	S-10 0-150
		Date Sampled	22/07/2021	22/07/2021	22/07/2021	22/07/2021	22/07/2021
Analyte	Unit	*Reporting Limit*	21-32436-6	21-32436-7	21-32436-8	21-32436-9	21-32436-10
Arsenic	mg/kg dry wt	*0.125*	2.9	2.8	3.0	3.1	3.3
Beryllium	mg/kg dry wt	*0.013*	0.39	0.39	0.35	0.36	0.40
Boron	mg/kg dry wt	*1.25*	4.7	5.0	4.6	4.5	5.5
Cadmium	mg/kg dry wt	*0.005*	0.093	0.10	0.076	0.091	0.11
Chromium	mg/kg dry wt	*0.125*	11	12	12	11	12
Copper	mg/kg dry wt	*0.075*	5.1	5.0	4.9	5.9	7.0

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation with the exception of tests marked *, which are not accredited.
This test report shall not be reproduced except in full, without the written permission of Analytica Laboratories.

Heavy Metals in Soil

Client Sample ID			S-4 0-150	S-5 0-150	S-8 0-150	S-9 0-150	S-10 0-150
Date Sampled			22/07/2021	22/07/2021	22/07/2021	22/07/2021	22/07/2021
Lead	mg/kg dry wt	*0.25*	9.98	9.30	8.96	9.27	10.1
Mercury	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Nickel	mg/kg dry wt	*0.05*	7.18	7.65	7.41	7.23	7.93
Zinc	mg/kg dry wt	*0.05*	50.3	51.3	46.2	48.9	53.9

Heavy Metals in Soil

Client Sample ID			S-11 0-150	S-12 0-150	S-16 0-150	S-17 0-150	S-13 0-150
Date Sampled			22/07/2021	22/07/2021	22/07/2021	22/07/2021	22/07/2021
Analyte	Unit	*Reporting Limit*	21-32436-11	21-32436-12	21-32436-13	21-32436-14	21-32436-15
Arsenic	mg/kg dry wt	*0.125*	3.5	3.1	2.7	3.0	3.6
Beryllium	mg/kg dry wt	*0.013*	0.39	0.34	0.36	0.37	0.39
Boron	mg/kg dry wt	*1.25*	5.2	4.0	5.2	6.0	4.6
Cadmium	mg/kg dry wt	*0.005*	0.12	0.10	0.077	0.076	0.12
Chromium	mg/kg dry wt	*0.125*	12.9	12	12	12	12
Copper	mg/kg dry wt	*0.075*	6.5	5.7	5.1	5.3	5.6
Lead	mg/kg dry wt	*0.25*	9.75	9.62	8.29	8.72	8.94
Mercury	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Nickel	mg/kg dry wt	*0.05*	8.17	7.45	7.06	7.04	7.17
Zinc	mg/kg dry wt	*0.05*	54.0	53.2	51.8	51.8	52.2

Heavy Metals in Soil

Client Sample ID			S-14 0-150	S-15 0-150	S-19 0-150	S-20 0-150	S-21 0-150
Date Sampled			22/07/2021	22/07/2021	22/07/2021	22/07/2021	22/07/2021
Analyte	Unit	*Reporting Limit*	21-32436-16	21-32436-17	21-32436-18	21-32436-19	21-32436-20
Arsenic	mg/kg dry wt	*0.125*	3.1	2.9	2.9	3.1	3.5
Beryllium	mg/kg dry wt	*0.013*	0.41	0.40	0.37	0.39	0.40
Boron	mg/kg dry wt	*1.25*	5.1	4.5	6.0	5.4	4.5
Cadmium	mg/kg dry wt	*0.005*	0.085	0.10	0.12	0.13	0.10
Chromium	mg/kg dry wt	*0.125*	12.7	12	12	12	12.9
Copper	mg/kg dry wt	*0.075*	4.6	6.3	6.1	6.2	6.4
Lead	mg/kg dry wt	*0.25*	9.17	9.09	9.10	8.89	9.64
Mercury	mg/kg dry wt	*0.025*	<0.025	<0.025	<0.025	<0.025	<0.025
Nickel	mg/kg dry wt	*0.05*	7.58	7.45	7.37	7.30	7.84
Zinc	mg/kg dry wt	*0.05*	53.0	53.9	54.9	54.9	52.6

Heavy Metals in Soil

Client Sample ID			S-22 0-150	S-18 0-150
Date Sampled			22/07/2021	22/07/2021
Analyte	Unit	*Reporting Limit*	21-32436-21	21-32436-22
Arsenic	mg/kg dry wt	*0.125*	2.9	2.9
Beryllium	mg/kg dry wt	*0.013*	0.46	0.44
Boron	mg/kg dry wt	*1.25*	6.4	6.1
Cadmium	mg/kg dry wt	*0.005*	0.084	0.081
Chromium	mg/kg dry wt	*0.125*	12	12
Copper	mg/kg dry wt	*0.075*	4.9	5.2
Lead	mg/kg dry wt	*0.25*	9.32	9.85
Mercury	mg/kg dry wt	*0.025*	0.030	0.028

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Heavy Metals in Soil

			Client Sample ID	S-22 0-150	S-18 0-150
			Date Sampled	22/07/2021	22/07/2021
Nickel	mg/kg dry wt	*0.05*		6.82	7.60
Zinc	mg/kg dry wt	*0.05*		51.1	52.7

Polycyclic Aromatic Hydrocarbons - Soil

			Client Sample ID	S-18 0-150	Composite 1 (S-1, S-2, S-6, S-7)	Composite 2 (S-3, S-4, S-5)	Composite 3 (S-8, S-9, S-10)	Composite 4 (S-11, S-12, S-16, S-17)
			Date Sampled	22/07/2021				
Analyte	Unit	*Reporting Limit*		21-32436-22	21-32436-23	21-32436-24	21-32436-25	21-32436-26
1-Methylnaphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[a]pyrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Benzo[b]&[j] fluoranthene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[g,h,i]perylene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[k]fluoranthene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
Fluorene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	*0.03*		0.030	0.030	0.030	0.030	0.030
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene-d10 (Surrogate)	%	*1*		100	100	100	100	100

Polycyclic Aromatic Hydrocarbons - Soil

			Client Sample ID	Composite 5 (S-13, S-14, S-15)	Composite 6 (S-19, S-20)	Composite 7 (S-21, S-22)
			Date Sampled			
Analyte	Unit	*Reporting Limit*		21-32436-27	21-32436-28	21-32436-29
1-Methylnaphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Acenaphthene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Anthracene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020
Benzo[a]pyrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Benzo[b]&[j] fluoranthene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020
Benzo[g,h,i]perylene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020
Benzo[k]fluoranthene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Chrysene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010

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Polycyclic Aromatic Hydrocarbons - Soil

			Client Sample ID	Composite 5 (S-13, S-14, S-15)	Composite 6 (S-19, S-20)	Composite 7 (S-21, S-22)
			Date Sampled			
Dibenz(a,h)anthracene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Fluoranthene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020
Fluorene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Naphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Phenanthrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Pyrene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	*0.03*		0.030	0.030	0.030
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Anthracene-d10 (Surrogate)	%	*1*		110	100	100

Moisture Content

			Client Sample ID	S-18 0-150	Composite 1 (S-1, S-2, S-6, S-7)	Composite 2 (S-3, S-4, S-5)	Composite 3 (S-8, S-9, S-10)	Composite 4 (S-11, S-12, S-16, S-17)
			Date Sampled	22/07/2021				
Analyte	Unit	*Reporting Limit*		21-32436-22	21-32436-23	21-32436-24	21-32436-25	21-32436-26
Moisture Content	%	*1*		21	22	21	23	21

Moisture Content

			Client Sample ID	Composite 5 (S-13, S-14, S-15)	Composite 6 (S-19, S-20)	Composite 7 (S-21, S-22)
			Date Sampled			
Analyte	Unit	*Reporting Limit*		21-32436-27	21-32436-28	21-32436-29
Moisture Content	%	*1*		24	25	20

Method Summary

Elements in Soil

Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

PAH in Soil

Solvent extraction, silica cleanup, followed by GC-MS analysis.
Benzo[a]pyrene TEQ (LOR): The most conservative TEQ estimate, where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the TEQ for that PAH.
Benzo[a]pyrene TEQ (Zero): The least conservative TEQ estimate, PAHs reported as less than the limit of reporting (LOR) are not included in the TEQ calculation.
Benzo[a]pyrene toxic equivalence (TEQ) is calculated according to *'Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health'*. Ministry for the Environment. 2011. (In accordance with in-house procedure).

Moisture

Moisture content is determined gravimetrically by drying at 103 °C.

Emily Hanna, B.Sc.
Trace Elements Team Leader

Rong Zhang
Technician

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ENVIRONMENTAL TESTING:

CHAIN OF CUSTODY

ANALYTICA LABORATORIES

CLIENT INFORMATION				Page #	1	of	2
Client	SEPHIRA ENVIRONMENTAL			Customer Comments / Instructions			
Address	CHRISTCHURCH						
Project Leader	CHRISTOPHER MONTGILLO						
Project ID	A0630	PO #	A0630				
Site	122 RACECOURSE RD.						
Sampler	CHRISTOPHER MONTILLO						
Phone	021 804 843						
Email	CHRISTOPHER@SEPHIRA.NZ						
Invoice Email	SYLVIA@SEPHIRA.NZ						

21-32436

LABORATORY USE ONLY								
Laboratory Job #	21-32436			Seal Status		Priority (mark with X)		
Date Received	23/7/21	Received By		Sample Temp Status		Routine		Urgent

TESTS REQUESTED

Lab ID	Sample ID	Depth	Date	Time	Matrix	# Cont.	Analysis Requests/Suites: 10 HEAVY METALS		Composit for PAH		Sample Comments
	S-1	0-150	22/7/21	10 47	S or W	1	✓				
	S-2			10 50	S or W	1	✓				
	S-6			11 06	S or W	1	✓				
	S-7			11 07	S or W	1	✓				
	S-3			1055	S or W	1	✓			✓	
	S-4			11 00	S or W	1	✓				
7	S-5			1105	S or W	1	✓				
	S-8			1108	S or W	1	✓			✓	
	S-9			1109	S or W	1	✓				
	S-10			11 10	S or W	1	✓				
	S-11			11 16	S or W	1	✓				
	S-12			11 17	S or W	1	✓			✓	
	S-16			11 28	S or W	1	✓				
14	S-17			11 30	S or W	1	✓				
	S-13			11 20	S or W	1	✓				
	S-14			11 21	S or W	1	✓			✓	
	S-15			11 23	S or W	1	✓				
	~~S-18~~			~~11 31~~	S or W	1	✓				~~NO PAH~~ NO PAH

Samples transferred to: Auckland / Hamilton / Wellington / Christchurch ✓ / Dunedin
Date: 22/07/21 Initials: KE

Relinquished by		Received by		Courier	
Date	22/7/21 Time 13 58	Date	23/7/21 Time 7AM	Courier #	NZC 8042000957

ENVIRONMENTAL TESTING:

CHAIN OF CUSTODY

ANALYTICA LABORATORIES

CLIENT INFORMATION				Page #	2	of	2
Client	SEPHIRA ENVIRONMENTAL			Customer Comments / Instructions			
Address	CHRISTCHURCH						
Project Leader	CHRISTOPHER MONGILLO						
Project ID	A0630	PO #	A0630				
Site	122 RACECOURSE RD						
Sampler	CHRISTOPHER MONGILLO						
Phone	021 804 843						
Email	CHRISTOPHER@SEPHRA.NZ						
Invoice Email	SYLVIA@SEPHIRA.NZ						

LABORATORY USE ONLY								
Laboratory Job #	21-32436			Seal Status		Priority (mark with X)		
Date Received	23/7/21	Received By		Sample Temp Status		Routine		Urgent

TESTS REQUESTED

Lab ID	Sample ID	Depth	Date	Time	Matrix	# Cont.	Analysis Requests/Suites: 10 HEAVY METALS			COMPOSITE FOR PAH	INDIVIDUAL PAH	Sample Comments
	S-19	0-150	22/7/21	11 34	S or W	1	✓			✓		
	S-20	↓	/ /	11 37	S or W	1	✓					
	S-21	↓	/ /	11 43	S or W	1	✓			✓		
21	S-22	↓	↓	11 45	S or W	1	✓					
	S-18	0-150	22/7/21	11 31	S or W	1	✓				✓	
			/ /	:	S or W							
			/ /	:	S or W							
			/ /	:	S or W							
			/ /	:	S or W							
			/ /	:	S or W							
			/ /	:	S or W							
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			/ /	:	S or W							
			/ /	:	S or W							
			/ /	:	S or W							

Relinquished by		Received by		Courier	
Date	22/7/21	Time	1358	Date	/ /	Time	:	Courier #	

Analytica Laboratories Ltd
Ruakura Research Centre
10 Bisley Road, Private Bag 3123
Hamilton 3240, New Zealand
Phone +64 7 974 4740
Email enviro.reception@analytica.co.nz
analytica.co.nz

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Christchurch 8441
Phone: 03 696 2812
www.austinbluewater.co.nz

PS1 Design

On site Wastewater system and Land Application for

Bryan Donnelly

153 Innes Road, Amberley

Lot 4 DP 502943

Po Box 16865, Hornby,
Christchurch 8441
Phone: 03 696 2812
www.austinbluewater.co.nz

12th October 2021

To Hurunui District Council

I, Joe Drury herby confirm that the sewage Land Application system for the above site, has been designed with sound and widely accepted principles to adequately dispose of the sewage effluent on site.

The standard of effluent treatment will meet and /or exceed the level specified within the Council recommendations for sewage treatment where municipal treatment is unavailable. The specified system will comply with AS/NZS 1547:2012 where applicable.

The design is detailed in the Specification and Working Drawings included in this document. As an independent suitably experienced design professional*, covered by a current policy of professional indemnity insurance (to indemnity value of $5,000,000), I believe on reasonable grounds that this system will adequately dispose of effluent on site and comply with N.Z Building Code G13.2, G13.3.4, G13/VM4 of the Building Regulation 1992 First Schedule and shall continue to satisfy the performance requirements of the First Schedule, Clause B2.3.1 (b) of the Building Amendment Reg 1997. Provided the system is installed as per specifications and the owner operates and maintains the system as detailed in the Owner's Manual, this Wastewater Treatment System will perform at the levels indicated.

Designed By:

Beth Roche
Wastewater Design

Reviewed By:

Joe Drury
General Manager

20 Illinios Drive
Rolleston
Christchurch

Office phone: 0800 287 846
Website: www.austinbluewater.co.nz

**Suitably qualified person being one who has such extensive experience and expertise which is proven to be equivalent to that qualification in the field of Wastewater Treatment Systems & Design".*

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Site Investigation: 5
Topography / Elevation Profile of LAS Envelope: 5
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Company Profile 15
Service Contract for Your Austin Bluewater ABS 2000 Series 19

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PS1 Design

On site Wastewater system and Land Application

This statement provides design specifications and technical information for an Austin Bluewater ABS2000 secondary treatment system (6 chamber septic system) and design specifications for the disposal field.

Customer details:

Applicant:	Bryan Donnelly		
Contact details:	Phone: 027 375 1899 Email: bryanvizbuilt@gmail.com		
Site Location:	153 Innes Road, Glasnevin Amberley		
Legal Description:	Lot 4 DP 502943		
Lot Size:	4.5ha		
Local Council:	Hurunui District Council		
Date site visit:	13/09/21		
Environment Canterbury Consent Info:	CRC 131130	Issued/Status:	Issued / Active

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Site Investigation:

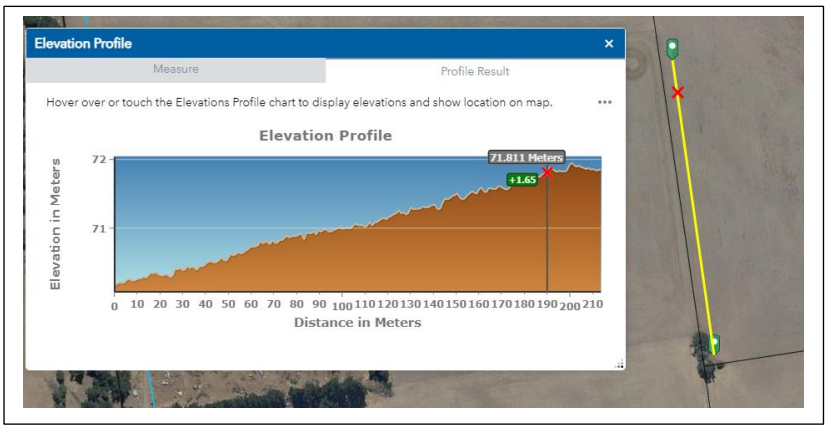
Steve Roche from Austin Bluewater met with the Bryan Donnelly at 153 Innes Road (Lot 4) on the 13/09/21 to discuss the proposed use for the property and assess the receiving environment in relation to wastewater treatment requirement and the regulations for the best practice environmental solution for the property.

At the onsite meeting the plan is to build a 4 bedroom dwelling on the property and install a ABS2000 to dripline as per consent conditions from Environment Canterbury CRC131130 which was issued on the 11/12/2012 all the conditions within the consenting document have been met by this design.

A detailed site and soil investigation was performed and the plan The property water is obtained by Council water scheme, closest well to the property is Well M34/5707 provides water to the community and is 243m S from the drip line location. The drip field is not within the community protection zone. There is a Waipara river is located 3,925m E from the dripline location and there are no open drains within 20m of the disposal field. The property is flat with no evidence of ground instability a test hole was dug within the designated LASE area, test hole depth was 1000mm with no evidence of mottling or groundwater.

Topography / Elevation Profile of LAS Envelope:

Flat <10 °



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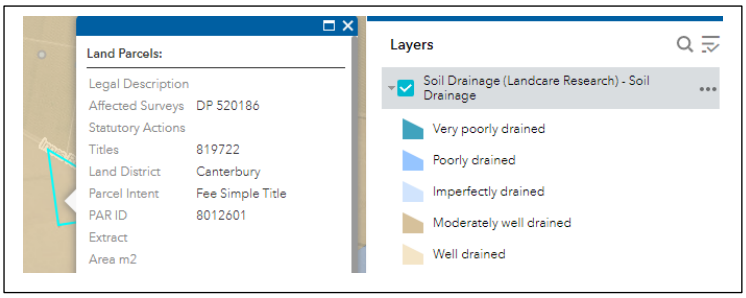
Soil Breakdown:

Test pit depth:	1000mm
Topsoil:	300mm
Subsoil:	300-700mm stony sandy loams 700-1000mm sandy gravels
Category:	2 (well drained)
Groundwater:	None
Mottling:	None
Unconfined / Coastal Confined:	Unconfined



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Design parameters:

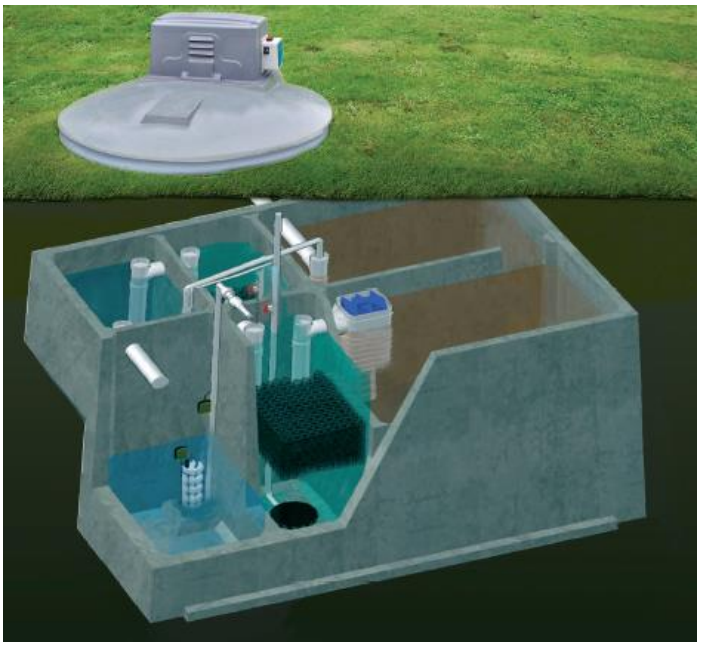
The chosen system has been designed in accordance with AS/NZS 1547:2012 On-Site Domestic Wastewater Management, the supply & installation of an ABS2000 on-site wastewater system dispersing to drip irrigation line

Dwelling	1 dwelling
Bedrooms	4 bedrooms
Population Equivalent:	7 people
Flow:	1400L/day
Dripline:	280m^2 drip irrigation line to be laid sub surface (150mm below ground level)
Drip irrigation rate:	5mm

- The Unit when used to its full potential will have a maximum wastewater flow of up to 1600L/day could be reached. (Accommodating 8 people maximum).

System Required:

Austin Bluewater ABS2000 is designed within accordance to AS/NZS 1547:2012 and process engineered to perform as specified in the On-site Effluent Treatment National Testing Programme (OSET NTP).



Technical Specifications

Primary pre-treatment chamber (gross)	2.33m³
Secondary pre-treatment chamber (gross)	2.33m³
Aeration Chamber 1 (gross)	.85m³
Aeration Chamber 2 (gross)	.85m³
Clarifying Chamber	.74m³
Pump Out Chamber	1.03m³
Total holding capacity (gross)	8.13m³
Working Tank Volume	6.71m³
Reserve Capacity	1.42m³

Tank construction - manufactured in special high grade 45mpa structural concrete.

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The ABS2000 is a 6 chambered secondary aeration wastewater treatment system:

1. The wastewater enters the first primary chamber has capacity of 2.33m3 through 100mm DW PVC and dropped into the mid-level of the tank to avoid any disturbance of the crust and then flows over a nib wall into
2. the second primary chamber of 2.33m3 capacity. The wastewater exits this chamber through a Polyloc PL525 filter into
3. the first aeration chamber of 0.85m3 Capacity where there is Bio-media located and a 9" air diffuser which exits up through 100mm DW PVC pipe tee into
4. The second aeration chamber of 0.85m3 Capacity where there is more Bio-media located and another 9" air diffuser which exits up through 100mm DW PVC pipe tee into
5. The first clarification chamber where at the angled base is a sludge return pipe that returns any heavy liquids back to the first primary chamber 0.74m3 Capacity, the treated wastewater exits up through 100mm DW PVC pipe tee into
6. The second clarification chamber of 1.03m3 Capacity, where the irrigation pump is located. The pump is operated on float switches, there is an alarm for high level, air pump failure and pump failure.

On-site Effluent Treatment National Testing Programme (OSET NTP)

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	A	B	C	D
BOD (mg/L)	2	0	A+	<5	<10	<20	<30	≥30
TSS (mg/L)	1	1	A+	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	27.6	6	C	<5	<15	<25	<30	≥30
NH_4- Nitrogen (mg/L)	0.04	2	A+	<1	<5	<10	<20	≥20
Total phosphorus (mg/L)	2.4	0.4	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	7,600	6,900	B	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)	1.75	0.3	B	0	<1	<2	<5	≥5

Land Application Irrigation System:

Discharge effluent from the ABS 2000 System into

- Soakage area to be a minimum 280m^2, multiple lines 16mm pressure compensating dripline x 1m apart.
- Disposal to be through 2.1Lt/hr with emitters at 0·6m centers 1m apart @ <5mm/day Rate. The dripline will be installed by being laid on the surface. This will allow soakage/treatment.
- The installation of the drip irrigation with correct placement within the area of disposal, of the Air/Vacuum Relief at the highest point of the field and Line flushing Valves at the end of every line of drip irrigation pipe as per working drawings & site plan.
- Recommend disposal area to planted in grass, which will assist in liquid and nitrogen uptake. (Maintenance of plants is the owner's responsibility).
- No stock or vehicles will have access to the discharge area.

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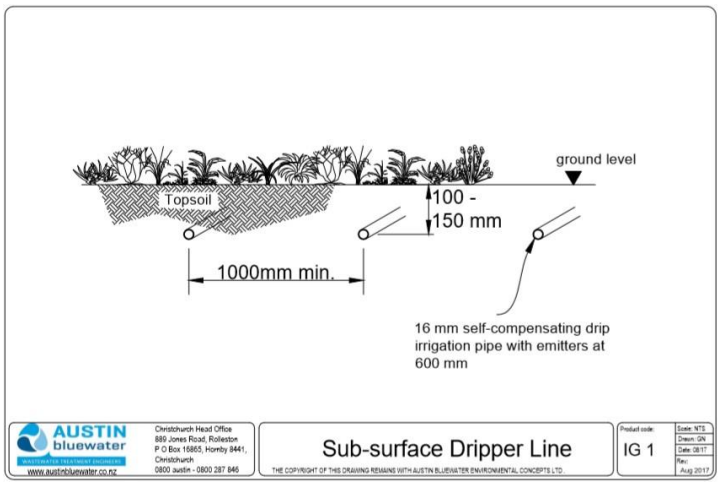

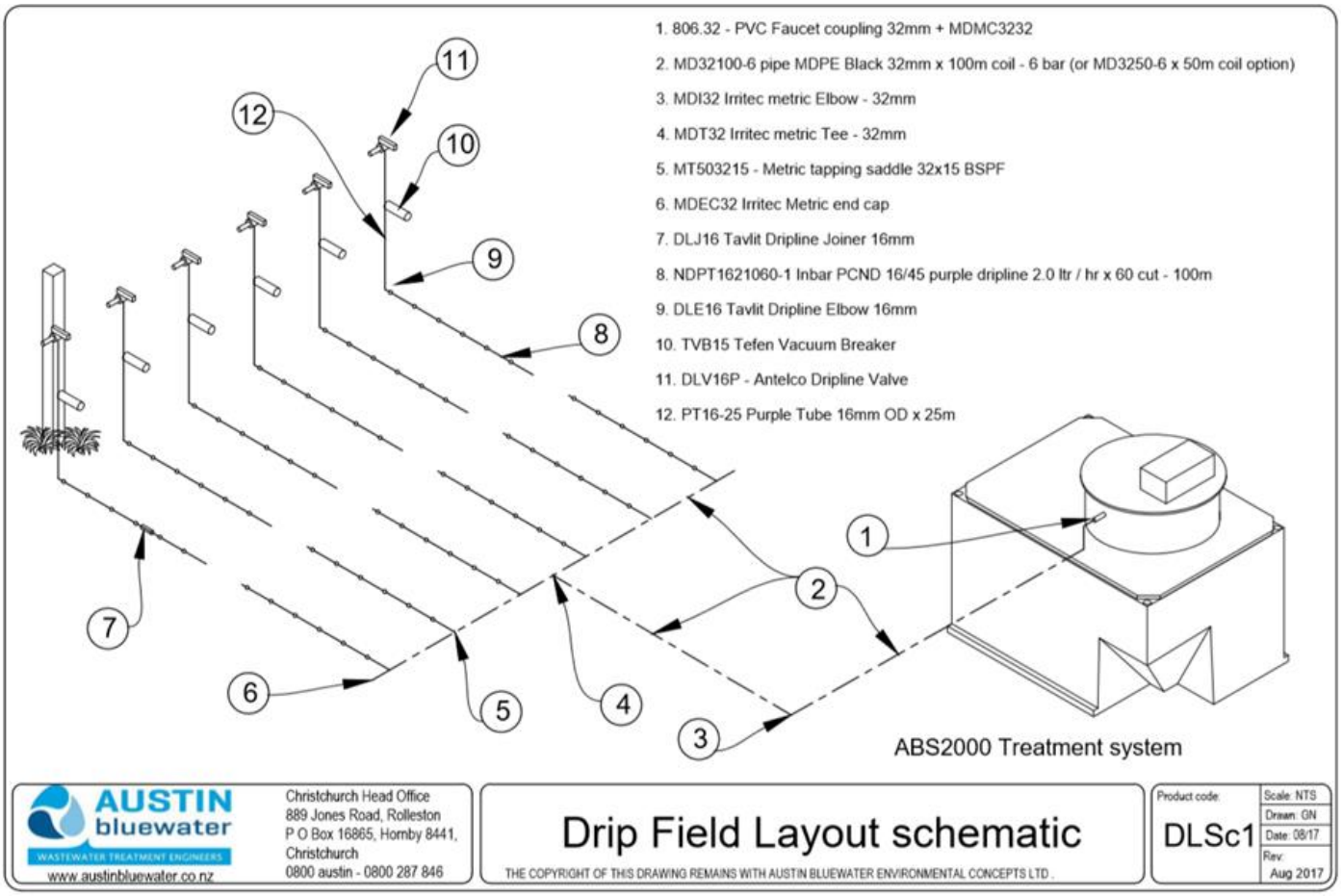

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Groundwater:

Groundwater/ Wells >1000m to Proposed Dripline Disposal Field Envelope						
WELL NO	WELL STATUS DESC	DEPTH	DISTANCE	HIGHEST WATER LEVEL	READING COUNT	YEARS
BV24/0105	130.75	Active (exist, present)	338m S	-9.030000299	1	July 17, 2019
M34/5603	108	Active (exist, present)	937m SE	-1.99999994	12	July 22, 2009, June 2, 2010
M34/0682	9.5	Active (exist, present)	436m SE	-2.609999895	2	November 26, 2000, May 7, 2001
M34/0666	24	Active (exist, present)	727m SW	-3.380000055	39	April 27, 1999, April 25, 2001
M34/5653	32.20000076	Active (exist, present)	414m SE	-1.98999992	318	July 8, 2007, April 28, 2016
M34/0659	28	Active (exist, present)	657m SW	-3.420000106	36	April 27, 1999, April 29, 2001
M34/0680	6.099999905	Altered (well has changed)	705m SE	-1.179999948	4	September 14, 1999, May 9, 2001
M34/5707	147	Active (exist, present)	314m S	-8.660000145	1	December 5, 2007
M34/0667	24	Active (exist, present)	541m SW	-3.019999921	57	April 27, 1999, May 15, 2002
M34/0713	8.800000191	Not Used	532m SE	-1.799999975	2	November 27, 2000, April 12, 2001
M34/0414	33	Not Used	536m SW	-5.199999809	2	November 26, 2000, May 8, 2001
M34/0077	25.10000038	Active (exist, present)	801m SW	-4.019999981	5	October 6, 1999, May 9, 2001
M34/0679	8.300000191	Active (exist, present)	649m E	-1.190000057	48	September 16, 1999, November 17, 2010
M34/0095	6.300000191	Active (exist, present)	510m S	-1.659999967	340	March 1, 1966, September 23, 2021
M34/5684	78.18000031	Active (exist, present)	780m SE	-3.130000114	102	August 10, 2006, September 23, 2021

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Water Entry:

- No other surface or stormwater to enter system either before or after the treatment process stage, indirect discharge only following secondary treatment standard.
- No adverse effects envisaged to the environment or neighbors due to the above standard of the irrigation and required separation from ground water.
- There are no open drains within 20m of the disposal field

Land application system for 153 Innes Road, Glasnevin Amberley
Bryan Donnolly
Lot 4 DP 502943 Section size 4.5ha

N

0 0.01 0.03 0.04 0.06 Kilometres

Scale: 1:1,100 @A3

Map Created by Canterbury Maps on 12/10/2021 at 3:23 PM

Environment Canterbury Consent Number CRC131130

Condition 9: A fence shall be erected around the perimeter of each land application system, which is sufficient to exclude stock, vehicles and the public

Test hole location

LAS envelope >280m^2 drip irrigation line to be laid sub surface (150mm below ground level) as per diagram below

Innes Road

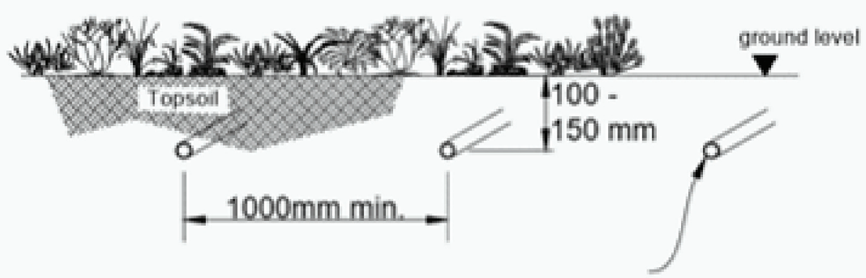
147

Boundary

2m off boundary

Proposed location 4 bedroom dwelling

Proposed location ABS2000 aerated treatment system



AUSTIN bluewater

Christchurch Head Office
880 Jones Road, Rolleston
P O Box 15885, Hornby 8441,
Christchurch
0800 austin - 0800 287 846
www.austinbluewater.co.nz

Sub-surface Dripper Line

THE COPYRIGHT OF THIS DRAWING REMAINS WITH AUSTIN BLUEWATER ENVIRONMENTAL CONCEPTS LTD

Product code IG 1

Scale: N°S
Drawn: GN
Date: 08/17
Rev: Aug 2017

Environment Canterbury, Waimakariri DC, LINZ, LINZ, Environment Canterbury, Environment Canterbury

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Installation:

Austin Bluewater Aeration is to be installed by a registered drainlayer and all associated drains connecting to tank and disposal field. Installation of the treatment unit to be in conjunction with manufacturers requirement. Rises and access lids to tank chambers are to be watertight. Access lids to be at ground level or above. Disposal field to be installed as per cross section and plan view drawings.

Site Clearance:

Upon completion of all drainage work, the site is to be left neat and tidy. (There will be a large volume of excavated material left over. The Drainlayer should check with owner if it needs to be removed or a location for it to be stock piled.)

Service Contract:

A Service Contract will need to be arranged, at the times required specified in Austin Bluewater **Home Owners Guide** to ensure the Aeration System is functioning properly. This contract must always be kept signed and active. This system requires servicing every six months.

Future proofing:

Currently the system will be operating @ 1400L/day. The system capacity to operate at 1600lt/day. The Dripline will need to be increased to accommodate any additional loading on the system.

Disclaimer:

The relevant parties incorporated with this wastewater design process are to be honest and transparent when providing Austin Bluewater with information relating to existing and/ or proposed wastewater activities on the site mentioned as this will impact on the calculations for proposed wastewater treatment. Examples of information provided are the potential number of bedrooms, other consent or activities on site, and also specifically to any water supply with any chemicals to wastewater connection and this potentially creating toxicants to the biological process. Any alterations to the proposed area of the land that could alter the soil profile or the potential daily wastewater quantity or quality must be reported Austin Bluewater. Parties who fail to report relevant information that could impact on this design & specification, will void authenticity of this document.

Consent must be sought and approved in order to use this document from Austin Bluewater**.** If any changes or variations to any particular specifications or plan in this documentation are thought as not relevant by the installer before, or at the time of installation. Failure to communicate necessary information will void this documentation which would result in Austin Bluewater not taking ownership for the wastewater design or functionality of the product. All expenses to variations of documentation created by introduced alterations after the design has been prepared, are the client or relevant parties' responsibility and expense. If the owner does not follow the Ecan/ Local Council requirements/ specifications of this product outlined in the Owner's Manual and does not have the recommended maintenance carried out, it will void the design and wastewater quality outcomes in this document.

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I certify that this treatment system has been designed in accordance with AS/NZS 1547:2012 (On site Domestic Wastewater Management). Providing the system is installed and maintained according to specifications and recommendations within this document and is operated and maintained correctly by the system owner, I believe the system will provide an effective, environmentally-safe system for treating and disposing of domestic wastewater into land then into groundwater.

For Austin Bluewater

BA Roche

Beth Roche
Wastewater Design

OWNER DECLARATION

I have read and understood this statement and will follow the usage/servicing requirements to maintain the system's as per the Environment Canterbury's decision document.

Owner: BRYAN DONNELLY

Date: 2/11/2021

Signature: Bryan Donnelly

Owner: PHILIPPA DONNELLY

Date: 2/11/2021

Signature: Philippa Donnelly

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Austin Bluewater Technical Specifications

Company Profile

The proprietor of Austin Bluewater, Lew Austin introduces the first Aerobic Wastewater Treatment Systems into New Zealand in 1991 and been manufacturing in 1992. Austin Bluewater continues to lead in the wastewater technology field and has associations with other leading authorities in Europe, USA and Australia. We manufacture all of our own products in our modern facility based in Christchurch.

TABLE OF CONTENTS

SECTION 1 - System Principles & engineering
SECTION 2 - Technical Specifications
SECTION 3 - System Performance Details
SECTION 4 - System Construction
SECTION 5 - System Componentry

Section 1 – System Principles

Austin Bluewater wastewater treatment systems are designed and manufactured with care & foresight. These are fine technical details that are born from the commitment to sustainability and performance, including quality & durable materials of the individual components that are installed in the system. The principle of the system is tried and true SAFE system (submerged aeration filtered effluent). Incorporating a structured filter media allows for a large specific surface area to volume ratio. When the media submerges in water & air diffuses from the media, this provides circulation of the wastewater & allows biological film (or bio film) to grow on the surface area, treating the waste water liquid as it passes through the various stages.
Efficient Technology: The Austin Bluewater residential treatment system is divided into 6 principle chambers.

Chamber 1: All wastes are delivered from dwelling into this anaerobic chamber. Capacity – 2.33m3.

Chamber 2: Secondary anaerobic pre-treatment chamber incorporating Polylok PS25 filter allowing for further breakdown of organic & inorganic waste. Capacity 2.33m3

Chambers 3 & 4: Dual Aeration Chambers – Our unique design incorporates two aeration chambers with additional bioblok media for further enhanced treatment & incorporating additional air & diffusers for a higher quality treated effluent with lower nitrogen levels. Joint capacity 1.7m3 **Chamber 5**: Clarification Chamber – The clarification chamber is purpose designed with a 60% slope to ensure fine particles settle for return to the primary pre-treatment chamber to assist denitrification. Capacity - .74m3

Chamber 6: Pumpwell Chamber: The separate pumpwell has a capacity of 1030 litres. The unit is fitted with an automatic irrigation pump specifically designed to suit the application.
SELF DIAGNOSTIC CONTROL PANEL: The Austin Bluewater system consists of a self-diagnostic controller complete with alarms displaying any abnormality occurring in the system. The blower operation automatically reduces to 30 mins an hour if no flow is detected for 48 hours, therefore reducing electricity usage.

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Section 2 – Technical Specifications

Primary Pre-Treatment Chamber (gross)	2.33m3
Secondary Pre-Treatment Chamber (gross)	2.33m3
Aeration Chamber 1 (gross)	.85m3
Aeration Chamber 2 (gross)	.85m3
Clarifying Chamber	.74m3
Pump Out Chamber	1.03m3
Total Holding Capacity (gross)	8.13m3
Working Tank Volume	6.71m3
Reserve Capacity	1.42m3

Tank construction- manufactured in special high grade 45mpa structural concrete.

System Dimensions

Overall Length 3 metres
Overall Width 2.1 metres
Overall Height (inc standard 500mm turret) 2.2 metres
Weight 7.7 tonnes
Invert Level (less extension turret) from bottom of tank 1.58 metres

Certification

Manufactured to AUS/NZS 1546-1 and 1547 standards. NZTP 58 Approved. Maximum rates capacity = 10 person domestic situation

Section 3 System Performance Criteria to AS/NZS1547

1: Performance Details (as discharged)

1BOD after 5 days	<20mg/l
2: Suspended Solids (TSS)	<30mg/l
3: Total Nitrogen	<30g/m3
4: Faecal Coliforms	<1000/100ml

2: Design Requirements
A Minimum daily flow of 160 litres per person
B Average daily BODs – 70 grams per person
C Average daily total SS – 70 grams per person

Section 4 - System Construction

Manufactured to AS/NZS 1546.1:2008, Austin Bluewater concrete tanks & lids are manufactured in 50mps concrete strength with 665 mesh for strength & durability. The lid is separate, recessed sealed to the tank. All internal walls are intergril as the tank is of monolithic poured construction (in one piece). The product is

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externally vibrated during the pouring process (note no fibre is used in our process). This manufacturing process eliminates any leakage caused by any movement of interim walls, common in other processes.

Concrete

Austin Bluewater's concrete is a high grade ready mix concrete design complying to NZS3104, relating to special grades, plant & testing. Concrete supplied for the manufacture exceeds the 154c standard and consists of 470kg of cement per cubic metre, 12mm aggrecates, with 80 slump. The final result is 50mpa strength at 28 days curing of each tank is carried out using steam curing.

Steel Mesh

Steel reinforcement mesh consists of 665 mesh centrally located in accordance with AUS/NZS 1546 and is supported with plastic bar chairs. All mesh overlaps at a rate of 2x per mesh pitch.

Section 5 - System Componentry Piston Air Pump

As standard a medo piston air pump or equivalent is incorporated into the system. Features of the superior piston air blower includes low noise, easy maintenance, high performance and longer life than comparable diaphragm blowers.

MODEL NOMINAL CAPACITY L/MIN
POWER CONSUMPTION
RATED PRESSURE OPERATING PRESSURE
LA-80B 80l/min 86w 50hz
0.15 bar 0.05.0.2 bar

Irrigation Pump

As standard a Bianco B42AC submersible pump is incorporated into the system. The model of pump may vary depending on final method of discharge (drip irrigation or other) or as designed by the engineer/approved designer.

Control Panel

The control panel is designed to perform the following duties: • Air fault LED – If air pressure switch isn't made for 5 seconds, alarm will activate. • High water fault LED – If high water alarm float is up, alarm will activate. • Check filter LED – If irrigation pump is running for greater than 20 mins, alarm will activate. • Automatic holiday mode – If irrigation pump has not discharged for 48 hours, controller will automatically enter holiday mode. Once pump runs again, holiday mode is deactivated. • System incorporates field isolator switch.

Polylok PL525 Biological Effluent Filter

The polylok PL525 is unique in its class as a filter with the largest surface area in its class. The unit has an automatic shut-off ball arrangement to prevent any over-flow effluent leaving the tank.

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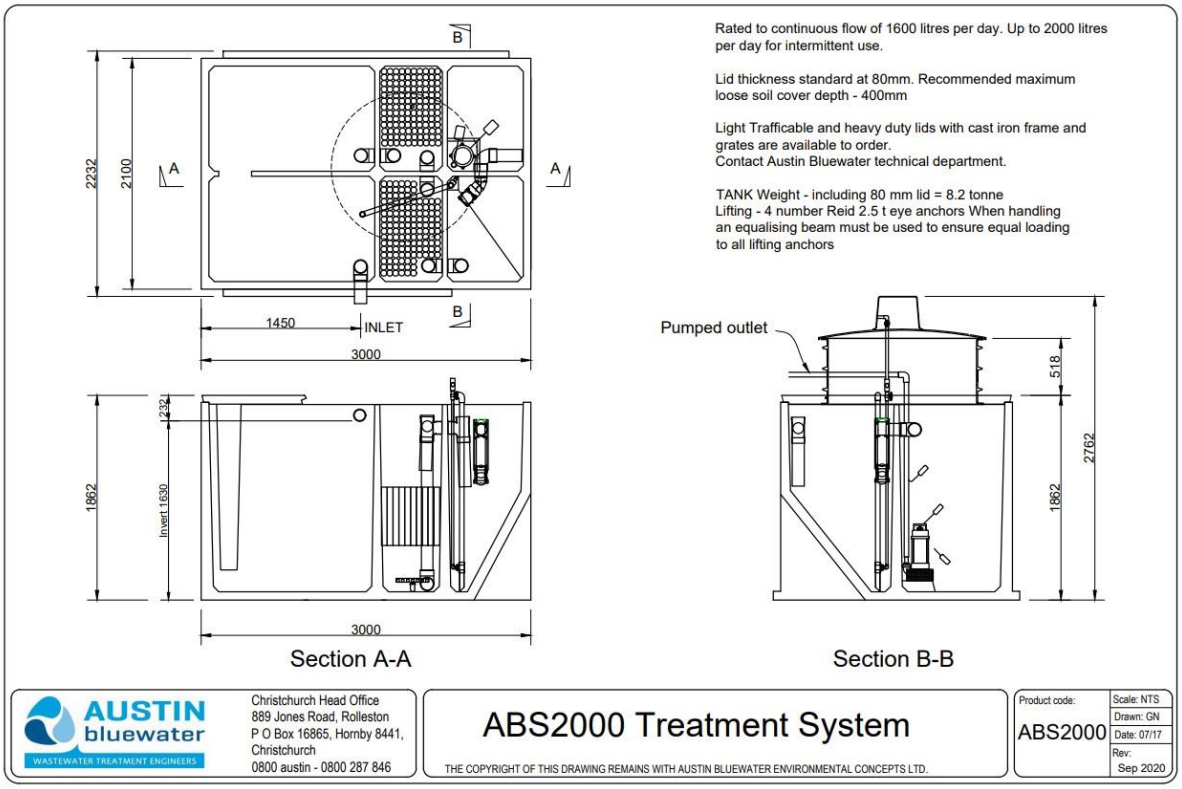

Please refer to separate attached technical drawing to this application for enlarged version.

BIA-B42AC – Bianco Submersible Clean Water Pump 105L/MIN 32M 550W 240V

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Phone: 03 696 2812
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Service Contract for Your Austin Bluewater ABS 2000 Series

Owners name……..

Contact no……

Owners email address……

Property Address……..…

Dear Homeowner,

To comply with council Requirements under the conditions of your consent for your wastewater treatment system, the system requires servicing at 6 monthly intervals

Upon acceptance of this service contract, Austin Bluewater will supply the following:

1. Your system will be commissioned free of charge so we can show you how to look after it, then half yearly field service inspections for the ABS 2000 series, will be made by a factory trained service person as per your consent.

Inspections include:

- Any adjustment, cleaning (excluding de-sludging) and field service of the unit necessary for proper operation
- Inspection of control panel alarm and overload protection, blower or aerator, biomass, recycle pump, clarifier, filter, effluent quality, irrigation pump, drip line, flush valves and float alarm (where fitted)

2. Both Labour and materials will be charged for any emergency service call outside the calls specified above

3. In the event of any repairs being necessary to the components during the warranty period, due to damage which has occurred outside the warranty specifications, these repairs will be charged to you the homeowner, to include a callout and/or labour and materials. The above will also apply after the end of the warranty period on the system

4. All repairs are on a strictly C.O.D basis

5. This agreement does not bind Austin Bluewater Wastewater treatment engineers to be responsible for the quality of the effluent. However, it will at all times possible, recommend how the effluent quality can be maintained at its maximum and alter and adjust the system during these regular visits to obtain the best possible standards

6. Your Austin Bluewater service agent will require clear access on site to access your treatment system. Any gate alarm codes to access property will be on file at Austin Blue water office so we can access property. Or alternatively if preferred you may wish to be home when system is serviced.

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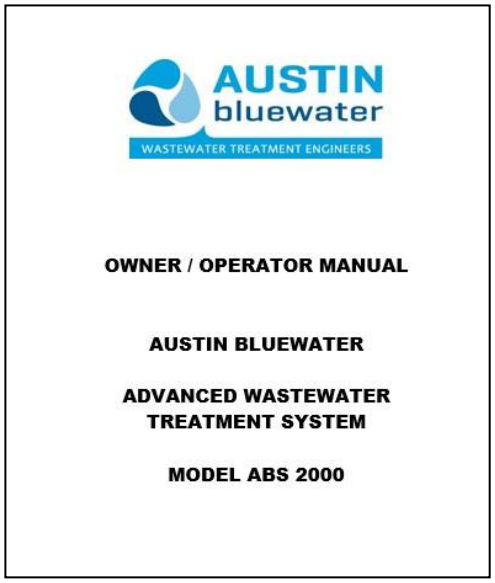
7. In applying for this agreement, the undersigned acknowledges that this Agreement is binding while they are owner/occupier of the premises. In the event of change of ownership any remaining services due will be honoured to the new owners until a new contract is negotiated with the new owner/occupier. Cancellation of this contract will be accepted upon written advise.

Price of service available on request from office 0800 287 846

SIGNED.....

DATED…….



Please find the Owner / Operator Manual as a separate document attached to the proposed application.

Phone: 03 595 2812
0800 287 846 or 0800 austin

Email: www.austinbluewater.co.nz

Please do not hesitate to contact Austin Bluewater if you have any questions about your Wastewater Treatment System or Disposal Area.

Partial transfer submitted to Environment Canterbury 4/11/21

11 December 2012

Warren Miller Hislop
122 Racecourse Road
RD 2
Amberley 7482

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

NOTICE OF RESOURCE CONSENT DECISION(S)

RECORD NO: CRC131130
NAME: Warren Miller Hislop

The decision of Environment Canterbury is to grant your application(s) on the terms and conditions specified in the attached resource consent document(s). Your resource consent(s) commences from the date of this letter advising you of the decision. The reasons for the decision are:

1. Any adverse effects on the environment as a result of the proposed activity will be minor.
2. There are no persons considered to be adversely affected by this proposal.

For some activities a report is prepared, with officer recommendations, to provide information to the decision makers. If you require a copy of the report please contact our Customer Services section.

If you do not agree with the consent authority decision, you may object to the whole or any part. Notice of any objection must be in writing and lodged with Environment Canterbury within 15 working days of receipt of this decision.

Alternatively you may appeal to the Environment Court, PO Box 2069, Christchurch. The notice of appeal must be lodged with the Court within 15 working days of receipt of this decision, with a copy forwarded to Environment Canterbury within the same timeframe. If you appeal this decision, the commencement date will then be the date on which the decision on the appeal is determined. If you are in any doubt about the correct procedures, you should seek legal advice.

You can find online information about your consent document at http://ecan.govt.nz/publications/General/YourConsentDocumentBooklet09.pdf and also information regarding the monitoring of your consent at http://ecan.govt.nz/publications/General/monitoring-your-consent-booklet.pdf. These booklets contain important information about your consent and answers some commonly asked questions about what will happen next in the life of your resource consent. There is an Annual Compliance Monitoring Charge associated with every consent. For details of this, please refer to page 10 of the "Monitoring Your Consent' booklet.

Our Ref: **CRC131130**
Your Customer No: EC105878,EC162310
Contact: **Customer Services**

Environment Canterbury takes every measure to improve both applications and processes, and we appreciate your feedback as an important component in ensuring this occurs. You can complete a consents survey on-line at http://www.ecan.govt.nz/services/resource-consents/pages/surveys.aspx. Alternatively, you can call our Customer Services Section on 0800 EC INFO who will be happy to complete the survey with you.

Charges, set in accordance with section 36 of the Resource Management Act 1991, shall be paid to the Regional Council for the carrying out of its functions in relation to the administration, monitoring and supervision of resource consents and for the carrying out of its functions under section 35 of the Act.

Thank you for helping us make Canterbury a great place to live.

For all queries please contact our Customer Services Section by telephoning (03) 353 9007, 0800 ECINFO (0800 324 636), or email ecinfo@ecan.govt.nz quoting your CRC number above.

Yours sincerely

CONSENTS PLANNING SECTION

CC Address:

Biotechnologies Limited
Attn To: Bill Cowie
PO Box 10091
Phillipstown
Christchurch 8145

RESOURCE CONSENT CRC131130

Pursuant to Section 104 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO:	Warren Miller Hislop
A DISCHARGE PERMIT:	To discharge up to 1,400 litres of wastewater to land per day.
Commencement Date:	11 Dec 2012
Expiry Date:	11 Dec 2047
LOCATION:	220 Racecourse Road, Amberley

SUBJECT TO THE FOLLOWING CONDITIONS:

1 The discharge shall be only domestic wastewater originating from a property, located at RS 41520, Racecourse Road, Amberley as shown on Plan CRC131130A, attached to and forming part of this resource consent.

2 The volume of wastewater discharged shall not exceed 5.6 cubic metres per day.

3 The discharge shall be only from a maximum of four dwellings with a combined maximum of 16 bedrooms.

4 The wastewater shall only be discharged into land via land application systems located within the discharge envelopes as shown on Plan CRC131130B,attached to and forming part of this consent, and as described below:

a. Wastewater from proposed Lot 1 shall only be discharged to land at or about map reference NZMS 260 M34:8724-8808/ Topo50 BV24:7724-2645;
b. Wastewater from proposed Lot 2 shall only be discharged to land at or about map reference NZMS 260 M34:8720-8828/ Topo50 BV24:7719-2665;
c. Wastewater from proposed Lot 3 shall only be discharged to land at or about map reference NZMS 260 M34:8703-8811/ Topo50 BV24:7703-2648; and
d. Wastewater from proposed Lot 4 shall only be discharged to land at or about map reference NZMS 260 M34:8698-8838/ Topo50 BV24:7698-2675.

5 Prior to discharge to the land application systems, the wastewater shall:

a. Receive secondary treatment in an aerated wastewater treatment system or alternative treatment system which provides the same or better quality treatment; and
b. Pass through a proprietary effluent filter.

6 The wastewater treatment systems and land application systems shall not include chlorine disinfection

7 After exiting the treatment system, the wastewater shall be pumped to a land application system constructed in accordance with the design shown on Plan CRC131130C, attached to and forming part of this resource consent, and as described below:

a. The drip irrigation lines shall be installed at least one metre apart.
b. The emitters on the drip irrigation lines shall be spaced at not more than 600 millimetres apart.
c. The drip irrigation lines shall be installed a maximum of 150 millimetres below ground level and covered with between 100 and 150 millimetres of soil.
d. The soil above the drip irrigation tubing shall be grassed or planted with vegetation. The grass or plantings shall be kept in a healthy state. Replanting shall occur when erosion or die-off has resulted in bare or patchy soil cover.

8 The wastewater shall be evenly dosed over the land application systems, at a rate not exceeding five millimetres per day.

9 A fence shall be erected around the perimeter of each land application system, which is sufficient to exclude stock, vehicles and the public.

10 A minimum depth of 1000 millimetres of unsaturated soil shall be maintained at all times beneath the drip irrigation lines.

11 The discharge shall not result in any wastewater being visible on the land surface.

12 There shall be no discharge:

a. Within 20 metres of any surface water body;
b. To surface water as a consequence of the exercise of this consent.

13 There shall be no discharge within:

a. 100 metres of well M34/5707; and
b. 50 metres in a down-gradient direction in relation to groundwater flow and 30 metres of any other authorised and/or existing bores.

14 Within one month of the installation of any treatment and land application system, the consent holder shall provide to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, the following:

a. A signed copy of a compliance certificate certifying:
    i. that the installation of the wastewater treatment systems, land application systems, any ancillary treatment devices and associated pipework has been installed by a person with at least two years experience in the installation of such systems; and
    ii. the installed wastewater treatment systems are capable of achieving the treatment standard specified in condition (5) of this consent; and
    iii. that the systems have been installed in accordance with the conditions of this consent.
b. A copy of a signed 'as built plan' which clearly shows the location of the installed wastewater treatment system and land application system, and the separation to property boundaries and surface water bodies; and
c. Photographs which show:
    a. the height of the installed distribution lines relative to ground level; and
    b. fencing of the perimeter of the land application systems.

15 The wastewater treatment and land application systems shall be serviced at least once every six months by a qualified person with at least two years experience in the maintenance of such systems. The servicing shall include but not be limited to:

a. Ensuring that the lid(s) of the wastewater treatment system are readily accessible at all times;
b. Measuring the depth of solids and scum in the wastewater treatment system(s);
c. Pumping out the wastewater treatment tank(s) if the solids and scum layers combined are greater than two thirds the depth of the wastewater treatment tank(s);
d. A visual inspection of the components outlined in clauses (i) to (v) below, and cleaning, repairing or replacing as required:
    i. aeration devices;
    ii. proprietary effluent filter;
    iii. electrical parts;
    iv. audible alarms; and
    v. the distribution pump
e. Flushing the distribution lines
f. Inspection of the distribution pipes at the site of the land application system to ensure that they are operating correctly and replacing as required.

16 Following every service a written report shall be prepared and kept by the consent holder. In addition, the consent holder shall also keep written records of all repairs made to any part of the wastewater treatment and land application systems. The consent holder shall forward a copy of the written reports and records of repairs to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, on request.

17 The Canterbury Regional Council may, once per year, on any of the last five working days of May or October, serve notice of its intention to review the conditions of this consent for the purposes of:

a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

18 The lapsing date for the purposes of section 125 shall be the 31 December 2017.

Issued at Christchurch on 11 December 2012

Canterbury Regional Council

Consent No: CRC131130

Exercising of resource consent

It is important that you notify Environment Canterbury when you first start using your consent.

GRANTED TO: Warren Miller Hislop
A DISCHARGE PERMIT: To discharge up to 1,400 litres of wastewater to land per day.
LOCATION: 220 Racecourse Road, Amberley

Even if the consent is replacing a previous consent for the same activity, you need to complete and return this page.

Providing this information will:

- Validate your consent through to its expiry date
- Minimise compliance monitoring charges
- Help provide an accurate picture of the state of the environment.

If consent CRC131130 is not used before 31 Dec 2017 this consent will lapse and no longer be valid.

Declaration:

I have started using this resource consent.

Action taken: (e.g. pasture irrigated, discharge from septic tank/boiler/spray booth etc).

_____

Approximate start date (***Note: this may be different to the date the consent was granted)***:: _____

Signed: _____ **Date:** _____

Full name of person signing (please print): _____

Please return to:

Environmental Protection - Administration
Environment Canterbury
PO Box 345
Christchurch 8140

Environment Canterbury Regional Council

Plan CRC131130A

Scale 1 : 20000

The information for this plot has been taken from Environment Canterbury records. Every reasonable effort has been made to maintain current and accurate information on this site. The information contained within the GIS has been assembled in good faith, but its accuracy and completeness cannot be guaranteed.

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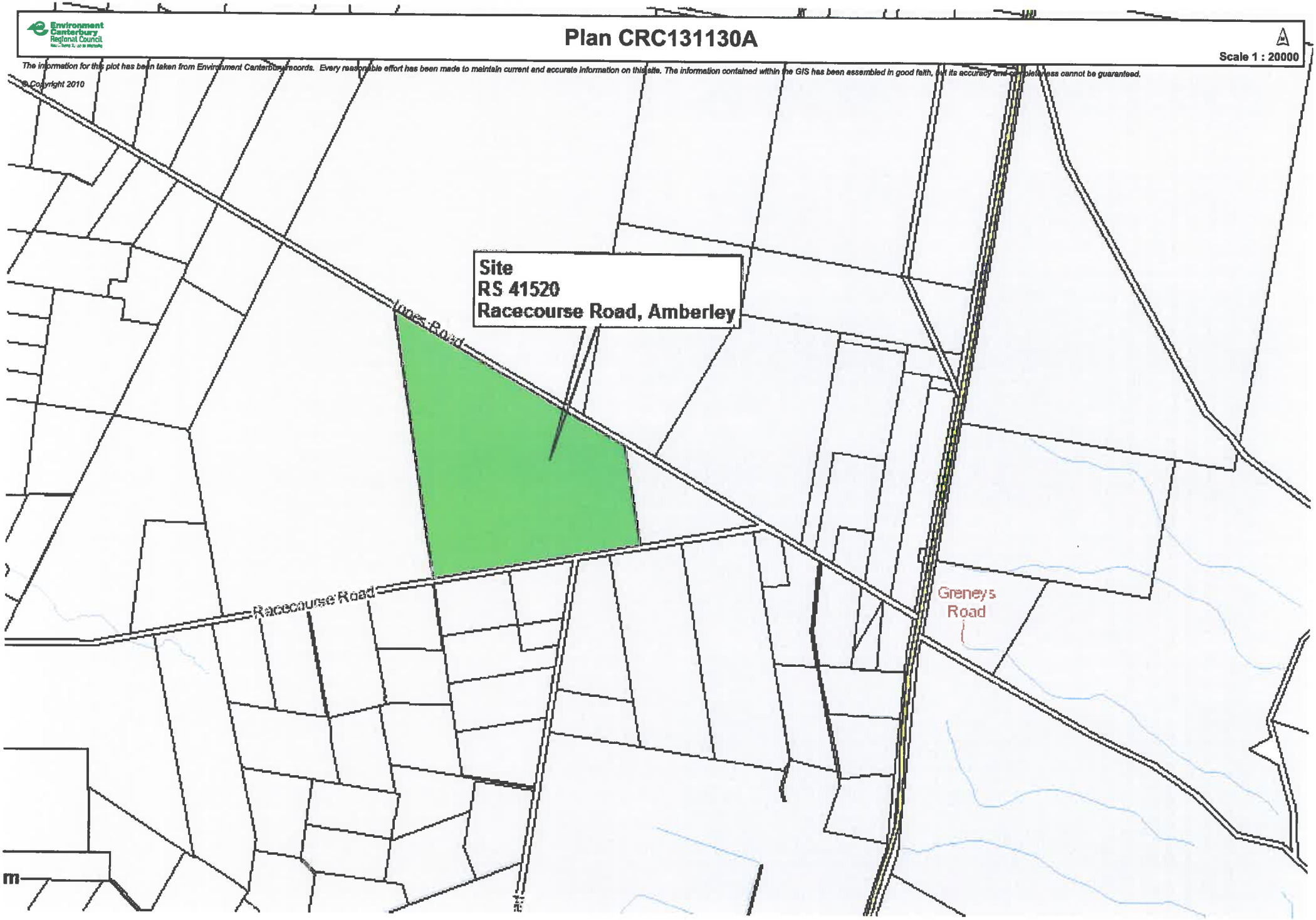
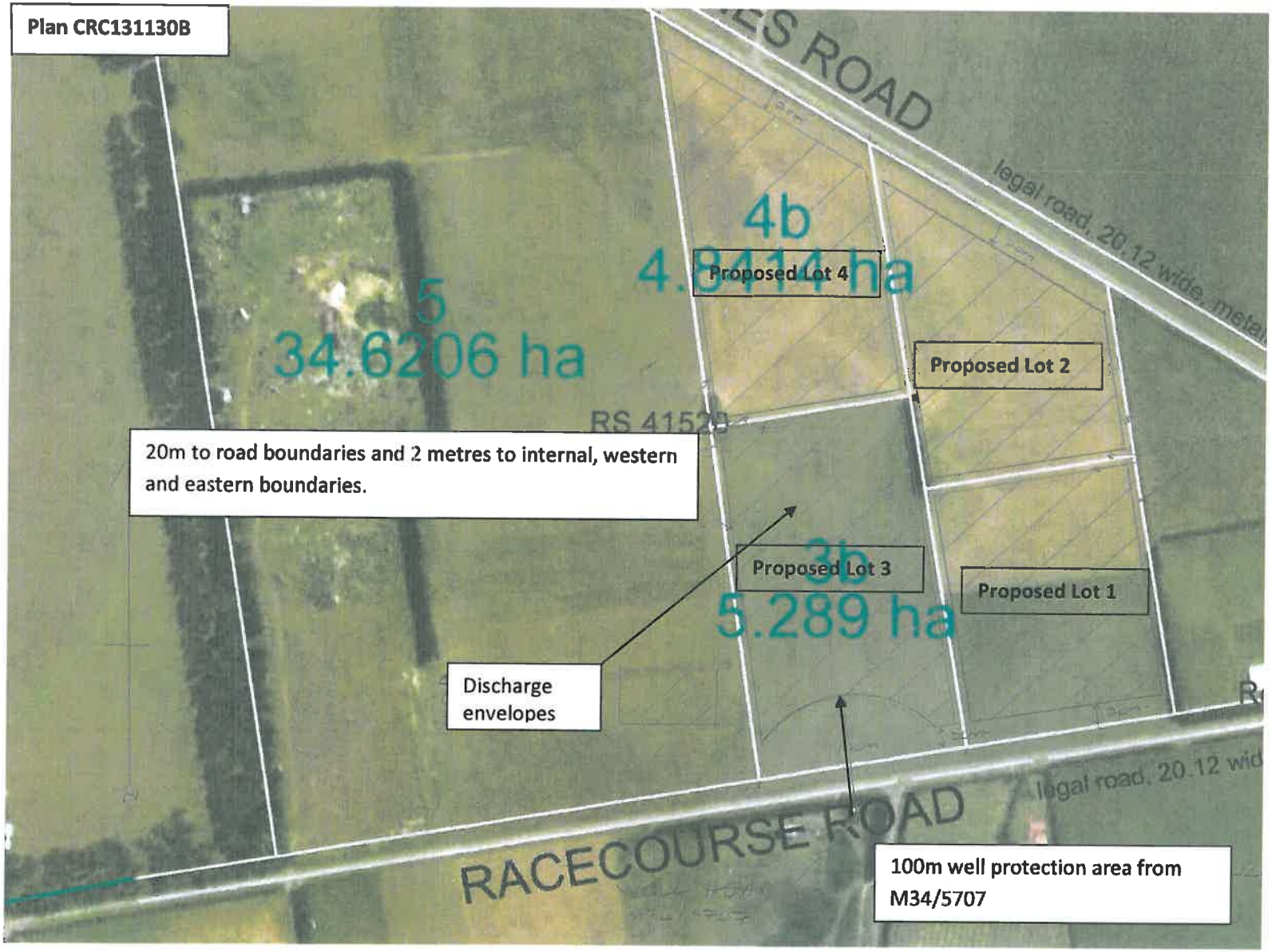
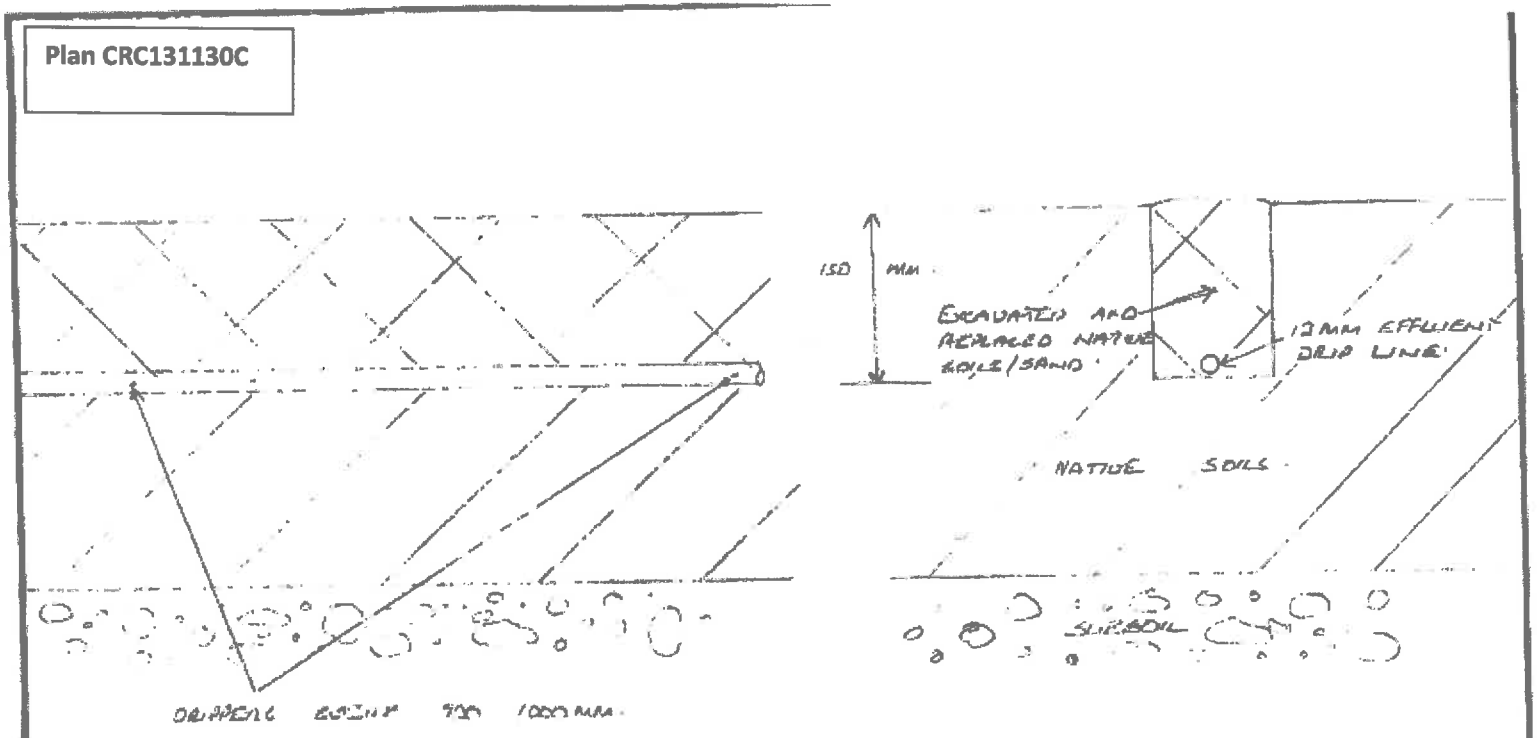



Plan CRC131130B
ES ROAD
legal road, 20.12 wide, metal
4b
4.8414 ha
Proposed Lot 4
5
34.6206 ha
Proposed Lot 2
RS 41529
20m to road boundaries and 2 metres to internal, western and eastern boundaries.
3b
5.289 ha
Proposed Lot 3
Proposed Lot 1
Discharge envelopes
legal road, 20.12 wid
RACECOURSE ROAD
100m well protection area from M34/5707

Plan CRC131130C

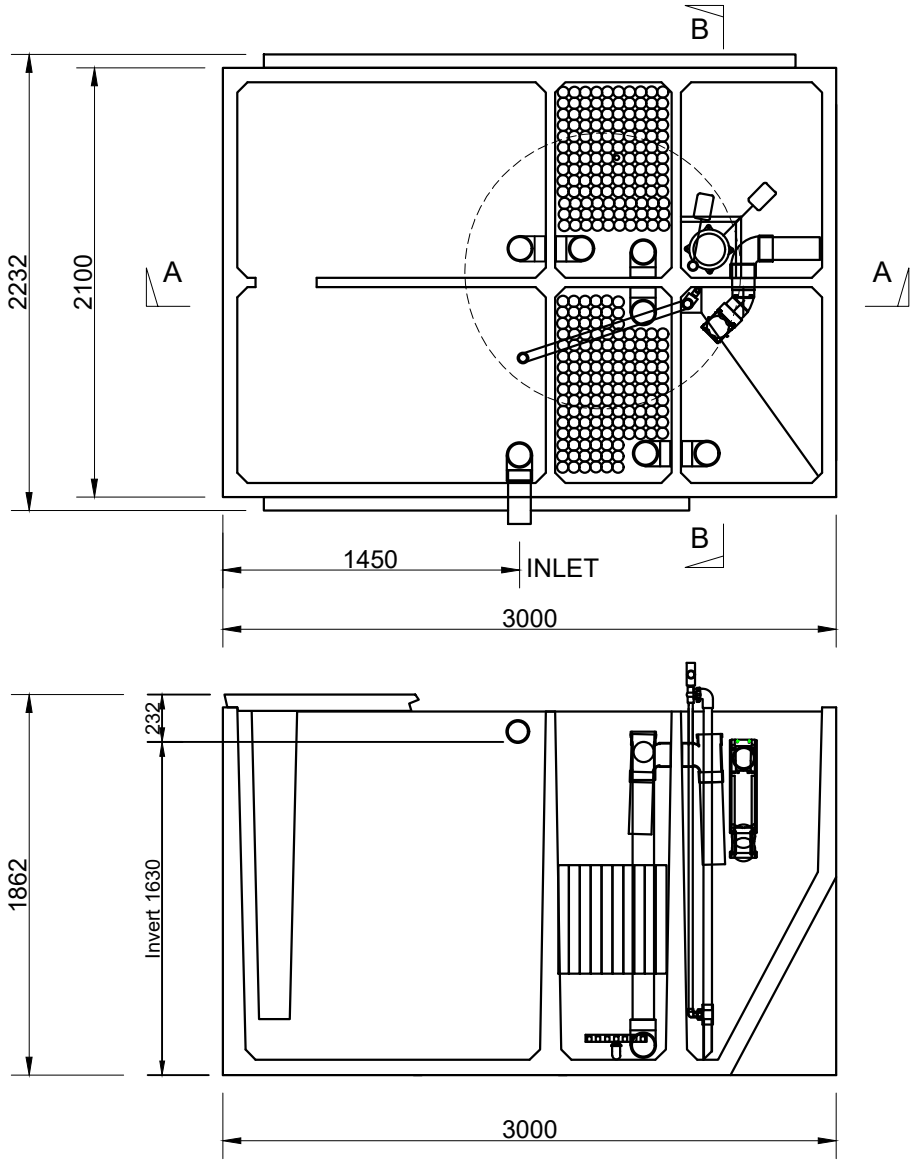


NOTES

1. 12MM EFFLUENT LINE TO BE LAID [illegible]
2. LINE TO INCLUDE AIR RELIEF VALVE AND FLUSHING [illegible]

EFFLUENT DRIP LINE SYSTEM SCHEMATIC

SCALE: 1:5.	APPROVED BY:	DRAWN BY W.J.C.
DATE: 13.08.03		REVISED
		DRAWING NUMBER



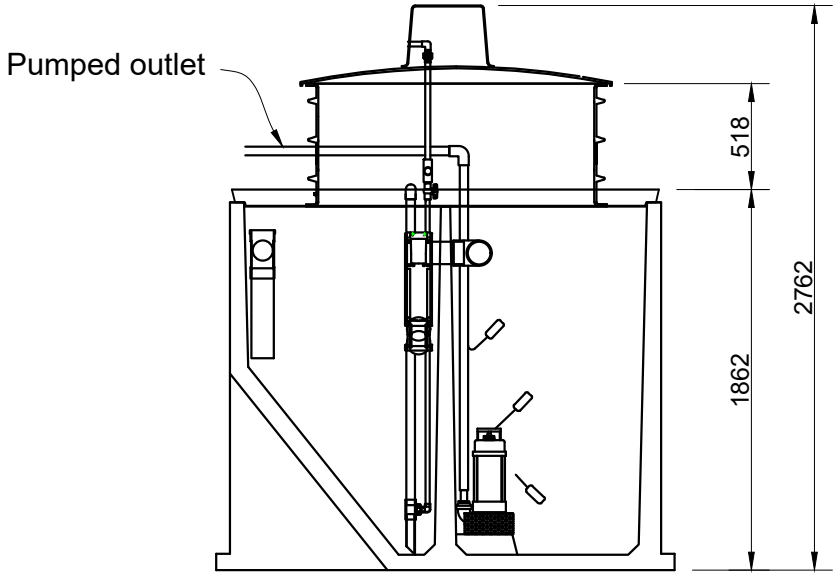
Section A-A

Rated to continuous flow of 1600 litres per day. Up to 2000 litres per day for intermittent use.

Lid thickness standard at 80mm. Recommended maximum loose soil cover depth - 400mm

Light Trafficable and heavy duty lids with cast iron frame and grates are available to order.
Contact Austin Bluewater technical department.

TANK Weight - including 80 mm lid = 8.2 tonne
Lifting - 4 number Reid 2.5 t eye anchors When handling an equalising beam must be used to ensure equal loading to all lifting anchors



Section B-B

AUSTIN bluewater
WASTEWATER TREATMENT ENGINEERS

Christchurch Head Office
889 Jones Road, Rolleston
P O Box 16865, Hornby 8441,
Christchurch
0800 austin - 0800 287 846

ABS2000 Treatment System

THE COPYRIGHT OF THIS DRAWING REMAINS WITH AUSTIN BLUEWATER ENVIRONMENTAL CONCEPTS LTD.

Product code: ABS2000

Scale: NTS
Drawn: GN
Date: 07/17
Rev: Sep 2020

On-site Effluent Treatment National Testing Programme (OSET NTP)

PERFORMANCE CERTIFICATE
Austin Bluewater AB2K
OSET NTP Trial 12, 2016/2017

System Tested

The Austin Bluewater AB2K submerged aerated filter wastewater treatment system participated in Trial 12 of the On-site Effluent Treatment National Testing Programme (OSET NTP). This commenced on 24 October 2016 and ran over nine months (39 weeks) during which the treated effluent discharge was monitored generally every six days. The test flow rate was 1,000 L/day to represent the daily domestic wastewater flow from a 3-bedroom dwelling with 5 to 6 occupants. Note that the manufacturers advised design capacity for this plant is 1600 L/day.

Test Flow Rate

The Austin Bluewater AB2K submerged aerated filter wastewater treatment system was tested at 1,000 litres/day (equivalent to servicing a 3-bedroom 5 to 6 person household) over an 8 month (35 week) period October 2016 to June 2017 followed by a 1 month (4 week) high load effects test involving 5 days at 2,000 litres/day then 1,000 litres/day over the following 3 weeks.

Testing and Evaluation Procedures

A total of 39 treated effluent samples of organic matter (BOD_5) and suspended solids (TSS) at generally six day intervals during weeks 9 to 35 were tested and evaluated against the secondary effluent quality requirements of the joint Australia/NZ standard AS/NZS 1547:2012.
A total of 16 treated effluent samples of organic matter (BOD_5), total suspended solids (TSS), total nitrogen (TN), ammonia nitrogen (NH_4-N), total phosphorus (TP) and faecal coliforms (FC) at generally six day intervals during weeks 23 through 35 were tested and the results benchmarked and rated on their median values. In addition, the energy used by the treatment system was assessed on the mean of consumption levels over the 16 sample days.

General Performance

In terms of effluent quality the Austin Bluewater AB2K plant performed well overall, with very low and stable BOD and TSS results. Good nitrification was achieved throughout with very low levels of NH_4-N. Denitrification was initially moderate but it declined through the test with increasing TOXN and TN and available alkalinity reduced. The plant handled the high flow test well with respect to BOD and TSS but had a sharp increase in NH_4 with no significant improvement over the following two weeks. Bacteria removal was good throughout for a secondary treatment plant without disinfection producing effluent with a median of 7600 cfu/100 ml (ie a 3.2log reduction).

The plants power usage of 1.75 kWh/day was typical for a package secondary treatment plant.

Apart an unfortunate incident when the manufacturer unfortunately left the power 'off' after the plant was insulated the plant operated without attendance throughout the trial.

Service requirements are 6 monthly where disposal is to dripline.

AS/NZS 1547:2012 Secondary Effluent Quality Requirements

These requirements are that 90% of all test samples must achieve a BOD_5 of $\leq$ 20 g/m^3 and TSS of $\leq$ 30 g/m^3 with no one result for BOD_5 being >30 g/m^3 and no one result for TSS being >45 g/m^3. The Austin Bluewater AB2K plant had **97% of BOD_5** results and **97% of TSS** results within the **Secondary Effluent Quality** requirements for both the 90%ile and maximum limits above. **The Austin Bluewater AB2K plant thus achieved AS/NZS 1547 secondary effluent quality performance requirements** when operated at 1,000 L/day, which is only 62% of the manufacturers advised design capacity of 1600 L/day.

Benchmark Ratings

The Austin Bluewater AB2K system achieved the following effluent quality ratings over the sixteen benchmarking results in weeks 20 to 35 (when operated at 1,000 L/day or 62% of the advised plants design capacity):

On-site Effluent Treatment National Testing Programme,
c/- Technical Manager 10 Tide Close, Mount Wellington, AUCKLAND 2013
Mob: 021 626 772 E-mail: ray@hedgland.co.nz

On-site Effluent Treatment National Testing Programme (OSET NTP)

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	*A*	*B*	*C*	*D*
BOD (mg/L)	*2*	*0*	A+	*<5*	*<10*	*<20*	*<30*	*≥30*
TSS (mg/L)	*1*	*1*	A+	*<5*	*<10*	*<20*	*<30*	*≥30*
Total Nitrogen (mg/L)	*27.6*	*6*	C	*<5*	*<15*	*<25*	*<30*	*≥30*
NH_4- Nitrogen (mg/L)	*0.04*	*2*	A+	*<1*	*<5*	*<10*	*<20*	*≥20*
Total phosphorus (mg/L)	*2.4*	*0.4*	B	*<1*	*<2*	*<5*	*<7*	*≥7*
Faecal Coliforms (cfu/100mL)	*7,600*	*6,900*	B	*<10*	*<200*	*<10,000*	*<100,000*	*≥100,000*
Energy (kWh/d) (mean)	*1.75*	*0.3*	B	*0*	*<1*	*<2*	*<5*	*≥5*

This Certificate of Performance applies to an Austin Bluewater AB2K wastewater treatment plant with a rated capacity of 1600 L/day, constructed from a single precast concrete tank comprising 6 chambers: 2 Primary (1970L each), 2 Aeration (700L each), Clarifier (540L), Pump Chamber (850L), and fitted with 6 blocks of Bioblok 150 growth media in the aeration tanks plus an 80Lpm air blower, and having 1400L emergency storage capacity.

This certificate is valid for 5 years from 20 December 2017. For the full OSET NTP report on the performance of the Austin Bluewater AB2K wastewater treatment plant contact Lew Austin,
Mobile 021 356 736 or Email: lew@austinbluewater.co.nz

Authorised By:

Ray Hedgland, Technical Manager, OSET NTP
23 March 2018

On-site Effluent Treatment National Testing Programme,
c/- Technical Manager 10 Tide Close, Mount Wellington, AUCKLAND 2013
Mob: 021 626 772 E-mail: ray@hedgland.co.nz

AUSTIN bluewater

WASTEWATER TREATMENT ENGINEERS

OWNER /OPERATOR MANUAL

AUSTIN BLUEWATER
ADVANCED WASTEWATER TREATMENT SYSTEM
MODEL ABS 2000

TABLE OF CONTENTS

1. ABOUT AUSTIN BLUEWATER ENVIRONMENTAL CONCEPTS
2. THE TREATMENT SYSTEM
3. INTRODUCING PRODUCTS INTO THE SYSTEM
4. SYSTEM MAINTENANCE, MONITORING AND SERVICING
5. TROUBLE SHOOTING
6. LIMITED WARRANTY
7. ABS CONTROL PANEL INSTALLATION GUIDE

IMPORTANT INFORMATION

We recommend you keep this Manual with other important household manuals for future reference.

If you have questions regarding the safety and operation of your Austin Bluewater ABS Treatment System contact your Local Authorised Service Technician.

- Do not attempt to service components of the system yourself, call your Accredited Service Technician.
- Only Authorised Service Personnel are to remove covers on the Treatment System.

NB Potential System Problems:

Problems with advanced treatment systems can be difficult to analyse.

Whenever your system is not functioning correctly, it is best to contact a trained professional, such as manufacturer or trained technician to recommend the best procedure.

SECTION ONE

ABOUT AUSTIN BLUEWATER ENVIRONMENTAL CONCEPTS

Austin Bluewater Environmental Concepts is a proven leader with over twenty five years hands on experience designing and manufacturing waste water treatment systems.

Quality, reliability and innovation are the pillars of our success, making us a true pioneer and the leader in onsite waste water treatment in New Zealand.

Austin Bluewater has a strong commitment to continually developing new and improved products by way of research and development activities. The Austin Bluewater Model ABS is a product of this research. Most importantly, Austin Bluewater has a continuing commitment to its clients, the end user of its products.

SECTION TWO

THE TREATMENT SYSTEM

The Nature of Household Sewage

Household sewage is a combination of wastewater from several sources including sinks, toilets, showers, washing machines and dishwashers. The largest source of household sewage may vary depending upon the number of residents and water-using appliances within the home. Organic matter comes mostly from toilets, while sinks, showers, and washing machines contribute large amounts of wastewater containing only small amounts of soap and dirt (including grease, detergents, lint and vegetable matter).

Your Treatment System Process

Step 1 & 2

All wastewater from the home flows by gravity into a 2-stage primary and secondary septic system. Anaerobic (no oxygen) bacteria establish themselves in these chambers and partially digest organic matter.

Step 3 & 4

Your system is unique as it comprises 2 aeration chambers for higher quality treatment. Air is introduced into the aeration chamber producing aerobic bacteria which proliferate and digest most of the remaining organic material.

Fixed bio-blok assist the retention and growth of the bio-mass.

Step 5

The purpose built clarifier acts as a final settling chamber, removing settled sludge back to the primary area, to assist in de-nitrification of the system.

Step 6

The automatic irrigation pump disposes highly treated effluent to the irrigation field for re-use and final treatment into the soil.

Septic Tank Effluent Filters

The Austin Bluewater ABS System is fitted with the Polylok PL525 Effluent Filter, recognised as the most efficient filter available.

While effluent filters are partially self-cleaning, they must be thoroughly cleaned when the tank is inspected. When operating properly, they provide a fail-safe reminder that your tank needs pumping.

Pumped Systems

Site conditions, engineers and local Councils will determine the type of pump to be installed.

Pump systems also allow for even pressure dosing of dispersal fields resulting in a longer life to the field than under gravity conditions. Effluent levels in the pump chamber are controlled by internal switches that turn the pump on and off, sending effluent to the system by dosing or pressure distribution.

SECTION THREE

INTRODUCING PRODUCTS INTO THE SYSTEM

SECTION A: WHAT UPSETS THE BALANCE

The greatest cause of problems with your treatment plant are **cleaning products and the washing machine.**

Cleaning Products

Unfortunately, what we call cleaning products, may harm your treatment system. Like humans, some poisons kill us while others will just make us sick and the same will happen to the bacteria in your system. You must use environmentally friendly products.

Your treatment system relies on bacteria for your system to work effectively. Any product used that kills bacteria is harmful to your system. If you wish to use some of the harsher cleaning products, it is suggested that you use a bucket and discard the contents in the garden. This also applies to disinfectant, surface spays and wipes.

Washing Machines

Try to evenly spread your washing over a period of a week. Avoid, where possible, washing everything in one day. It puts too much pressure on the system and your unit will struggle to cope. Liquid soaps breakdown easier than granulate styles do. **Try not to be heavy handed with the amount of soaps you use.**

When working properly, your treatment system will work efficiently with no odours or problems.

It needs a happy balance.

Suitable Products

All products should be used in moderation.

DISHWASHING LIQUIDS

Adds	Morning Fresh	Bushlands	Rix
Palmolive	Sunlight	Greenapple	Kit

Finish for Dishwashers (limit quantity)

SURFACE CLEANERS

Jiff Cream Cleaner	Spray & Wipe (limit quantity)
Nifty	Swipe
Shower Power	Windex

TOILET CLEANERS

Jiff Cream Cleaner or any cream cleaner – toilet fresheners are not recommended.

FLOOR CLEANERS

Use hot water and detergent.

LAUNDRY POWERS AND LIQUIDS

Please look at the Independent Laundry Product Research which is on the next couple of pages.

Avoidable Products

ANTIBACTERIAL SOLUTIONS

Antibiotics	Nappy Plus	Pineoclean	Blue Loo
Napisan	Preen Soaker	Bio-Ad	Nappy Soft
Tri-zyme	Bio Jo	Nappy Fresh	Toilet Duck
Milton Tablets	Nursil	Toilet Cleaners	

BLEACHES

Domestos	lemon Bleach	White King	Budget Lemon
Zixo	Fiesta	Marolinn	

OTHER CLEANERS

Ajax	ESP Herbal	Metho or Kero	Swipol
Aussa	Exit Mould	Flea, Tick Wash	
Handy Andy	Bubble Baths	Floor Cleaners	
Spirits/Alcohol	Draino	Caustic Oven Cleaners	
Green Coice	Down to Earth		

Please Note:

The above lists are not intended to promote or discredit the product of any Company. It is provided to assist in ensuring the satisfactory on-going operation of your system.

SECTION B: HOW TO LOOK AFTER YOUR AUSTIN BLUEWATER ABS TREATMENT SYSTEM

Limited-use substances in large concentration will reduce or stop the treatment process. These same substances in smaller concentrations will have no harmful effect on the treatment process. You may use the following substances without harming your Austin Bluewater ABS Treatment System if you use the substance according to the manufacturer's directions, use the substances sparingly, and do not introduce concentrated doses to the system:

- Bio-degradable laundry powders
- Laundry bleach
- Detergents with bleach
- Household cleaners containing sodium bactericides such as
    - Pine oil (disinfectant used in the general purpose liquid cleaners)
    - N-alkyl dichlorobenzyl ammonium chloride (disinfectant used in detergents and spray cleaners)
    - Sodium hydroxide (lye chemical used in drain openers and cleaners)
    - Sodium dichlor-s-triazinetrione (powdered bleach used in scouring powders and automatic dishwasher detergents)
    - Ortho-phenylphenol (bactericide used in tub and toilet bowel cleaners)

Waste Food

Some food waste, whether or not it is run through a waste grinder will not be treated by the system, but will remain in solid form and fall to the bottom of the septic tank.
Therefore, you should consider not using a waste grinder system, or disposing of these food items through the Austin Bluewater ABS Treatment System:

- Animal bones
- Melon rinds
- Corn cobs
- Pips and seeds
- Eggshells
- Any other non-edible food waste

Acceptable Solutions

Substances that are considered to be typical domestic wastewater are human waste, bath and dish water and edible food waste.

The following substances may be used regularly without harming your Austin Bluewater ABS Treatment System:

- Laundry detergents without bleach
- Dishwashing detergents without bleach
- Toilet paper
- Household cleaners containing sodium bicarbonate, sodium carbonate and sodium borate.

NEVER DISPOSE OF ANY OF THE FOLLOWING ITEMS INTO THE SYSTEM:

- Automotive Oil
- Bleaches, disinfectants, whiteners
- Nappy liners, condoms, sanitary napkins

Automotive oil is not treatable by the bacteria; the disinfectants will take away all the bacteria's oxygen; the sanitary items are impregnated with anti-bacterial matter, so they will never break down. The results will be – bacteria will die. The tank will almost certainly need to be pumped out to remove the gross pollutants and the tank refilled and re-started.

Whatever the product, always ensure that it is marked as Bio-degradable and Safe to Use in Septic/Onsite Systems. Refer to the LANFAX LABORATORIES INDEPENDENT LAUNDRY PRODUCT RESEARCH website for more unbiased information. www.lanfaxlabs.com.au

SECTION FOUR

SYSTEM MAINTENANCE, MONITORING AND SERVICING

The Austin Bluewater ABS Treatment System is available as a dosed pumped system. The owner should determine the status of the system, substances introduced into the system, and the frequency of required pump-out as determined by the service provider.

To maintain the Limited Warranty your Austin Bluewater ABS Treatment System should be furnished with a 6 month service policy to ensure proper operation of the system.

Primary and Secondary Chamber
Periodically, waste will need to be removed from both primary chambers using normal pump-out procedures.

Polylok PL525
The system is complete with a Polylok PL525 bacteriological filter which performs two primary functions in a septic tank installation. It retains the filters 75% of all suspended solids in the tank and treats the wastewater by lowering the BOD, more than 50%.

Dosed Pumping System
A dosed pumping system is used to give a proportioned controlled flow to the engineered designed disposal field, to allow for even distribution over the entire field. Submersible effluent pumps operate in harsh acidic conditions and should be checked on an annual basis for satisfactory operation.

System Capacity
The system is rated for a maximum of 8-10 persons or 1,600 litres/day continuous. As with any system it is important the system is not hydraulically overloaded as this will interfere with the organic breakdown of the treatment process.

Visual
Wastewater backup is characterised by wastewater flowing back into the house or slow movement of the wastewater in the drains. This may indicate a problem with your wastewater treatment system. Identify where the backup is occurring within your home's plumbing system. If no material is blocking the drain, contact your Service Technician or local supplier.

Within the greater Canterbury area, Austin Bluewater Environmental Concepts offer a six month service and maintenance contract to ensure your system functions correctly. This also forms part of our two year Limited Warranty Validation.

Service procedure includes the following:

1. Visual inspection of system to ensure correct biological function of system.

2. Septic and secondary chamber checked and biological breakdown of sewage analysed for correct operation of system. Client notified of correct timing for septic pump-out.

3. Polylok bacteriological filter cleaned and repositioned as necessary.

4. If pump fitted, unit removed, screen removed, impeller checked and unit fully cleaned of debris/build-up.

5. Field Service Report presented to owner and Council verifying work carried out.

SECTION FIVE

TROUBLE SHOOTING-PROCESS FAILURE

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
Audible alarm on control panel is ringing.	The pump has failed, or is blocked.	Remove pump from system and determine if inlet is blocked or complete pump failure has occurred.
Wastewater is backing up into the home sewer piping.	There is an obstruction in the home sewer piping.	Check the piping lead to the system visually or with drain cleaning equipment for an obstruction and correct.
	There is an obstruction in the discharge line from the system.	Check the effluent piping and lateral field piping visually or with drain cleaning equipment for an obstruction and correct.
	The lateral field pump has failed.	Check the operation of the lateral field pump per the manufacturer's specifications.
	The flow rate to the system is too high.	Check the maximum flow rate to the system to see that it is within normal limits.
	The tank requires cleaning and/or a pump out is required.	Check the sludge depth in both chambers of the tank to see if it is below required levels.
	Polylok filter is blocked.	Remove Polylok filter from system and clean as necessary.

SECTION SIX

LIMITED WARRANTY

Austin Bluewater Environmental Concepts Limited warrants the Austin Bluewater ABS Treatment System to be free from defects in material and workmanship for a period as follows:

(a)	Concrete Structure	=	10 years
(b)	Electrical and Mechanical Componentry	=	3 years
(c)	Polylok Filter	=	Lifetime Warranty

From the date of sale to the ultimate consumer when properly registered with Austin Bluewater Environmental Concepts Limited sole obligation under this warranty is as follows:-

Austin Bluewater Environmental Concepts Limited shall fulfil this warranty by repairing or exchanging any component part, F.O.B. factory, that shows evidence of defects, provided said component part has been paid for, warrantee has notified Austin Bluewater Environmental Concepts Limited the defect complained of and the component is returned through an authorised Distributor, transportation paid. There is no informal dispute settlement available under this LIMITED WARRANTY.

The three year Limited Replacement Warranty on pumping units is based on the ultimate consumer engaging with Austin Bluewater Environmental Concepts Limited, or authorised Distributor, in a Service Agreement for twelve monthly maintenance (2 x 6 monthly services) of system. Failure to do this negates the pump warranty.

The warranty does not allow for labour or travel. The warranty does not cover Austin Bluewater Environmental Concepts Limited treatment plants and related components that have flooded, by external means, or that have been disassembled by unauthorised persons, improperly installed, subject to external damage, or damage due to altered or improper wiring or overload protection.
DO NOT cover service lids with soil.

Other than the mechanical and structural working of the plant itself, Austin Bluewater Environmental Concepts is not responsible for the in-field operation of a plant. The proper operation of this or any other individual wastewater plant depends upon proper organic and hydraulic loading of the plant. We cannot control the loading and thereby cannot control the amount of harmful substances that may be discharged into the plant. Only the users of a plant can control what enters the unit. Therefore, we provide a comprehensive user's manual that outlines substances that should be kept out of the plant.

This LIMITED WARRANTY extends to the ultimate consumer of the product. 'Ultimate Consumer' is defined as the purchaser who first had the plant installed, or in the case of a system designed for non-permanent installation, the purchaser who first uses the system. It is the purchaser's or any sub-vendee's obligation to make known to any other consumer, the terms and conditions of this warranty.

This warranty is a LIMITED WARRANTY and no claim of any nature shall be made against Austin Bluewater Environmental Concepts Limited unless and until the ultimate consumer, or his legal representative, notifies Austin Bluewater Environmental Concepts in writing of the defect complained of and delivers the product and/or defective part(s) freight prepaid, to Austin Bluewater Environmental Concepts Limited or an authorised service agent.

SECTION SEVEN

N2P | Controls
engineering innovative solutions

ABS CONTROL PANEL

ABS CONTROLLER DESIGN MANUAL

ABS CONTROLLER INSTALLATION GUIDE

Refer to attached wiring and circuit diagram when installing the controller. All electrical work must be carried out as per NZS 3000:2007 and NZECP2:1993. The controller is to be earthed at the distribution board and the supply to the controller should be protected by to a maximum of 16 Amps. Any questions during installation please contact N2P Controls on 09 570 1919.

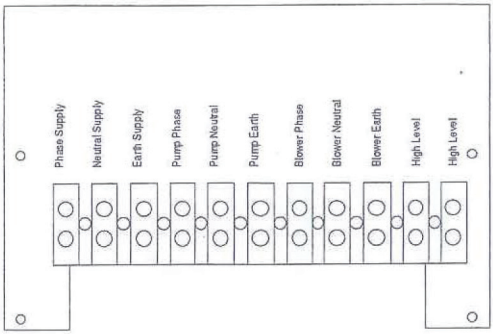
This controller is rated to lOA at 230V and has been designed for the ABS tank only.

1. Run the power supply cable through a cable gland (or similar water tight method) to the inside of the controller. Ensure this connection is high as practical above ground level to ensure the chance of water entering is as low as possible.

2. Remove the lid of the controller. This will expose the printed circuit board on the lid of the controller and the mounting plate. The mounting plate is shown to the right.

3. The inside of the turret will show two cables with plugs attached to them, and a cable for the high level alarm. The plugs supply power to the Pump and Blower respectively.

4. The pump and blower plugs each have a label identifying what is the plug for the pump and blower. Connect the pump and blower to their respective plugs



N2P | Controls
engineering innovative solutions

AB2K CONTROLLER DESIGN MANUAL

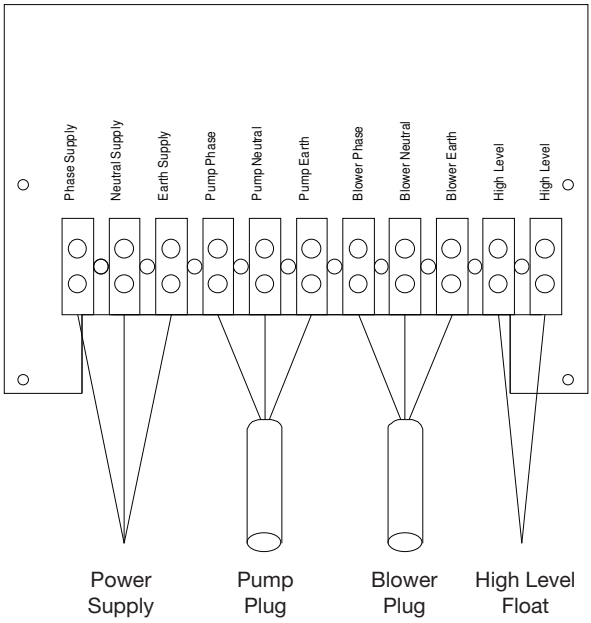
AB2K CONTROLLER INSTALLATION GUIDE

5. Once the power supply cable is inside the enclosure, wire the supply Earth, Neutral and Phase to the 3 terminals named *Phase Supply, Neutral Supply* and *Earth Supply.*

6. Wire the high level alarm float to the cable supplied. The wires of the float used are the Blue and Brown wire. The Green/Yellow wire is not used and can be cut but ensure it is sealed well so no moisture can track down the float cable. The float is to be wired Normally Open (NO). The level float circuit is extra low voltage. NB: This is typically done at the factory.

7. Once finished wiring, secure the Controller's lid back onto the controller and the lid onto the turret.

NOTE: The ON/OFF switch is on the side of the controller is to turn power on and off to the pump, blower and printed circuit board only.



ABS CONTROLLER DESIGN MANUAL

ABS CONTROLLER INSTALLATION GUIDE

8. Once installed commission by:
    - Plug the pump int o the plug socket labelled Pump.
    - Plug the blower into the plug socket labelled Blower.
    - Supply power to controller once safe to do so. The Green Power LED light should illuminate on front of controller.
    - The Blower should run continuously
    - Test pump by lifting the float attached to the pump.
    - Test high level alarm by lifting high level alarm float. The red High Water Fault LED should illuminate, the buzzer sound and alarm light flash.
    - Press the mute button and the buzzer should stop. The mute will disengage after 24 hours.

Any questions during the installation, please contact N2P Controls on +64 9 570 1919

Plants that are highly recommended. (Suitable for both sorts of effluent fields).

Grasses, Grass-like or Flaxes, Flax-like

Botanical name	Maori Name	Common Name	Typical height
Arthropodium cirratum	Rengarenga	Rock lily	20-40cm
Astelia grandis *		Swamp Astelia	1.5-2m
Carex dissita *			40-90cm
Carex flagellifera			50-70cm
Carex germinate			50cm-1m
Carex lessoniana			70cm-1.2m
Carex maorica *			50cm-1m
Carex secta	Purei, Pukio		70cm-1m
Carex tenuiculmis			50-70cm
Carex virgata			70cm-1m
Cortaderia fulvida	Toetoe, Kakaho	Cutty Grass	1-1.5m
Cortaderia toetoe	Toetoe, Kakaho	Cutty Grass	1.5-2m
Cyperus ustulatus *	Toetoe upokotangata	Giant umbrella sedge	60cm-1m
Dianella nigra	Turutu	NZ blue berry	30-60cm
Juncus gregiflorus *	Wiwi	Common rush	50cm-1.5m
Leptocarpus similis	Oioi	Jointed Rush	50-70cm
Machaerina sinclairi *	Pepepe, Toetoe tuhara		50cm-1m
Phormium tenax	Harakeke	Flax	1.5-2m
Phormium tenax purpurea		Purple Flax	1.5-2m
Uncinia unciniata *		Hook Grass	20-40cm

Spreading ground covers

Botanical name	Maori Name	Common Name	Typical height
Coprosma acerosa	Tataraheke	Sand Coprosma	30-40cm
Coprosma atropurpurea *			5-10cm
Coprosma 'Hawera'			10-20cm
Coprosma kirkii			30-50cm
Coprosma 'Poor Knights'			30-50cm
Coprosma prostrata			30-50cm
Coprosma 'Taiko'			20-30cm
Elatostema rugosum *	parataniwha		40-70cm
Fuchsia procumbins			10-20cm

Shrubs and small trees (typically less than 5m)

Botanical name	Maori Name	Common Name	Typical height
Brachyglottis repanda *	Rangiora		3-4m
Carpodetus serratus	Putaputaweta	Marble leaf	3-5m
Coprosma arborea *	Mamangi		3-4m
Coprosma areolate *		Thin-leaved coprosma	3-4m
Coprosma cultivars which are coloured (lots of options)			1-3m
Coprosma propinqua	Mingimingi		1-3m
Coprosma repens	Taupata	Mirror Plant	2-4m
Coprosma rhamnioides *			1-2m
Coprosma robusta	Karamu		2-4m
Clianthus puniceus	Kowhai ngutu-kaka	Kaka Beak	2-3m
Fuchsia excorticate *	Kotukutuku	Tree Fuchsia	3-5m
Geniostoma rupestre *	Hangehange		1-2m
Hebe Stricta	Koromiko		1-3m
Macropiper excelsus	Kawakawa		1-3m

Trees (typically 5m or more)

Botanical name	Maori Name	Common Name	Typical height
Kunzea ericoides	Kanuka	White Tea-tree	6-10m
Cordyline australis	Ti kouka	Cabbage Tree	5-10m
Leptospermum scoparium	Manuka	Tea-tree	4-8m

Ferns

Botanical name	Maori Name	Common Name	Typical height
Blechnum novaezealandiae *	kiokio		1-2m
Dicksonia squarrose	wheki	tree fern	3-5m
Hypolepis dicksonioides *			1-1.5m

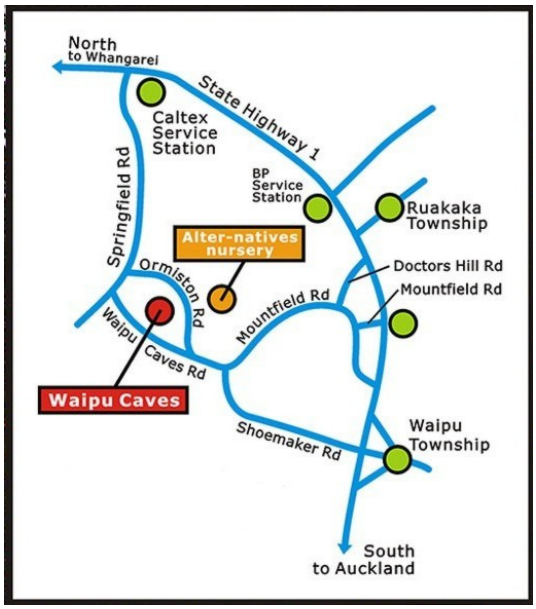
Large trees that are recommended for effluent fields using dripper lines; or only for on the fringe of underground systems (3m or more away from pipes because of the potential for the plant roots damaging your pipes).

Trees (typically 5m or more)

Botanical name	Maori Name	Common Name	Typical height
Laurelia novae-zealandiae	Pukatea		10-20m
Corynocarpus laevigata	Karaka		8-15m
Dacrycarpus dacrydioides	Kahikatea	White pine	20-30m
Pittosporum eugenoides	Tarata	Lemonwood	6-10m
Aristotelia serrata	Makomako	Wineberry	6-10m
Pittosporum tenuifolium	Kohuhu		5-8m
Plagianthus regius	Manatu	Ribbonwood	8-12m
Hoheria populnea	Houhere		6-8m
Melicytus ramiflorus	Mahoe	Whiteywood	4-6m
Rhopalostylis sapida	Nikau		6-12m
Pennantia corymbose *	Kaikomako		6-10m
Schflera digitata	Pate, Pata	Seven finger	4-6m
Vitex luscens	Puriri		10-20m

Note: Plants marked with a * can sometimes be hard to find in nurseries around Northland.

Good luck. From the team at Alter-Natives Nursery.



SOUTHERN WOODS
PLANT NURSERY
Main South Road, Templeton, Christchurch 8441
P: 03 347 9221 or 0800 800 352 | Fax: 347 9223
info@southernwoods.co.nz | www.southernwoods.co.nz

Info 16: PLANTING FOR EFFLUENT RUNOFF

The following plants are suitable for the Canterbury area. Maximum heights and spreads are approximate only, and will differ in different situations, soils and aspects.

Botanical Name	Common Name	Max Height	Max Spread
Aristotelia serrata	Wineberry	6	3
Carex comans	Ornamental Grass	0.5	1
Carex secta	Large Green Sedge	1.5	1.5
Carex trifida	Ornamental Sedge	1	1
Carex virgata	True Wetland Sedge	1	1
Carpodetus serratus	Marble Leaf	7	4
Chionochloa conspicua	Snow Grass	1	1.5
Chionochloa rubra	Red Tussock	1	1.5
Coprosma propinqua	Mingimingi	5	2.5
Coprosma robusta	Karamu	5	4
Cordyline australis	Cabbage Tree	10	2
Cortaderia richardii	Toe Toe	2	2
Cyperus ustulatus	Giant Umbrella Sedge	1	0.6
Dacrycarpus dacrydioides	White Pine	50	5
Eucalyptus gregsoniana	Wolgan Snow Gum	6	4
E. lansdowneana ssp albopurpurea	Crimson Mallee	6	4
Eucalyptus lingustrina	Privit-leaved Stringybark	6	4
Eucalyptus moorei	Narrow-leaved Sally	4	3
Eucalyptus ovata	Swamp Gum	20	6
Griselinia littoralis	Broadleaf	5	2.5
Hebe spp			
Hoheria populnea	Lacebark	8	3
Leptospermum scoparium	Manuka	4	3
Melicytus ramiflorus	Whiteywood	8	2.5
Nothofagus fusca	Red Beech	30	5
Pennantia corymbosa	Bellbird Tree	8	3
Phormium spp	Flax		
Pittosporum colensoi	Black Mapou	5	3
Pittosporum tenuifolium	Kohuhu	6	3
Plagianthus divaricatus	Swamp Ribbonwood	2	2
Plagianthus regius	Ribbonwood	12	3
Pseudopanax arboreus	Fivefinger	6	3.5
Sophora microphylla	Kowhai	8	3
Uncinia uncinata 'Rubra'	Red-leaved Grass	0.3	0.3

AUSTIN bluewater
WASTEWATER TREATMENT ENGINEERS

TEN COMMANDMENTS FOR YOUR SEPTIC TANK

I Thou shalt not pour greases, fats or oil into the system

II Thou shalt not attach a waste disposal unit to your system

III Thou shalt not dispose of paints and/or any household chemicals into the system. Use liquid cleaners/washing powders and biodegradable products where possible

IV Thou shalt not dispose of automotive fluids down any drain including petrol, oil, transmission or brake fluid, grease or antifreeze

V Thou shalt not rinse pesticides, herbicides or any other toxins down the system

VI Thou shalt not dispose of any non-biological item in your toilet e.g. disposable nappies, condoms or feminine products

VII Thou shalt not waste unnecessary amounts of water

VIII Thou shalt not run half loads in the dishwasher or washing machine. Where possible stagger laundry wash loads throughout the week

IX Thou shalt not use chemicals to "clean out" blocked drains

X Thou shalt not attach "clean water" sources such as sump pumps or storm water to your wastewater system

AUSTIN bluewater
WASTEWATER TREATMENT ENGINEERS

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Demand Calculation Sheet

Job Details

Name:	CH1054 Bryan & Philippa Donnelly
Street and Number:	153 Innes Road
Lot and DP Number:	Lot 4 DP 502943
City/Town/District:	Amberley
Designer:	GW
Company:	IDesign Architecture
Date:	Friday, 22 October 2021

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)	8
Roof Height above Eaves (m)	1.6
Building Height to Apex (m)	4.6
Ground to Lower Floor (m)	0.25
Average Stud Height (m)	2.4
Building Length (m)	20.83
Building Width (m)	14.7
Building Plan Area (m²)	246.1

Building Location

Wind Zone = 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	**714**	**877**

Bracing Units required for Earthquake

	Along & Across
Single Level	**1289**

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Single Level Along Resistance Sheet

Job Name: CH1054 Bryan & Philippa Donnelly

									Wind	EQ
									Demand	
									714	1289
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	2160 302%	1899 147%
A	1	1.50		2.4	GS1-N	GIB®	104	90		
	2	1.50		2.4	GS1-N	GIB®	104	90		
	4	1.50		2.4	GS1-N	GIB®	104	90		
	External Length = 12.89								311 OK	270 OK
B	1	1.70		2.4	GS1-N	GIB®	117	102		
	2	4.80		2.4	GS1-N	GIB®	331	288		
	External Length = 1.4								449 OK	390 OK
C	1	3.00		2.4	GS1-N	GIB®	207	180		
	2	0.70		2.4	GS1-N	GIB®	41	41		
	3	4.90		2.4	GS1-N	GIB®	338	294		
	External Length = 5.47								586 OK	515 OK
D	1	1.80		2.4	GS1-N	GIB®	124	108		
	2	1.60		2.4	GS1-N	GIB®	110	96		
	3	1.80		2.4	GS1-N	GIB®	124	108		
	External Length = 3.87								359 OK	312 OK
E	1	3.00		2.4	GS1-N	GIB®	207	180		
	2	0.80		2.4	GS1-N	GIB®	49	47		
	3	0.70		2.4	GS1-N	GIB®	41	41		
	4	0.60		2.4	GS1-N	GIB®	34	35		
	5	1.80		2.4	GS1-N	GIB®	124	108		
	External Length = 20.83								456 OK	411 OK

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Single Level Across Resistance Sheet

Job Name: CH1054 Bryan & Philippa Donnelly

Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	Wind	EQ
									Demand	
									877	1289
									Achieved	
									1523	1378
									174%	107%
M	1	1.00		2.4	GS1-N	GIB®	65	60		
	2	0.60		2.4	GS1-N	GIB®	34	35		
	3	0.90		2.4	GS1-N	GIB®	57	53		
	External Length = 8.35								156 OK	148 OK
N	1	3.20		2.4	GS1-N	GIB®	221	192		
									221 OK	192 OK
O	1	1.80		2.4	GS1-N	GIB®	124	108		
	2	0.60		2.4	GS1-N	GIB®	34	35		
	3	0.90		2.4	GS1-N	GIB®	57	53		
	4	0.60		2.4	GS1-N	GIB®	34	35		
	External Length = 6.35								249 OK	232 OK
P	1	2.90		2.4	GS1-N	GIB®	200	174		
									200 OK	174 OK
Q	1	1.70		2.4	GS1-N	GIB®	117	102		
	2	1.80		2.4	GS1-N	GIB®	124	108		
									242 OK	210 OK
R	1	2.00		2.4	GS1-N	GIB®	138	120		
	2	2.00		2.4	GS1-N	GIB®	138	120		
	3	1.10		2.4	GS1-N	GIB®	74	66		
	External Length = 8.72								350 OK	306 OK
S	1	0.43		2.4	BLP-H	GIB®	53	59		
	2	0.43		2.4	BLP-H	GIB®	53	59		
	External Length = 5.98								106 OK	117 OK

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GIB®

EzyBrace® Systems

Specification and installation manual

CBI 5113

AUGUST 2016

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NATIONAL SUPPORT

VISIT: Winstone Wallboards Limited
37 Felix Street, Penrose,
Auckland 1061, New Zealand
POST: PO Box 12 256, Penrose 1642,
Auckland, New Zealand
PHONE: +64 9 633 0100
FAX: +64 9 633 0101
Free Fax: 0800 229 222
EMAIL: info@gib.co.nz
WEB: gib.co.nz

GIB® HELPLINE

0800 100 442

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Based on learnings derived from the 2011 Canterbury earthquakes GIB EzyBrace® Systems have been updated to offer improved design flexibility and further simplification of the bracing design and build process.

NEW GIB EZYBRACE® 2016 DESIGN SOFTWARE

- Improved user interface with simplified bracing design process.
- Increased functionality including exterior line check function, easy insert/deletion of bracing elements and built in software help function.
- Includes the new GIB® Bracing element GS2- NOM
- Allows the GIBFix® Framing System to be used in GIB EzyBrace® designs.

NEW GIB® BRACING ELEMENT GS2-NOM

- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute to bracing resistance.
- Potentially reduces the amount of fasteners[1]
- Encourages more even bracing distribution throughout the building.

[1] Actual savings dependent on building and bracing design

UPDATE TO OPENINGS IN BRACING ELEMENTS AND CEILING DIAPHRAGMS

- Large hole specification updated to use a more conservative methodology.
- Guidance included for fireplace flues and range hoods.

NEW — GIBFIX® FRAMING SYSTEM

- Reduced potential for fastener pop and joint cracking as a result of timber frame movement.
- Reduced potential for on-site call backs.
- Improved thermal performance.
- Reinforced plasterboard junctions.

BRANZ Appraised
Appraisal No.928 [2016]

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GIB EzyBrace® Systems — August 2016

Winstone Wallboards Ltd accepts no liability if GIB EzyBrace® Systems are not designed and installed in strict accordance with instructions contained in this publication.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication at any time. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. Check for the current publication at gib.co.nz/library before using this publication. If you are unsure whether this is the current publication, call the GIB® Helpline on 0800 100 442.

GIB EzyBrace® 2011 software and specification literature remains valid until futher notice.

PATENTS

GIBFix® Framing System and GIB EzyBrace® Systems, including componentry and design method, have patents pending (NZ Patent Number 596691, NZ Patent 709159 pending) and design and other IP rights reserved.

Beware of substitution

The performance of GIB® Systems are very sensitive to design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested or assessed to ensure the required level of performance. It is important to use only GIB® branded components where specified and to closely follow the specified design details and construction practices, to be confident that the required level of performance and quality is achieved on site.

For further information call our GIB® Helpline on 0800 100 442.

GIB EzyBrace® Systems have been designed and tested using only the products specified. When additional GIB® plasterboard properties are required the table below provides acceptable alternative options.

	Acceptable alternative GIB® plasterboards								
Specified GIB® plasterboard	GIB® Standard	GIB Ultraline®	GIB Braceline/ Noiseline®	GIB Aqualine®	GIB Toughline®	GIB Fyreline®			
						10mm	13mm	16mm	19mm
GIB® Standard		OK	OK	OK	OK	Note 1 and 3			
GIB Braceline®	X	X		Note 2	OK	X	Notes 1, 2 and 3		

Note 1 *The fastener type and length must be as required for the relevant FRR system using the perimeter fixing pattern illustrated for the relevant bracing specification.*

Note 2 *The element must be 900mm or longer. Decrease perimeter fastener centres to 100mm. The bracing corner fastening pattern, as illustrated for the relevant specification applies to all four corners of the element. Panel hold-down fixings are required.*

Note 3 *Specify traditional wall framing layout (see figure 1) where a Fire Resistance Rating (FRR) is required.*

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Scope of use

This document is a guide to wall bracing of light timber frame (LTF) buildings constructed in accordance with NZS3604:2011 Timber Framed Buildings and presents a simple and efficient method for calculating and incorporating bracing resistance. This information draws on recent experiences from seismic activity in New Zealand and seeks to minimise earthquake damage to plasterboard linings in LTF buildings.

This document outlines the main principles of bracing design and construction using GIB® plasterboard products and systems. Further detailed information can be found in the GIB® Bracing Supplement by visiting gib.co.nz/library. This 'live' on-line document is updated continuously in response to market feedback and Winstone Wallboards' development initiatives.

Finish quality — framing and substrates

Home owners are increasingly demanding a high quality of interior finish. Finish quality is heavily influenced by the substrate to which linings are fixed. Detailed information on 'Levels of Finish' is given in AS/NZS 2589 and the latest version of the GIB® Site Guide.

New GIBFix® Framing System

With increased NZ Building Code requirements and growing customer demand for thermal efficiency and high quality interior finishes, traditional framing practices present problems such as multiple framing members at wall intersections creating thermal 'bridges' and cavities where insulation cannot be installed effectively.

Figure 1 shows a traditional wall framing layout. Figure 2 shows the alternative GIBFix® Framing System layout.

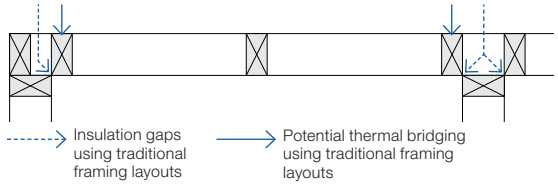
Multiple timber framing members also take longer to dry resulting in an increased risk of fastener pops and blemishes resulting from timber frame movement.

The GIBFix® Framing System offers better thermal efficiencies and minimises potential joint imperfections resulting from interior linings being fixed to multiple timber framing members.

The GIBFix® Framing System can be used in conjunction with GIB EzyBrace® Systems.

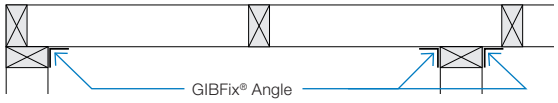
Bracing ratings apply whether fixing is directly into timber or into the metal components, provided correct construction details, fastener types and centres are applied.

FIGURE 1: TRADITIONAL WALL FRAMING LAYOUT



GFS004

FIGURE 2: GIBFIX® FRAMING SYSTEM (ALTERNATIVE LAYOUT)



GFS005

NEW GS2-NOM Bracing Element

The new GS2-NOM bracing element allows most homes to be braced with a single lining type and less fixings so that a high quality finish is maintained throughout.

GS2-NOM permits the contribution of 'nominally fixed' internal walls. Higher performance elements are commonly specified on external walls and where limited wall area is available or adjacent to significant openings.

Winstone Wallboards recommends the use of the GIBFix® Framing System in conjunction with GS2-NOM elements. Key benefits of this approach include:

- Reduced potential for fastener pop and joint cracking of plasterboard linings.
- Enhanced thermal performance.
- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute bracing resistance.
- Potentially reduces the amount of fasteners[1].
- Encourages more even bracing distribution throughout the building.

1. Actual savings dependent on building and bracing design.

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Compliance with the NZ Building Code

NZBC CLAUSE B1 — STRUCTURE

The design and material specification for steel and timber framing used in conjunction with this literature must be in accordance with the performance requirements of NZBC Clause B1. GIB EzyBrace® Systems comply with the requirements of NZS 3604:2011, when designed and installed in accordance with this publication and relevant technical literature. NZS 3604:2011 is an acceptable solution to NZBC Clause B1.

NZBC CLAUSE B2 — DURABILITY

Under normal conditions of dry internal use GIB EzyBrace® Systems have a service life in excess of 50 years and satisfy the requirements of NZBC Clause B2. When in conditions of dry internal use, the components specified in this literature satisfy the requirements of NZBC Clause B2.

GIB® EzyBrace® Systems must not be specified in areas where 15 year durability applies and where linings are subject to direct water pressure, e.g. shower cubicle or shower over bath situations.

NZBC CLAUSE F2 — HAZARDOUS BUILDING MATERIALS

Under normal conditions of use, during handling, installation or serviceable life, the products detailed in GIB EzyBrace® Systems do not constitute a health hazard and meet the provisions of the NZBC Clause F2.

NZBC CLAUSE H1 — ENERGY EFFICIENCY

Buildings must be constructed to achieve an adequate degree of energy efficiency and the building envelope must provide adequate thermal resistance. The required thermal resistance (R-value) of timber framed external walls depends on climate zone but is commonly in the range from R 1.9 to R 2.0.

CAD design details

Where applicable drawings related to GIB EzyBrace® Systems have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box. CAD design details can be found at gib.co.nz/library.

Appraisal

GIB EzyBrace® Systems 2016 have been appraised by the Building Research Association of New Zealand (BRANZ), Appraisal No. 928 (2016) GIB EzyBrace® Systems, 2016.

It is of prime importance to comply with the details of design, construction and workmanship in this document.

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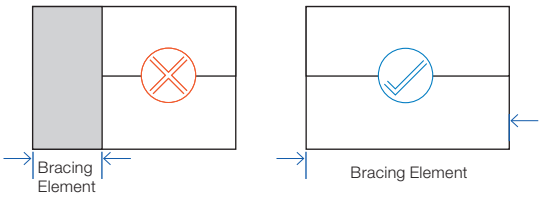
Bracing resistance

WALL BRACING LAYOUT

When designing the bracing layout, carefully consider the final finished appearance and utilise full wall lengths where possible, avoiding unnecessary fastenings in the centre of a clear wall. Using the available wall length provides additional bracing and achieves improved aesthetics.

FIGURE 3: WALL BRACING LAYOUT



BRACING DISTRIBUTION

Distribute bracing by drawing a grid pattern of bracing lines along and across the building. Bracing lines must coincide as much as possible with the wall bracing elements. Pairs of elements may be counted on a single line provided they are no more than 2 metres apart and parallel. See figure 4.

Locate bracing evenly throughout the building and as close as practical to corners of external walls.

Space bracing lines no more than:

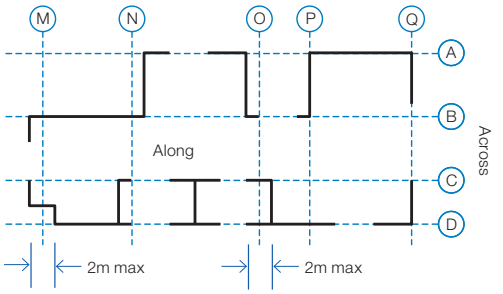
- 6 metres for standard construction with any GIB® plasterboard ceiling, or
- 7.5 metres where dragon ties in accordance with NZS3604:2011 have been installed, or
- 12 metres with a GIB® plasterboard ceiling diaphragm.

The construction of ceiling diaphragms is described in detail on p.18–20.

NZS3604:2011 requires that no bracing line shall have a capacity less than the greater of:

- 100 Bracing Units (BUs), or
- 15 x the external wall length (BUs) for bracing lines coinciding with external walls, or
- 50% of the total demand (D) divided by the number of lines (n) in the direction being considered (BUs).

FIGURE 4: BRACING GRID LAYOUT



The NZS3604 ‘rules’ are merely minimum guidelines and compliance with them does not in itself ensure even distribution. The designer is responsible for checking distribution. Poor distribution can cause torsional effects and localised or more significant damage in an earthquake event.

GIB EZYBRACE® SYSTEMS

The GIB EzyBrace® Specification Numbering System (and sub-components thereof) is protected by copyright and makes specification and identification of GIB EzyBrace® Systems transparent.

- 'GS' stands for GIB® Standard.
- 'BL' for GIB Braceline®.
- 'P' for plywood.
- '1' and '2' for linings one or both sides.
- ‘N’ stands for 'no specific panel hold-down fixings'.
- 'H' stands for 'specific panel hold-down fixing' required.
- 'NOM' stands for 'nominal plasterboard fixing'. This refers to the standard fixing method used to install plasterboard as shown in the current GIB® Site Guide.

Where specific hold-down fixings are specified, refer to p.15-16. GIB HandiBrac® is fully contained within the framing cavity and does not interfere with lining installation and quality of finish.

Where no specific hold-down fixings are required, the minimum NZS3604:2011 bottom plate fixings apply.

Full bracing element construction details are provided in this technical literature.

Further general design and construction information can also be found in our GIB® Bracing Supplement by visiting gib.co.nz/library.

Specifying GIB EzyBrace® elements (minimum wall length 400mm)	
Inside lining external walls.	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required. If the other side of the frame is lined with plywood consider GSP-H or BLP-H elements or use alternative proprietary bracing systems.
Internal walls (only one side available for bracing).	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required.
Internal walls (both sides available for bracing).	Nominate available length of wall as GS2-NOM elements. Change to GS1-N if higher ratings are required. Change to GS2-N if higher ratings are required. Change to BLG-H for even higher ratings. Consider GSP-H or BLP-H if the opposite side is lined with plywood.

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Bracing demand

GIB EZYBRACE® CALCULATOR

The GIB EzyBrace® calculator is a software tool to determine the wind and earthquake bracing demand and to design the bracing resistance for light timber-framed buildings constructed in accordance with NZS 3604:2011.

The updated GIB EzyBrace® calculator combines an up-to-date user-friendly interface with the latest knowledge relating to the performance of GIB® plasterboard in light timber-framed structures when subjected to high winds or earthquakes. The calculator can be down-loaded free of charge by visiting gib.co.nz/ezybrace and can be installed on either Microsoft® or Apple® Mac environments.

DEMAND

Wind and Earthquake 'Demand' calculates the forces a structure must be able to resist during its 'design life'. The GIB EzyBrace® calculator's Demand sheet determines the number of Bracing Units required depending on building location, building dimensions and materials used. The Demand sheet closely follows the familiar format of our Excel based GIB EzyBrace® calculator, and includes additional features such as a pop-up help facility explaining required input.

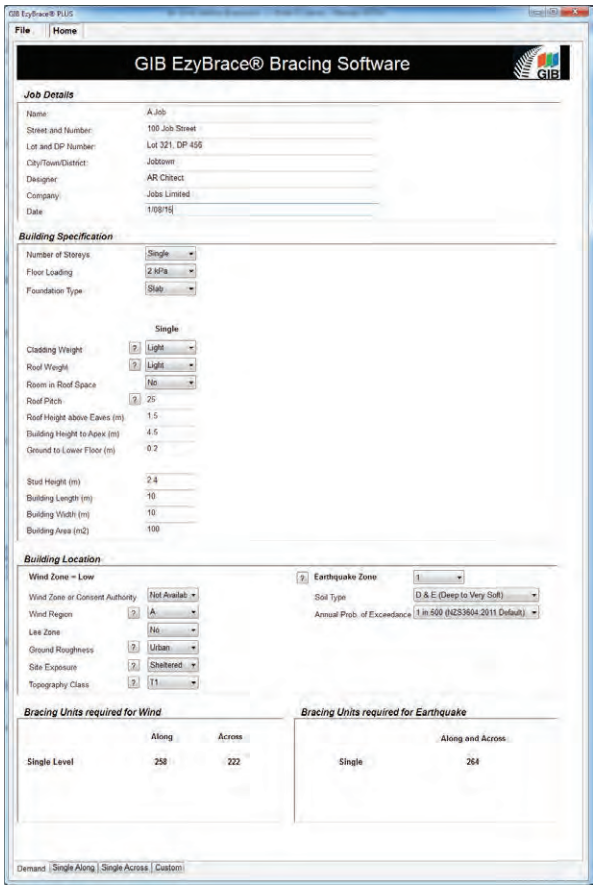
Bracing resistance sheets ('tabs') are added depending on the building specification entered. For example, subfloor bracing resistance tabs only show when a 'subfloor' foundation type has been selected.

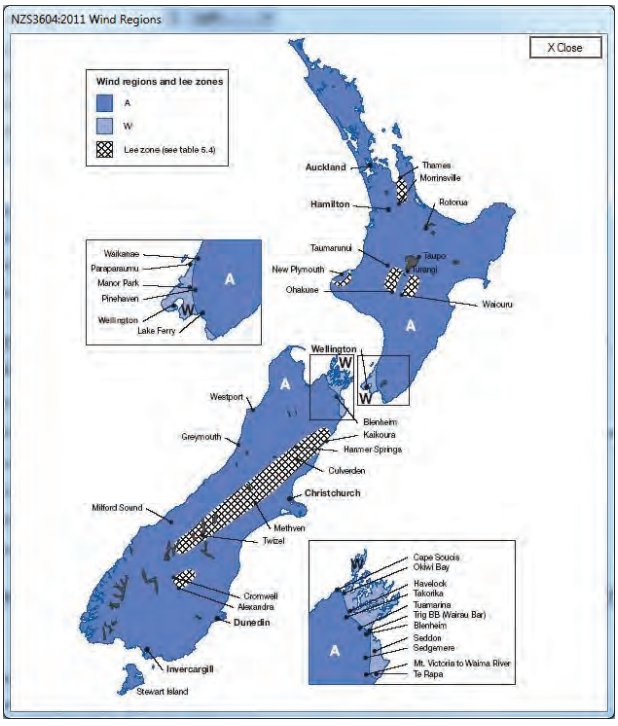
The Demand sheet gives the designer the option to select a longer earthquake return period which represents a higher earthquake design force. The default for buildings constructed in accordance with NZS3604:2011 is an earthquake that has a 10% chance of being exceeded within the assumed 50 year 'design life' of a light timber framed residential structure, a 'return period' of 500 years.

Many commercial and public buildings are designed for the more stringent requirement of a 10% probability of exceedance in a 100 or 250 year life expectancy.

A screen shot of the GIB EzyBrace® 2016 Demand Sheet and Help Facility is shown in figure 5.

FIGURE 5: GIB EZYBRACE® 2016 — DEMAND CALCULATION SHEET AND 'POP UP' HELP FACILITY





Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

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Software functionality

Innovations adopted in the GIB EzyBrace® 2016 bracing 'resistance' calculation sheets include the ability to easily add and delete lines and elements during calculations.

The software compares bracing resistance achieved with demand and for wall bracing lines incorporating external walls, the external wall length can now be entered to check minimum bracing units required on that line. The NZS 3604:2011 rules and associated software output are not the only check. Designers must additionally check the building layout to ensure adequate bracing distribution.

Figures 6 and 7 show screen shots of the Wall and Subfloor Resistance Sheets respectively.

FIGURE 6: GIB EZYBRACE® 2016 — WALL BRACING RESISTANCE CALCULATION SHEET

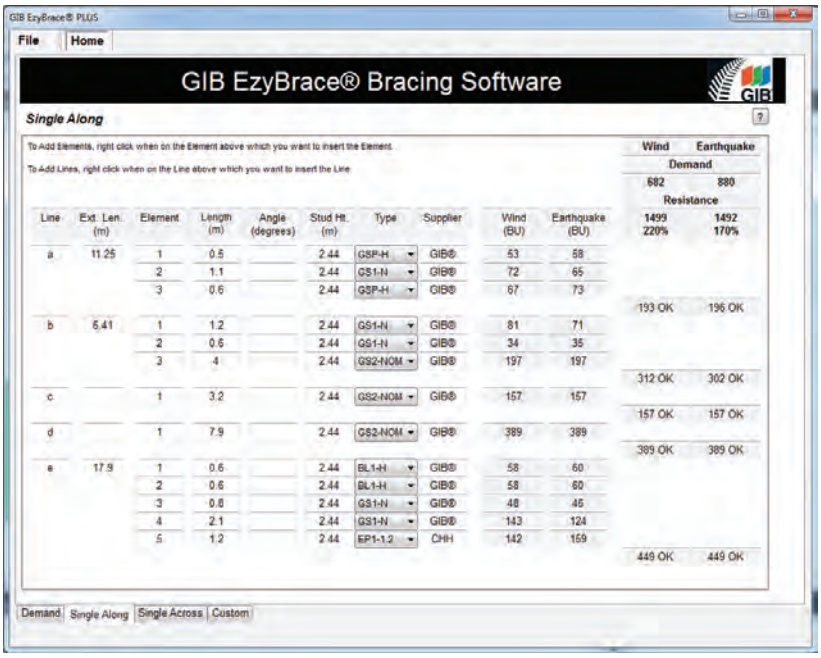
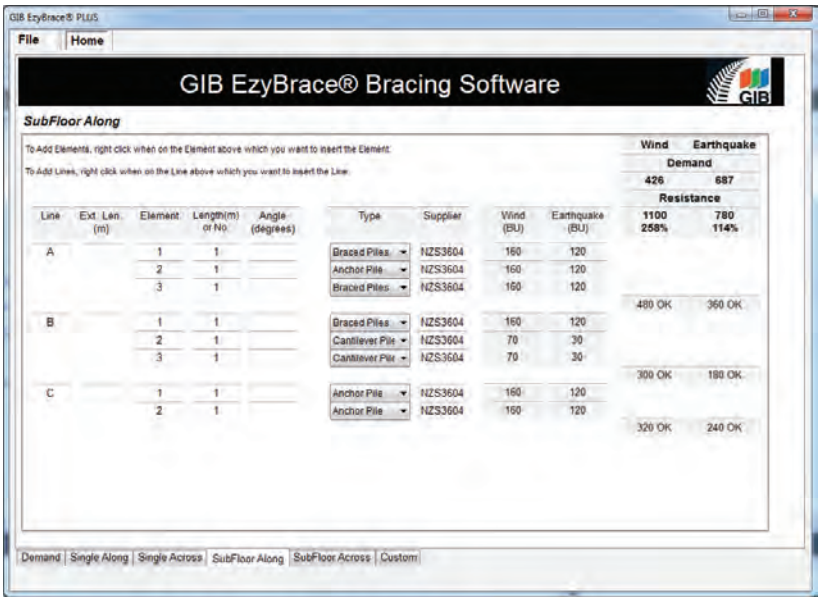


FIGURE 7: GIB EZYBRACE® 2016 — SUBFLOOR BRACING RESISTANCE CALCULATION SHEET



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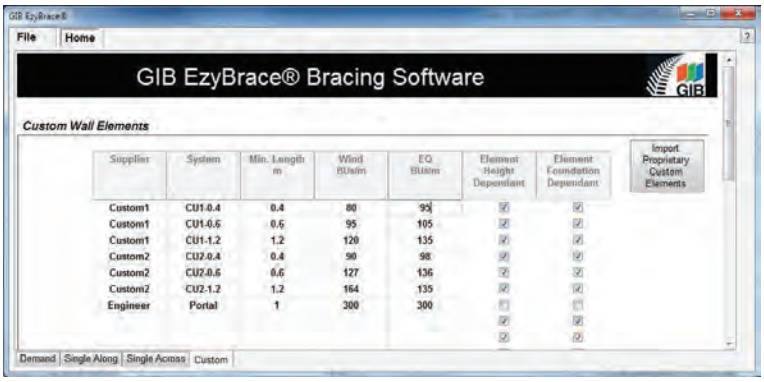
Software functionality

Custom elements can be entered by accessing the 'custom' tab as shown in figure 8.

FIGURE 8: GIB EZYBRACE® 2016 — CUSTOM ELEMENTS SHEET



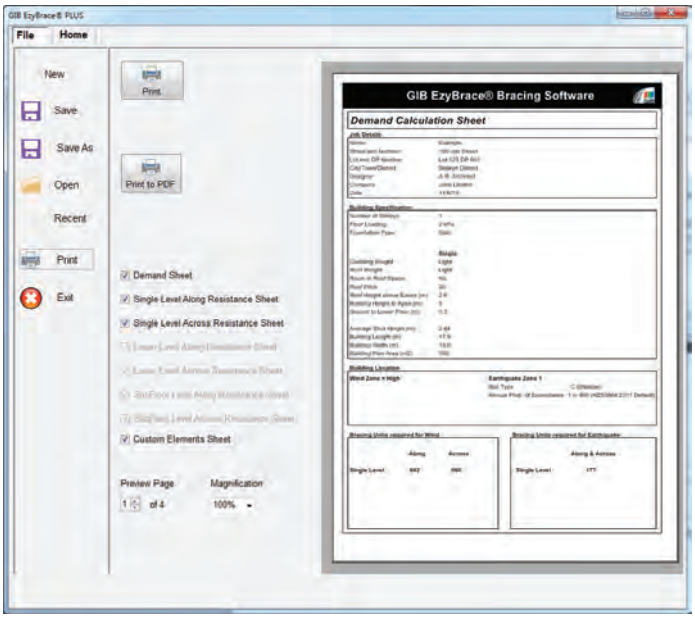
Note: Values and systems shown in Custom Elements Sheets are for illustrative purposes only.

Help can be accessed by pressing the ? symbol which displays a window with further information.

The GIB EzyBrace® 2016 software has a number of options that can be accessed via the File tab at the top left hand corner of the window. The options include: New, Save, Save As, Open, Recent and Print.

- The New option closes any opened job ready for the input of a new job.
- The Save option saves the currently opened job to the same filename and the Save As option saves the job to a new filename.
- The Open option prompts for the name of an existing job.
- The Recent option displays a list of the ten latest jobs and allows for the selection of one of these jobs to be opened.
- The Print option displays the print screen. In this screen, a print preview is displayed. The print preview can be copied to the clipboard by clicking the right-hand mouse button. Also on the print screen is the option to choose which pages are to be printed and the option to print the output to a portable data format, PDF, file.
- The Print Screen View is shown in figure 9.

FIGURE 9: GIB EZYBRACE® 2016 — PRINT SCREEN VIEW



Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

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GIB® plasterboard linings

When fixing part sheets of GIB® plasterboard, a minimum sheet width of 300mm applies for bracing elements. Horizontal fixing is recommended. If fixing vertically, full height sheets shall be used where possible. Where sheet end butt joints are unavoidable they must be formed over nogs or over the studs and fastened at 200mm centres. Alternatively, and preferably, sheet end butt joints may be back-blocked.

When a GIB® Bracing element has been designated for a section of wall, BU ratings cannot be increased by incorporating additional proprietary bracing elements within that same section of wall.

LIMITATIONS

- GIB® plasterboard must be stacked flat and protected from the weather.
- GIB® plasterboard must be handled as a finishing material.
- GIB® plasterboard in use must not be exposed to liquid water or be installed in situations where extended exposure to humidities above 90% RH can reasonably be expected.
- GIB EzyBrace® Systems must not be used in showers or behind baths.
- It is highly recommended not to install GIB® plasterboard in any situation where external claddings are not in place or the property is not adequately protected from the elements.
- If GIB® plasterboard is installed under these conditions, the risk of surface defects such as joint peaking or cracking is greatly increased.

GIB EzyBrace® Systems in water-splash areas

When GIB® plasterboard is installed in locations likely to be frequently exposed to liquid water it must have an impervious finish. Examples are adhesive fixed acrylic shower linings or ceramic tiles over an approved waterproof membrane over GIB Aqualine®. The NZBC requires 15 years durability in these situations. Bracing elements are required to have a durability of 50 years. Bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members. Otherwise GIB EzyBrace® Systems can be used in water-splash areas as defined by NZBC Clause E3, provided these are maintained impervious for the life of the building.

For futher design details refer to the current GIB Aqualine® Wet Area Systems literature.

Renovation

When relining walls during the process of renovation, ensure that bracing elements are reinstated (check the building plans).

Openings in bracing elements

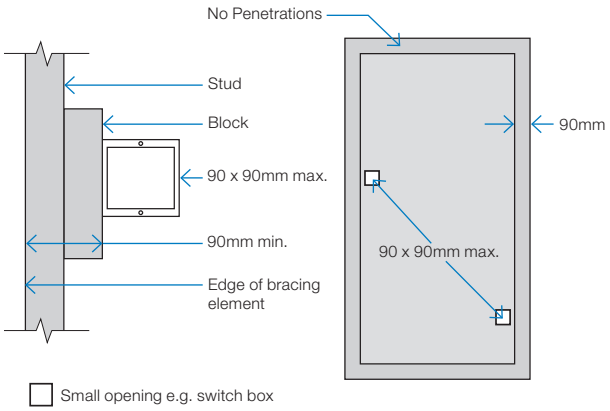
SMALL OPENINGS

Small openings (e.g. power outlets) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the braced element. A block may need to be provided alongside the perimeter stud as shown below.

LARGE OPENINGS

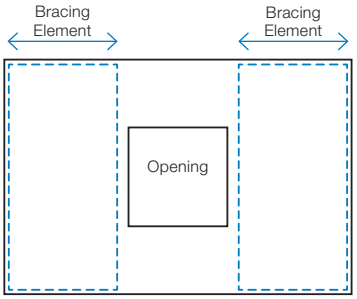
Openings above 90 x 90mm such as switch boards, recessed cabinets and TV's etc. should be placed outside of the bracing element or locate bracing on the other side of the wall framing.

FIGURE 10: SMALL OPENINGS IN BRACING ELEMENTS



GEB001

FIGURE 11: LARGE OPENINGS AND BRACING ELEMENTS



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Timber framing

General framing requirements such as grade, spacings and installation shall comply with the provisions of NZS 3604:2011. To achieve the published bracing performance the minimum actual framing dimensions are 90 x 45mm for external walls and 70 x 45mm for internal walls.

As a minimum the use of Kiln Dried Stress Graded timber for all wall, roof and mid-floor framing members is recommended.

GIBFix® Framing System (alternative layout)

Practices recommended as part of the GIBFix® Framing System aim to increase timber framing efficiencies, reduce reliance on unnecessary framing at wall junctions and minimise surface imperfections that commonly arise from constructing plasterboard junctions over multiple timber members. GIBFix® Angles fixed to a single timber framing member are introduced to tie together plasterboard junctions, improving seismic resilience and decrease the risk of future defects due to timber movement. The GIBFix® Framing System can be used in conjunction with the GIB EzyBrace® System.

Note: GIBFix® Angles and 32mm x 7g GIB® Grabber® Dual Thread Screws may also be used in traditional wall framing layouts and in GIB EzyBrace® Systems.

When the GIBFix® Framing System is used a minimum of 2 equally spaced nogs for walls between 2.4m and 3m in height are required at corners and wall junctions.

When used in GIB EzyBrace® systems GIBFix® Angles must run from top to bottom on all applicable studs. If 2 GIBFix® Angles are required on a stud they must be overlapped by a minimum of 300mm with 2/32mm 7g GIB® Grabber® Dual Thread Screws penetrating through both GIBFix® Angles.

For full specification details refer to GIBFix® Framing System literature available at gib.co.nz/gibfix.

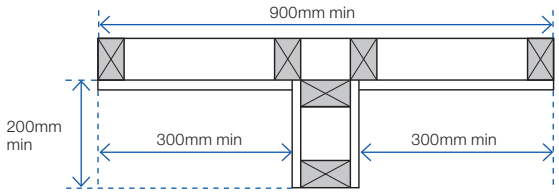
Guidelines for intersection walls

GIB® Bracing Elements may have intersecting walls with a minimum length of 200mm. Fasteners are required around the perimeter of the bracing element. Vertical joints at T-junctions shall be fixed and jointed as specified for intermediate sheet joints. The bracing element length must be no less than 900mm.

Where a Wall Bracing Element is interrupted by a T-junction the element is deemed to be continuous for the whole length (900mm minimum in the example illustrated).

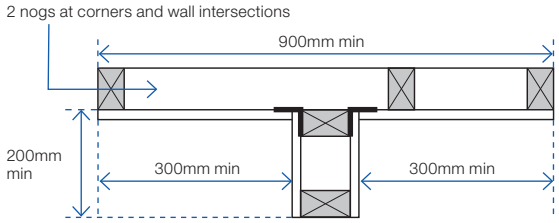
When fixing part sheets of GIB® plasterboard to the side of a T-junction, a minimum width of 300mm applies for bracing elements. See figures 12 and 13.

FIGURE 12: WALL INTERSECTION (TRADITIONAL WALL FRAMING)



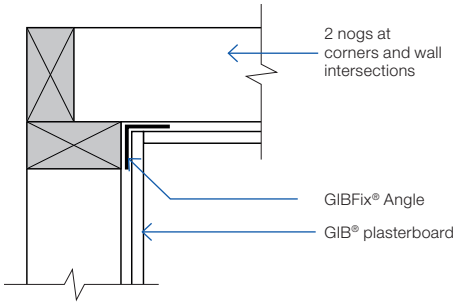
GEB002

FIGURE 13: WALL INTERSECTION (GIBFIX® FRAMING SYSTEM)



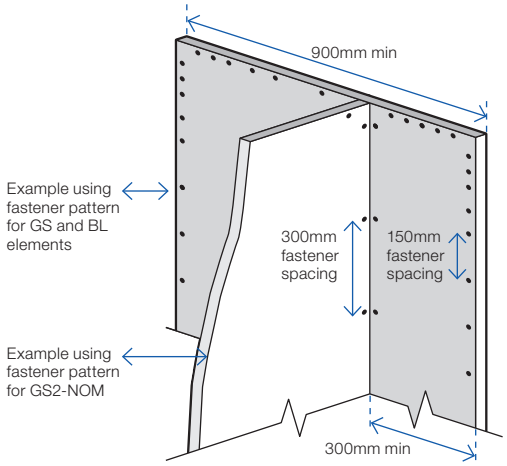
GEB003

FIGURE 14: CORNER INTERSECTION (GIBFIX® FRAMING SYSTEM)



GFS001

FIGURE 15: WALL INTERSECTION FASTENER PLACEMENT



Junction

Min 32mm x 6g GIB® Grabber® High Thread or 32mm x 7g GIB® Grabber® Dual Thread Screws @ 300mm ctrs each side.

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Top plate connections

For top plate connections refer to NZS3604:2011 section 8.7.3.

Parapets and gable end walls

Bracing elements must be fixed from top plate to bottom plate. Fixing to a row of nogs is not acceptable unless either:

A continuous member such as an ex 90 x 45mm ribbon plate is fixed across the studs just above a row of nogs at the ceiling line, as shown in figure 16.

or

GIBFix® Angle as shown in figure 17. The angle is fixed to a row of nogs with 30 x 2.5mm galv flat head nails or 32mm x 7g GIB® Grabber® Dual Thread Screws at 300mm centres.

Bottom plate fixing

TIMBER FLOOR

For elements with an 'N' specification use 2/100 x 3.75mm hand or 3/90 x 3.15mm power-driven nails at 600mm centres.

In addition, for elements with an 'H' specification, use GIB HandiBrac® panel hold-down fixings at each end of the bracing element, see p.16.

CONCRETE FLOOR — EXTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix external wall plates in accordance with NZS 3604:2011.

Use GIB HandiBrac® panel hold-down fixings at each end of bracing elements with an 'H' specification and minimum intermediate fixings as required by NZS 3604:2011.

CONCRETE FLOOR — INTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix plates in accordance with NZS 3604:2011 or use 75 x 3.8mm shot-fired fasteners with 16mm discs spaced at 150 and 300mm from end-studs and 600mm centres thereafter.

For bracing elements with an 'H' specification use GIB HandiBrac® panel hold-down fixings at each end of the element and minimum intermediate fixings as required by NZS 3604:2011.

FIGURE 16: PARAPETS AND GABLE ENDS WITH RIBBON PLATE

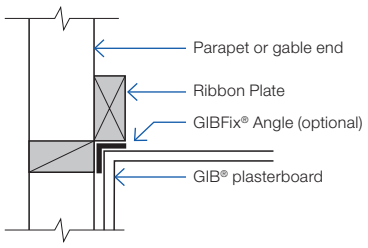
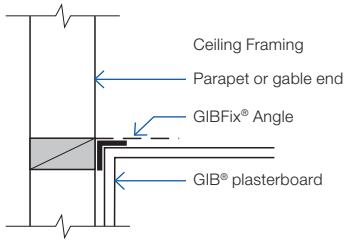


FIGURE 17: PARAPETS AND GABLE ENDS WITH GIBFIX® ANGLE



GFS003

BOTTOM PLATE FIXINGS FOR GIB® BRACING ELEMENTS

Brace type	Concrete slabs		Timber floors
	External wall	Internal wall	External and Internal walls
GS1-N	As per NZS 3604:2011. No specific additional fastening required.	As per NZS 3604:2011. Alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs, 150mm and 300mm from each end of the bracing element and at 600mm thereafter.	Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011.
GS2-N	Not applicable.		
GS2-NOM			
GSP-H BL1-H BLP-H	Intermediate fastenings to comply with NZS 3604:2011 In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.		Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011. In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.
BLG-H	Not applicable	As for GSP-H, BL1-H, BLP-H on concrete slab as illustrated on p.15 and 16.	

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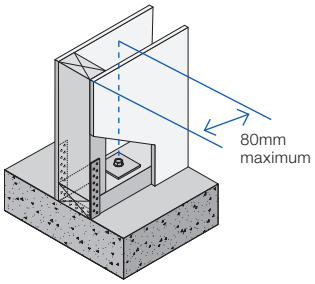
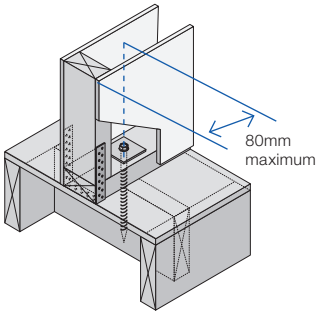
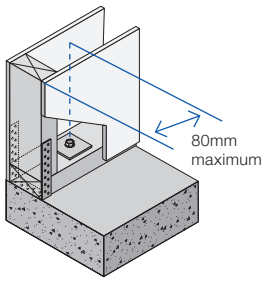
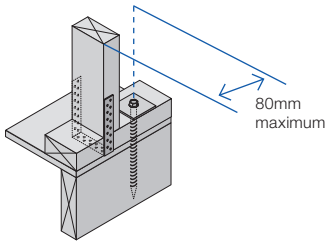
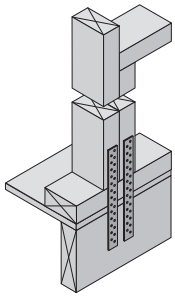
Bracing strap installation

Care needs to be taken with the installation of the bracing strap. It should be checked in to be flush with the face of the stud providing a flat substrate for the plasterboard and positioned in such a way that the corner fastenings of the bracing element are not affected by it. Keeping the strap to the edge of the end stud as shown will allow the corner fastenings to be installed without having to penetrate the bracing strap.

Concrete floor	Timber floor
400 x 25 x 0.9mm galvanised strap to pass under the plate and up the other side of the stud. Six 30 x 2.5mm flat head galvanised nails to each side of the stud. Three 30 x 2.5mm flat head galvanised nails to each side of the plate. Hold down bolt with 50 x 50 x 3mm washer to be fitted within 80mm of the end of the element.	
Internal wall	
 GEB004	 GEB005
External wall	
 GEB006	 GEB007
Note: Where applicable drawings have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box that can be found at gib.co.nz/library.	2/300 x 25 x 0.9mm galvanised straps with six 30 x 2.5mm flat head galvanised nails to each stud and into the floor joist and three nails to the plate. Block to nog fixed with 3/100 x 3.75mm nails to stud.
	 GEB008

Hold-down fastener requirements	
Concrete floor	Timber floor
A mechanical fastening with a minimum characteristic uplift capacity of 15kN fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element.	12 x 150mm galvanised coach screw fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element

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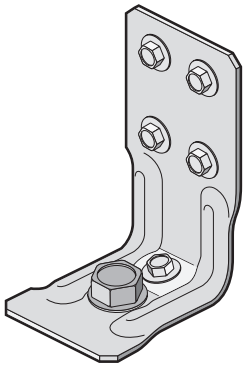
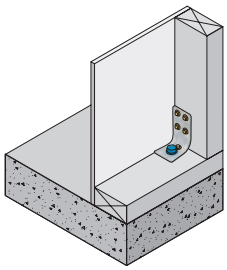
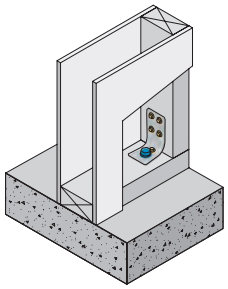
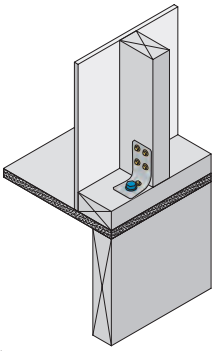
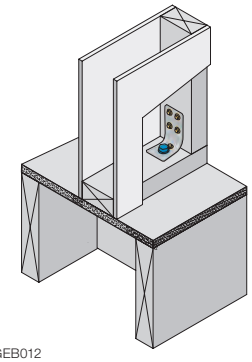
GIB HandiBrac® installation

Developed in conjunction with MiTek™, the GIB HandiBrac® has been designed and tested by Winstone Wallboards for use in GIB EzyBrace® elements that require hold-downs. The GIB HandiBrac® is a substitute for bottom plate hold-down straps.

- Quick and easy to fit.
- May be fitted at any stage before lining.
- Framing face is clear to allow flush lining.
- Easily inspected.

The GIB HandiBrac® with BOWMAC® blue head screw bolt is suitable for timber and concrete floors constructed in accordance with NZS 3604:2011.



Concrete floor		Timber floor	
External walls	Internal walls	External walls	Internal walls
 GEB009	 GEB010	 GEB011	 GEB012
Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.	Position GIB HandiBrac® at the stud/plate junction and at mid-width of plate.	Position GIB HandiBrac® flush with the outside stud face, as close as practicable to the centre of the boundary joist.	Position GIB HandiBrac® in the centre of floor joist or full depth solid block.
Hold-down fastener requirements			
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.		12 x 150mm galvanised coach screw or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.	

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GIB HandiBrac® placement with GIBFix® Framing System for concrete floors

Figure 18 shows the preferred positioning of the GIB HandiBrac® panel hold-down brackets within the GIBFix® Framing System layout and where they are required by bracing systems with an 'H' in the specification code.

Note that, in corners and at wall junctions, a single GIB HandiBrac® can serve 'H' type bracing elements in both directions, but additional intermediate concrete anchors may need to be installed to meet the minimum requirements of NZS 3604:2011 for bottom plate fixing.

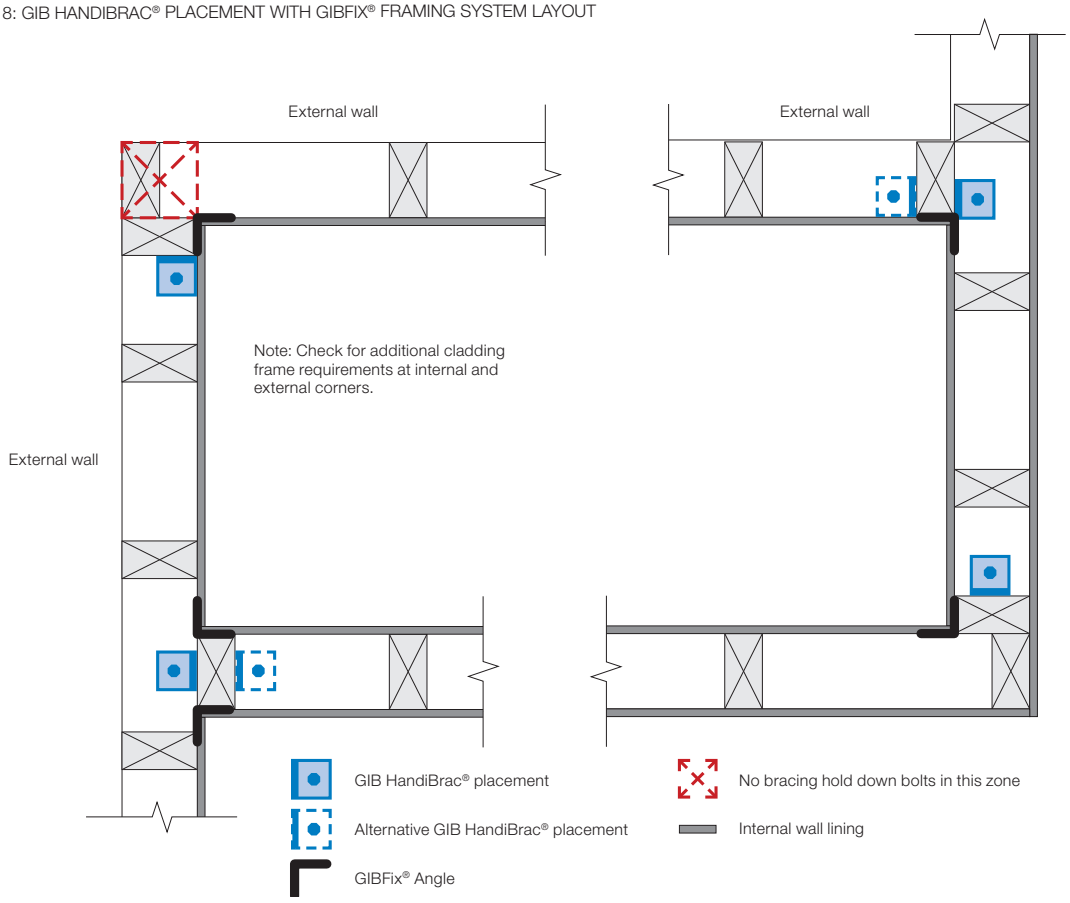
The GIB HandiBrac® is fixed to the stud which has the GIBFix® Angle.

For bracing elements with sheet material both sides of the wall connect corner studs using 8/90mm gun nails as shown in figure 19.

TIMBER FLOORS

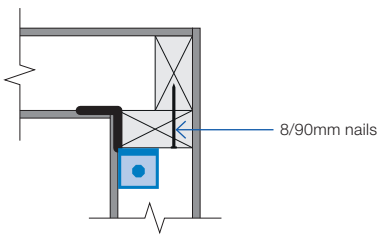
For timber floors bolt fixing in to solid joist or block is required, as shown on p 15.

FIGURE 18: GIB HANDIBRAC® PLACEMENT WITH GIBFIX® FRAMING SYSTEM LAYOUT



GEB013

FIGURE 19: STUD CONNECTION FOR 'H' TYPE BRACING ELEMENTS WITH SHEET MATERIAL BOTH SIDES



GEB014

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Ceiling diaphragms

GIB® plasterboard ceiling diaphragms are stiff and strong horizontal elements which effectively transfer loads to bracing walls. They themselves do not have a bracing unit rating but are used when bracing lines exceed 6m separation. The basic shape of a ceiling diaphragm is square or rectangular. Protrusions are permitted but cut-outs are not. The length of a ceiling diaphragm shall not exceed twice its width. Dimensions are measured between supporting bracing lines. Supporting bracing lines shall have a bracing capacity no less than the greater of 100 bracing units or 15 bracing units per metre of diaphragm dimension, measured at right angles to the line being considered, see figure 21.

Limitations for GIB® plasterboard ceiling diaphragms

Ceiling diaphragms may be constructed using any GIB® plasterboard provided perimeter fixing is at;

150mm centres for: Diaphragms up to 7.5m in length, no steeper than 15°.

100mm centres for: Diaphragms up to 7.5m in length, no steeper than 45°. Diaphragms up to 12m in length, no steeper than 25°.

Diaphragms outside these parameters must be specifically designed.

General fixing requirements for GIB® Ceiling Diaphragms:

- Linings must be installed over the entire area of the diaphragm.
- Fastening must be no less than 12mm from sheet edges and not less than 18mm from sheet ends.
- Sheets must be supported by framing members (e.g., ceiling battens) spaced at no more than 500mm centres for 10mm GIB® plasterboard and at no more than 600mm centres for 13mm GIB® plasterboard.
- Sheets within the diaphragm area may be fastened and finished conventionally in accordance with the publication entitled, “GIB® Site Guide”. All joints shall be GIB® Joint Tape reinforced and stopped. It is recommended that sheet butt joints are formed off framing and back-blocked (see “GIB® Site Guide”).
- Use full width sheets where possible. At least 900mm wide sheets with a length not less than 1800mm shall be used. Sheets less than 900mm wide but no less than 600mm may be used provided all joints with adjacent sheets are back-blocked (see “GIB® Site Guide” and figure 22).
- Fasteners are placed at the specified centres around the ceiling diaphragm with the corners fastened using the GIB EzyBrace® fastener pattern.

FIGURE 20: PROTRUSIONS AND CUTOUTS

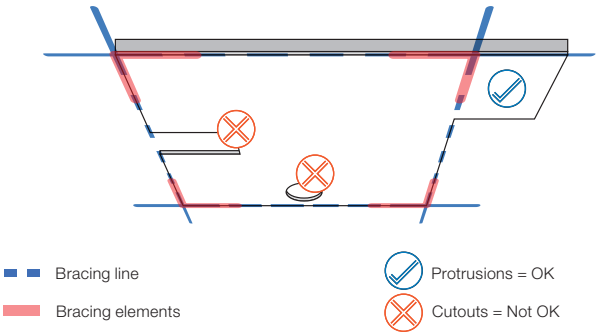


FIGURE 21: DIAPHRAGM BRACING LINING SPACINGS

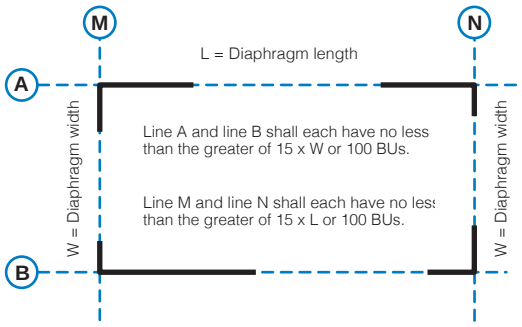
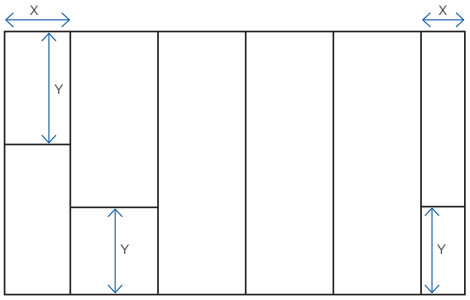
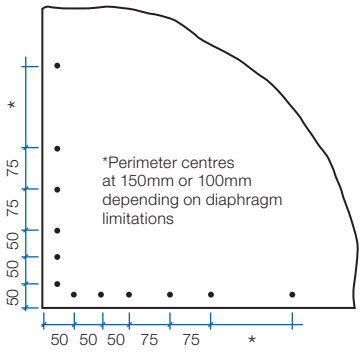


FIGURE 22: GIB® CEILING DIAPHRAGM SHEET WIDTHS AND LENGTHS



X = 900mm min or 600–900mm min provided all adjacent joints are back-blocked.
Y = 1800mm min sheet lengths at ends of ceiling diaphragms.

FIGURE 23: GIB EZYBRACE® FASTENER PATTERN



Unless stated all fastener spacings are maximums.

GEB015

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Ceiling battens in ceiling diaphragms

Ceiling diaphragms may be constructed using steel or timber ceiling battens.

Battens shall be spaced at a maximum of:
- 500mm for 10mm GIB® plasterboard.
- 600mm for 13mm GIB® plasterboard.

Timber battens shall be fixed in accordance with the requirements of NZS 3604:2011.

Metal battens shall be GIB® Rondo® battens with two external flanges of 8mm to allow direct screw fixing to roof framing.

GIB® Rondo® metal battens shall be fixed with 2/32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws to supporting framing.

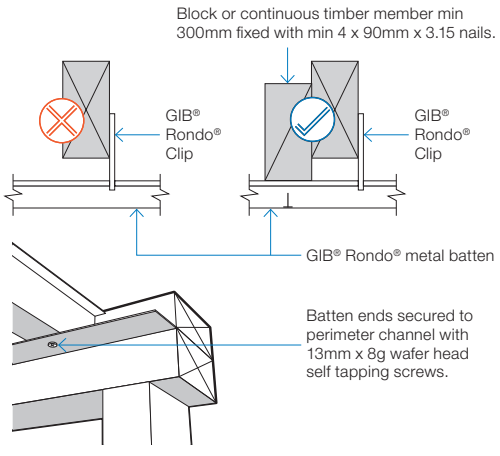
GIB® Rondo® metal battens must be fixed directly to the roof framing. If a clip system has been used, a timber block (min 300mm) or a continuous timber member can be fixed alongside the bottom chord to permit a direct connection to the batten, see figure 26.

For GIB® Rondo® metal battens, a GIB® Rondo® metal channel or metal angle is required at the perimeter of the diaphragm. The perimeter channel shall be fastened to the top plate with 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screw at 300mm centres maximum.

Linings are fastened to metal using 25mm x 6g GIB® Grabber® Self Tapping screws and to timber framing using 32mm x 6g GIB® Grabber® High Thread screws. Alternatively 32mm x 7g GIB® Grabber® Dual Thread screws can be used in both cases. Fastener centres are specified on p.18.

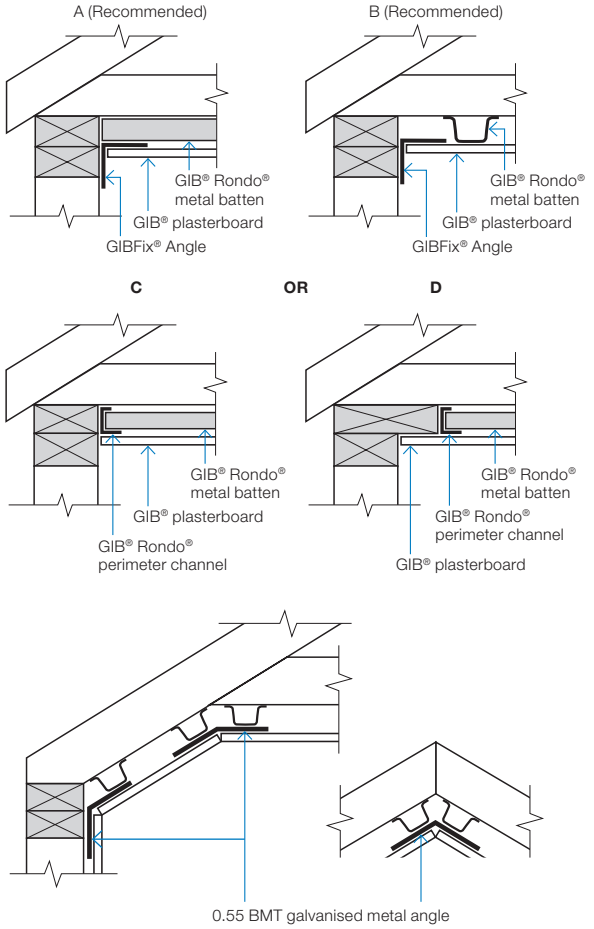
Coved ceiling diaphragms can be achieved by using nominally 32 x 32 x 0.55mm proprietary galvanised metal angles ("back-flashing") at the changes in direction. These angles shall be:
- Fastened at 300mm on each edge to metal battens using 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screws.
- Fastened to timber framing using 32mm x 7g GIB® Grabber® Dual Thread screws when linings are installed.

FIGURE 26: GIB® RONDO® METAL CEILING BATTEN INSTALLATION



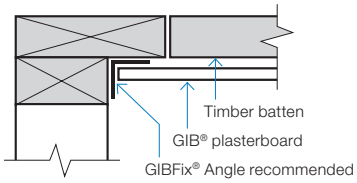
GEB016

FIGURE 27: GIB® RONDO® METAL CEILING BATTENS WITH CORNER ANGLES



GEB017

FIGURE 28: TIMBER CEILING BATTENS*



GEB018

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Openings in ceiling diaphragms

SMALL OPENINGS

Small opening (e.g. down lights) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the ceiling diaphragm.

LARGE OPENINGS

Openings are allowed withing the middle third of the diaphragms length and width. Fixing of sheet material to opening trimmers shall be at 150mm centres. Neither opening dimension shall exceed a third of the diaphragm width. Larger openings or openings in other locations require specific engineering design.

Where fireplace flue or range hood openings are required in a ceiling diaphragm use a galvansed metal backing plate as shown in figure 25, with a maximum hole diameter of 350mm.

Figure 25 can also be used for range hood openings in walls.

For information on openings in ceiling diaphragms contact the GIB® Helpline on 0800 100 442.

FIGURE 24: LARGE OPENINGS IN CEILING DIAPHRAGMS

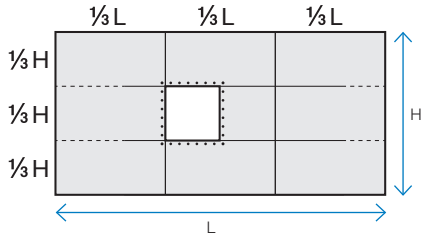
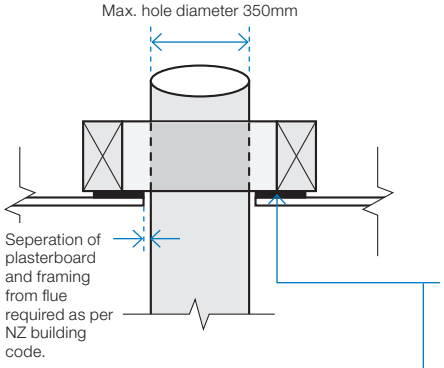
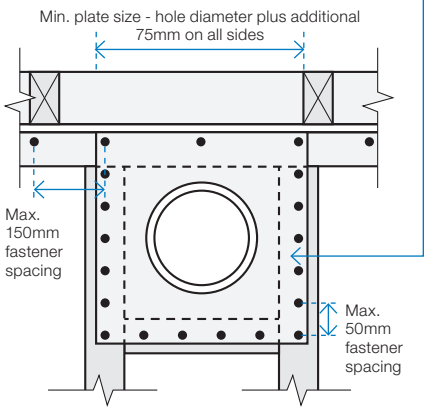


FIGURE 25: FIREPLACE FLUES AND RANGE HOOD OPENINGS

Section view



Plan view



Steel plate
0.55 BMT Galvanised sheet Max. opening 350mm diameter. Installed prior to GIB® plasterboard.

Framing
90 x 45mm framing trimmed to provide extra fixing.

GIB® plasterboard ceiling
Installed over the steel plate and into framing using a minimum of 32mm x 6g GIB® Grabber High Thread or 32mm x 7g GIB® Grabber Dual Thread screws at 50mm max centre spacing.

Plasterboard ceiling not shown in plan view

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Length of GIB EzyBrace® elements ('N' Type)

The length of GIB EzyBrace® elements with an 'N' extension (requiring standard NZS3604:2011 plate connections) can be taken as the full frame length measured from the outside of the end-stud to the opening face as illustrated in figures 29-32.

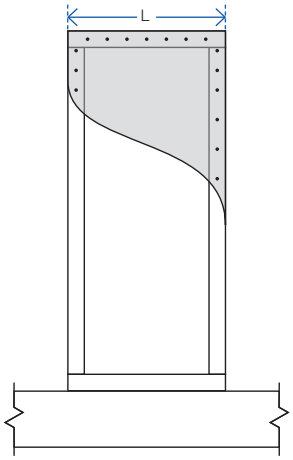
'N' type GIB EzyBrace® elements are identified by GIB® specification numbers GS1-N, GS2-N and GS2-NOM

The dimension 'L' shall not be less than 400mm.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening.

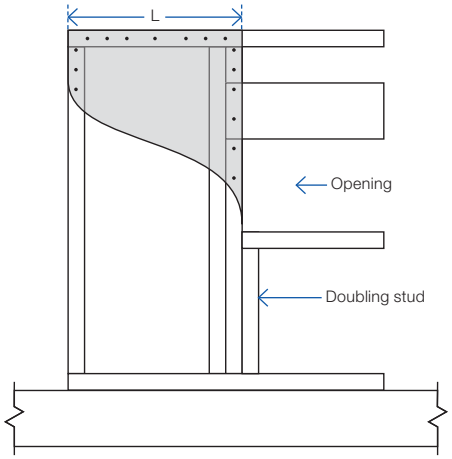
Fastener spacings and diagram scales shown in Figures 29–32 are indicative only. Refer to p.23–30 for construction details.

FIGURE 29: GS BRACING ELEMENTS (OPTION A)



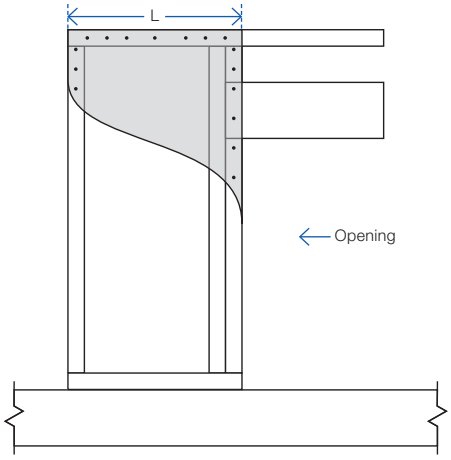
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 30: GS BRACING ELEMENTS (OPTION B)



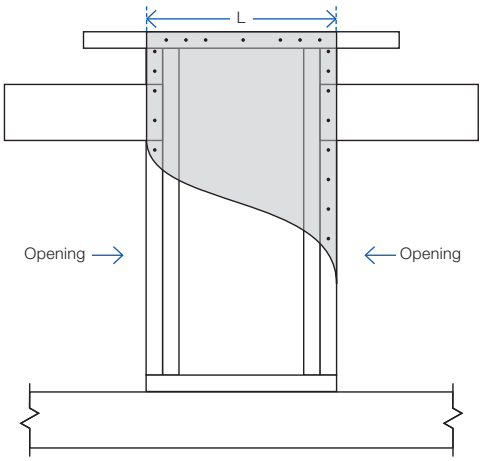
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 31: GS BRACING ELEMENTS (OPTION C)



GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 32: GS BRACING ELEMENTS (OPTION D)



GS1-N, GS2-N elements
'L' indicates the length of the bracing element

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Length of GIB EzyBrace® elements ('H' Type)

GIB EzyBrace® elements with an 'H' extension (requiring special panel hold-down fixings) can be used when the dimension 'L' as illustrated in figures 33–36 is 400mm or more.

'H' type GIB EzyBrace® elements are identified by GIB® specification numbers GSP-H, BL1-H, BLG-H and BLP-H.

The length of an 'H' type element is not only determined by the sheet material, but also by the placement of the hold-down fixings.

Hold-down fixings cannot be placed closer together than what is shown for the standard panel in figure 33.

Hold-down fixings can be placed under windows provided sill trimming studs beneath the opening are connected to the bracing element using 8/90mm gun nails, as illustrated in figure 34.

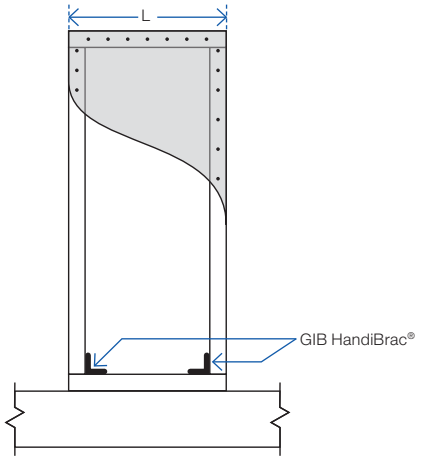
Spike doubling stud to trimming stud using a minimum of 2/90mm gun nails at 600mm centres. Lintel straps (where required for wind uplift) should be checked in and be located away from the bracing element fasteners.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening as indicated in figures 34-36.

When using bracing straps, installed in accordance with p.17, fix the strap to the same framing member as shown for the GIB Handibrac® below, and install the adjacent anchor bolt in the same position as the GIB HandiBrac® bolt.

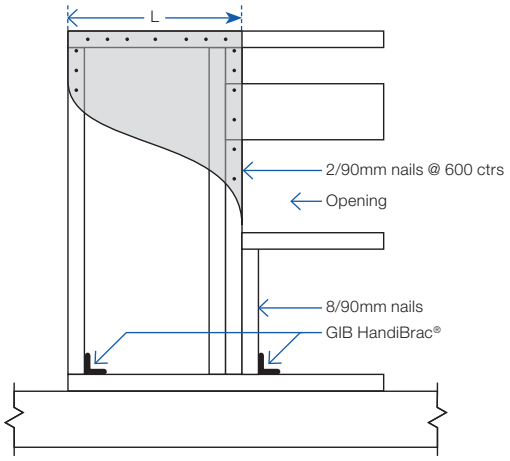
Fastener spacings and diagram scales shown in figures 33–36 are indicative only. Refer to p.23–30 for construction details.

FIGURE 33: BL BRACING ELEMENTS (OPTION A)



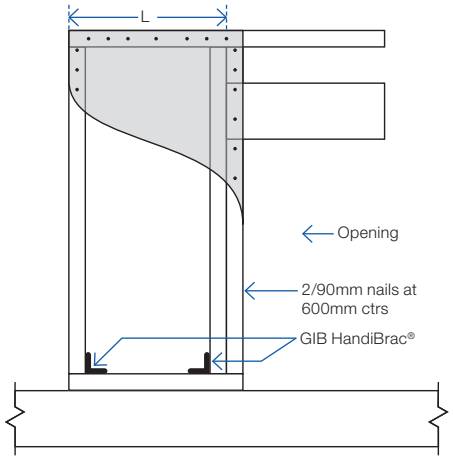
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 34: BL BRACING ELEMENTS (OPTION B)



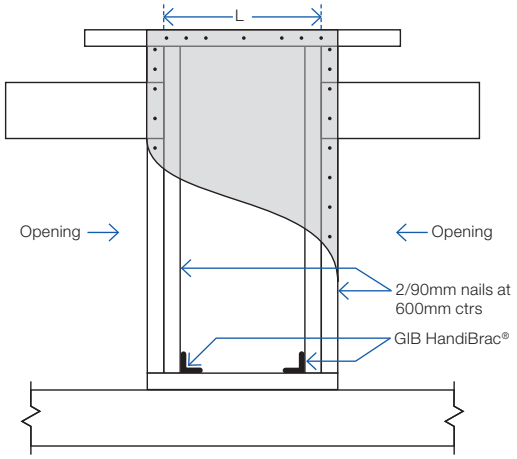
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 35: BL BRACING ELEMENTS (OPTION C)



'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 36: BL BRACING ELEMENTS (OPTION D)



'H' type elements with specific hold downs
'L' indicates the length of the bracing element

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GIB EzyBrace® Systems specification GS1-N

Specification code	Minimum length (m)	Lining requirement
GS1-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard to one side only

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and 600mm centres thereafter.

External Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for external wall bottom plate fixing.

WALL LINING

- Any 10mm or 13mm GIB® plasterboard lining.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

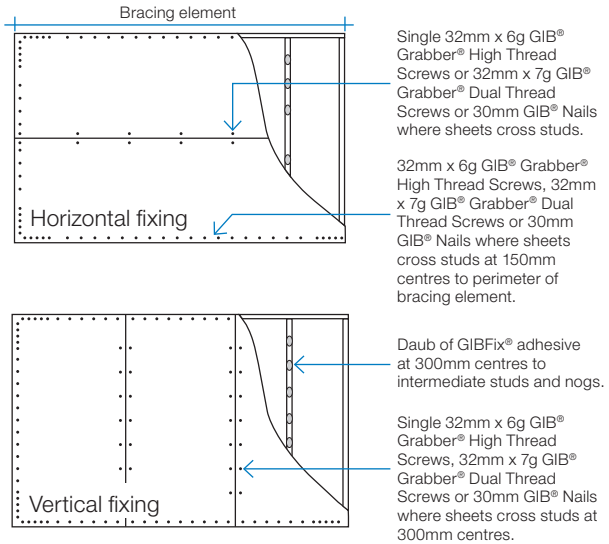
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

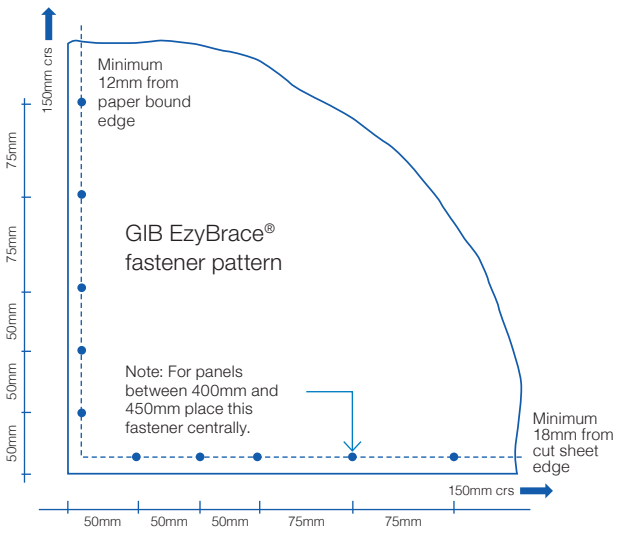
Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GIB EzyBrace® Systems specification GS2-NOM

Specification code	Minimum length (m)	Lining requirement
GS2-NOM	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Pairs of hand driven 100mm x 3.75mm nails at 600mm centres; or three power driven 90mm x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75mm x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

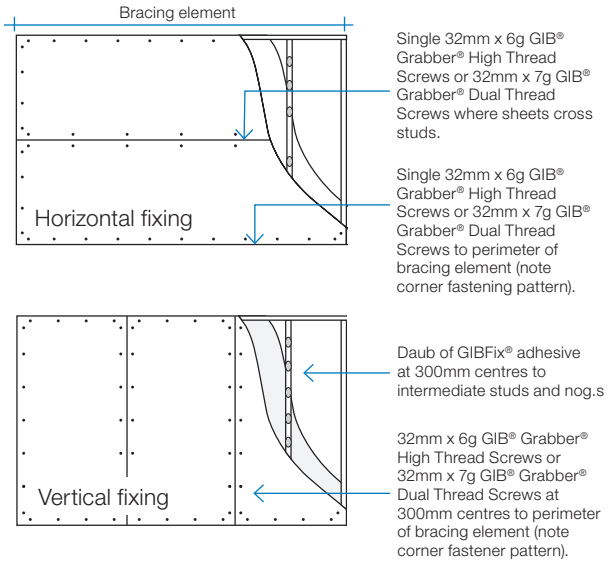
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Angle use 32mm x 7g GIB® Grabber® Dual Thread Screws.

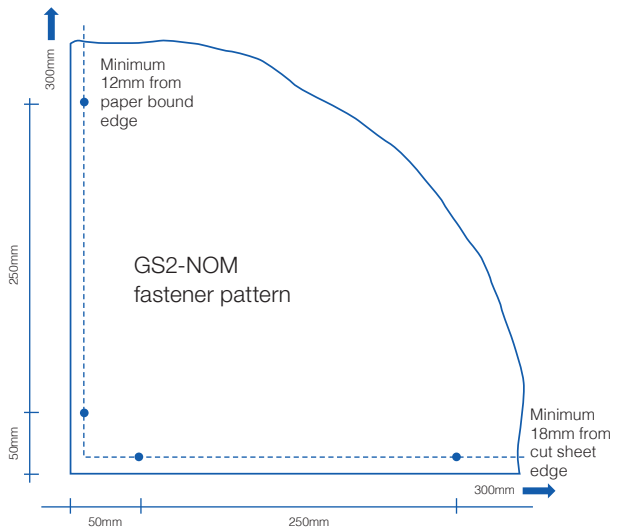
Fastener centres

50, 300mm from each corner and 300mm maximum thereafter around the perimeter of the bracing element. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GS2-NOM ADHESIVE FIXING OPTION AT DOOR JAMBS

As an alternative to using screw fixings, a continuous 6-10mm bead of solvent based GIBFix® All-Bond can be applied along the full height studs immediately adjacent to an internal door opening and at the door lintel or head trimmer. The lining is then bedded into the adhesive and installed into the rebated jamb, as shown in figure 38.

This solvent based adhesive option may only be used with GS2-NOM specification and is designed to reduce popping of fasteners around door openings on internal walls.

FIGURE 37: SCREW FIX FOR OPENINGS

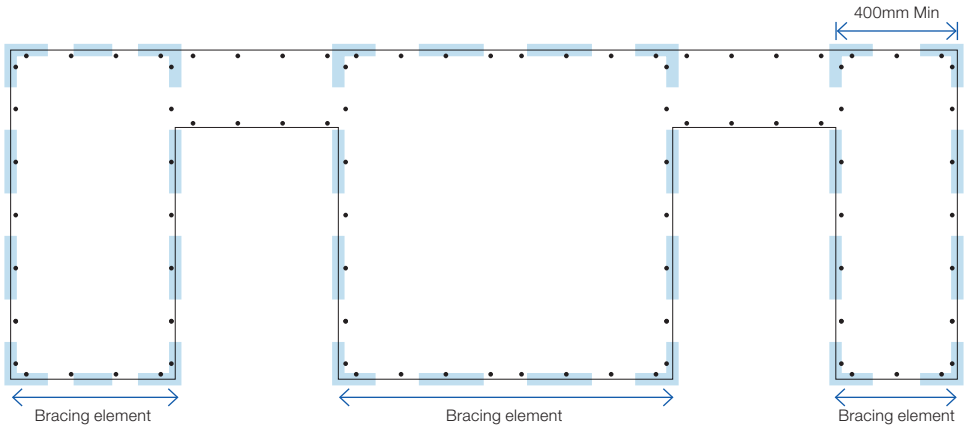
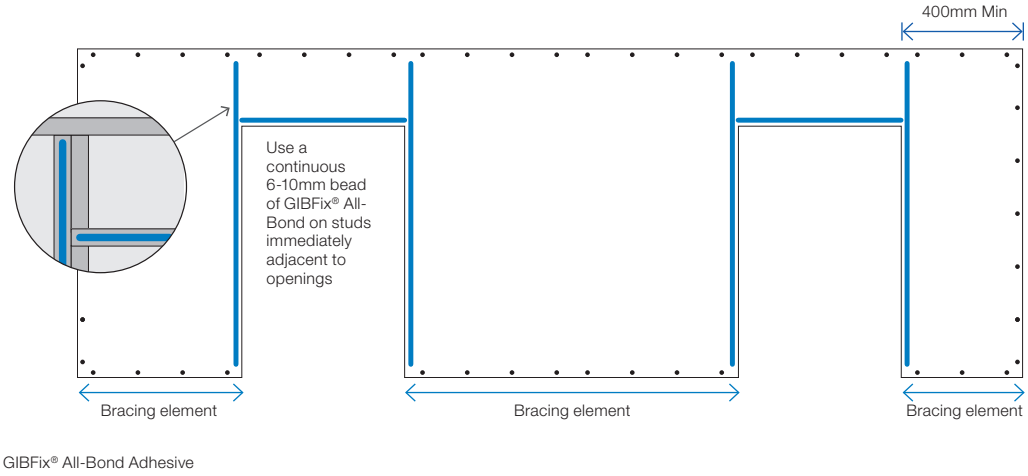
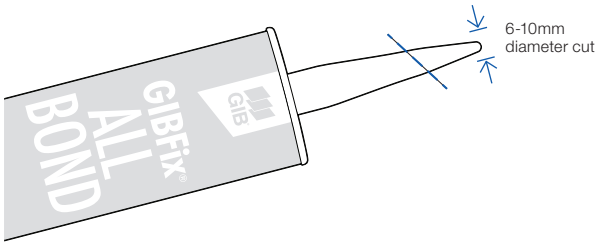


FIGURE 38: SCREW AND ADHESIVE FIX FOR OPENINGS



ADHESIVE NOZZLE APERTURE



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GIB EzyBrace® Systems specification GS2-N

Specification code	Minimum length (m)	Lining requirement
GS2-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber Floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

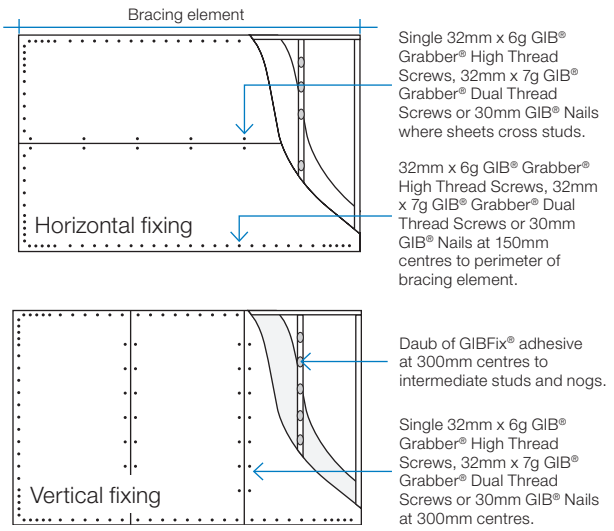
32mm x 6g GIB® Grabber® High Thread Screws,32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

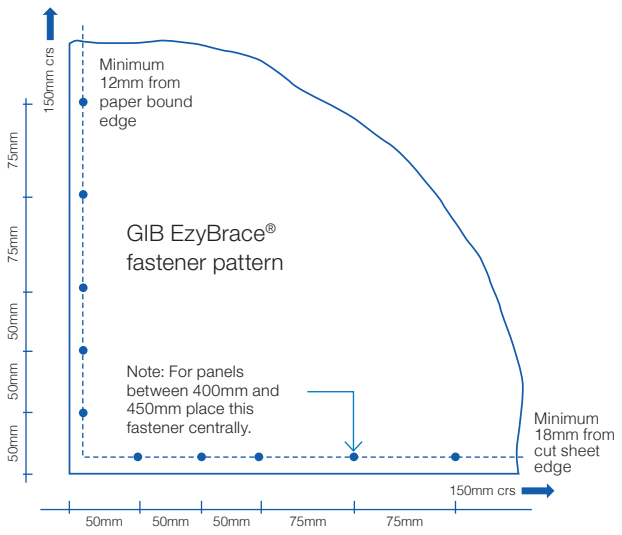
Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GIB EzyBrace® Systems specification GSP-H

Specification Code	Minimum length (m)	Lining requirement	Other requirements
GSP-H	0.4	Any 10mm or 13mm GIB® plasterboard lining to one side of framing and minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to one side of the wall plus minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side.
- Sheets can be fixed vertically or horizontally, with edges supported.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails.

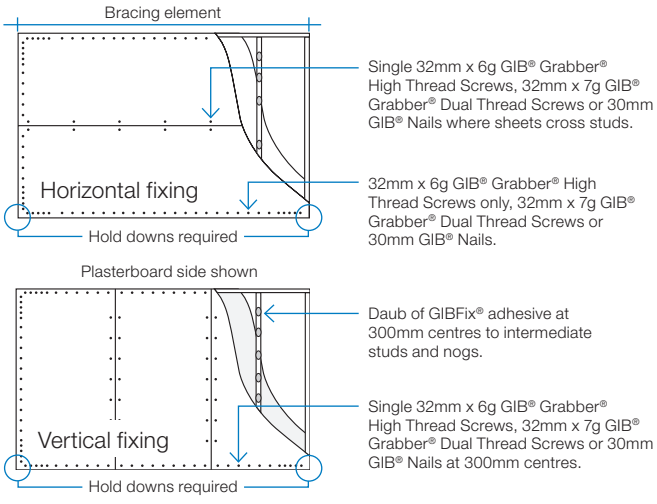
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails.

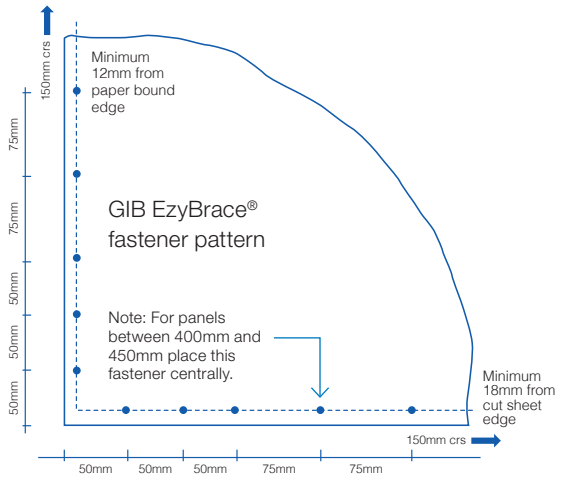
Fastener centres

GIB® plasterboard side: 50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge. Plywood side: 150mm centres to the perimeter of each sheet. GIB® corner fastener pattern does not apply to the plywood side. 300mm centres to intermediate studs.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GIB EzyBrace® Systems specification BL1-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BL1-H	0.4	10mm or 13mm GIB Braceline® to one side only	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline®
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

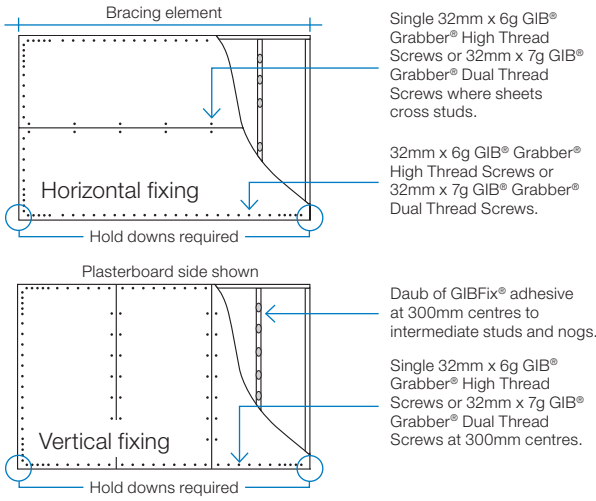
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

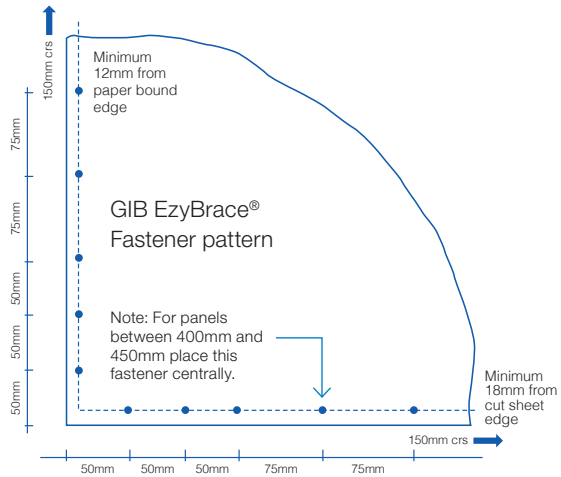
Fastener centres

50,100,150, 225, 300mm from maximum each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the sheet joint. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

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GIB EzyBrace® Systems specification BLG-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BLG-H	0.4	10mm or 13mm GIB Braceline® to one side of the frame plus any 10mm or 13mm GIB® plasterboard to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems 2011 or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline® to one side of the wall plus any 10mm or 13mm GIB® plasterboard lining to the other side.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws.Other side: 32mm x 6g GIB® Grabber® High Thread Screws, 30mm GIB Nails or 32mm x 7g GIB® Grabber® Dual Thread Screws.

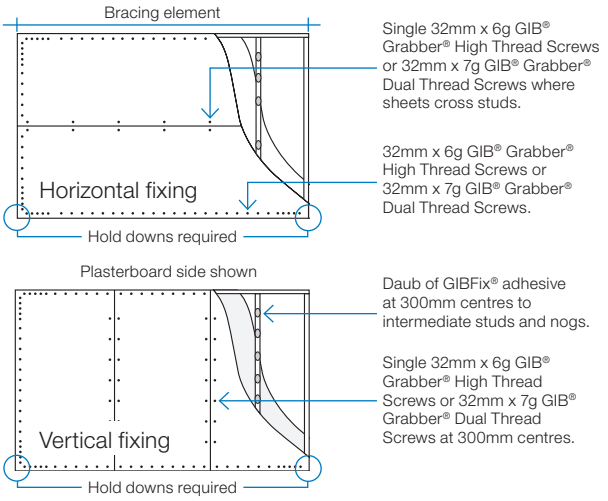
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

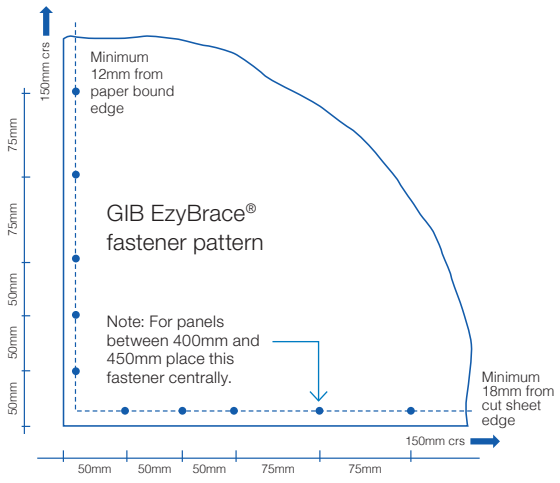
Fastener centres

50,100,150, 225, 300mm maximum from each corner and then 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





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GIB EzyBrace® Systems specification BLP-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BLP-H	0.4	10mm or 13mm GIB Braceline® to one side of the frame plus minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure; B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB® HandiBrac is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of AS/NZ 2269/0 :2012.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline® to one side of the wall plus minimum 7mm structural plywood manufactured to AS/NZS 2269.0 :2012 to the other side.
- Sheets can be fixed vertically or horizontally.
- Plywood is to be fixed vertically with edges supported.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

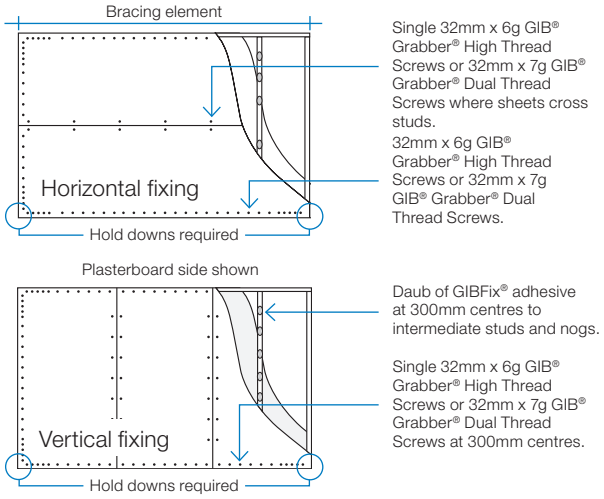
GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

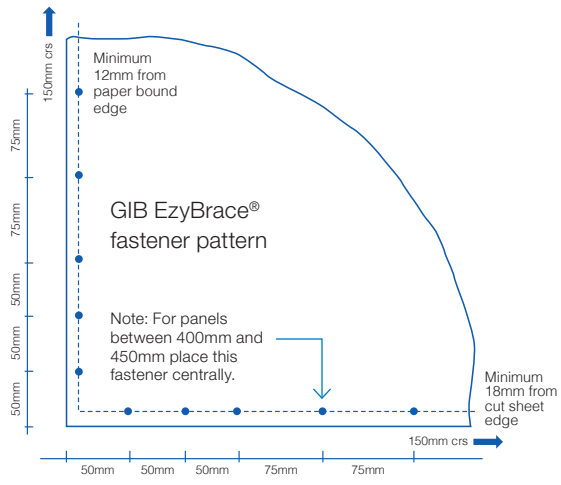
Fastener centres

GIB® Plasterboard side: 50,100,150, 225, 300mm from each corner and then 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge. Plywood side: 150mm centres to the perimeter of each sheet. GIB® corner fastener pattern does not apply to the plywood side. 300mm centres to intermediate studs.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





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Winstone Wallboards is committed to protecting the environment. Environmental matters are integrated into all business activities:

- Our operations strive to exceed all environmental regulatory requirements at all times.
- Protection of the environment is a day to day responsibility that we all must accept.
- We allocate appropriate management time and resources to address relevant environmental issues and continuously improve our activities in that area.
- We will achieve our standards of performance through positive action, employee involvement and constant communication with our neighbours, local authorities and customers.

Minimise on-site waste when designing and/or installing GIB® Systems. For larger projects give consideration to our cut-to-length service to reduce waste. GIB® plasterboard off-cuts, if separated from other waste building materials, can be readily recycled.

For larger projects waste can be diverted to compost manufacturers who grind up the GIB® plasterboard and use it in compost. For smaller projects, the GIB® plasterboard can be ground up and spread around the building site.

GLOBAL GREENTAG^{CERTTM}

The Global GreenTag^{CertTM} certified eco-label acknowledges product as meeting the GreenRate Standard set by Global GreenTag.^{CertTM}

GIB® plasterboard has a Level B green rating.

DECLARE CERTIFICATION

Declare is a database of non-toxic, sustainably sourced building products.

Many GIB® plasterboard products including GIB® Standard, GIB Braceline®, GIB Noiseline® and GIB Aqualine® have achieved Red List Free status in Declare certification.

For more information on Winstone Wallboards sustainability commitments visit gib.co.nz.

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Winstone Wallboards asserts its moral rights and reserves all other intellectual property rights in the materials contained in this brochure and related to GIBFix® Framing System and GIB EzyBrace® Systems.

TRADEMARKS

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Braceline®, GIB Toughline®, GIB Noiseline®, GIB Aqualine®, GIB Nail®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, the colour mauve for GIB Toughline®, GIB HandiBrac®, GIB EzyBrace®, the colour blue for GIB Braceline®, the colour pink for GIB Fyreline®, the colour green for GIB Aqualine®, and the shield device are registered trademarks of Fletcher Building Holdings Limited.

PATENTS

GIBFix® Framing System and GIB EzyBrace® Systems, including componentry and design method, have patents pending (NZ Patent Number 596691, NZ Patent 709159 pending) and design and other IP rights.

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GIB®

FOR MORE INFORMATION VISIT

gib.co.nz

OR CALL THE GIB® HELPLINE

0800 100 442

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Design Navigator H1 Compliance Report

Project Summary

H1 Report created by:	i design architecture
Project Name:	CH1054
Client:	Donnelly
Lot No:	Lot 4 DP 502943
Comment:	
Project Id:	147264
Report Date:	30/08/2021

Compliance Result

This report shows compliance of the design with Clause H1 Fourth edition Amendment 4 from November 2019 and the R-value targets of Clause E3 Second edition Amendment 7 from November 2020.

This building complies with H1 via the following methods:

- the Calculation Method in NZS4218:2009

H1 Compliance Details

NZS4218:2009 Calculation Method Compliance

The use of the Calculation Method is permitted .

In order to comply the Actual Heat Loss must be the same or smaller than the Reference Heat Loss AND all component R-values must be the same or larger than 50% of the R-values in the '50% Rule' table below. This design **complies** with the NZS4218:2009 Calculation Method.

HeatLoss:

Reference building	Proposed building
456	377

Minimum R-values ("50% rule"):

	Permitted Minimum	Proposed Minimum	
Floor:	0.65	1.63	✓
Non-solid Walls:	1	2.08	✓
Roof:	1.65	2.97	✓

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The Reference building has the following areas and R-values.

				Non-solid	Solid Timber	Other Solid
				100.0	0.0%	0.0%
Floor:	Area: 202.8	m²	R-values:	1.3	1.3	1.5
Walls excl. glazing:	Area: 111.1	m²	R-values:	2	1.4	1.2
Glazing (up to 30%):	Area: 47.6	m²	R-values:	0.26	0.26	0.26
Glazing (surplus of 30%):	Area: 0	m²	R-values:	0.4	0.34	0.34
Roof:	Area: 202.8	m²	R-values:	3.3	3.5	3.5
Heat Loss:				456	476	469

For mixed constructions the heat loss of the reference building is calculated as the sum of the heat losses for each type of wall construction multiplied by the fraction of the wall area of each type. This approach is based on clause 4.2.6 of NZS4218:2009.
There are no skylights in the reference building. The reference building roof area is the sum of the proposed building roof and skylight areas.

Compliance with Clause E3

This building complies with the R-value targets in NZBC Clause E3 .

Component	Minimum R-value	Project R-value
Framed wall constructions with cavities	1.5	2.08
Single skin masonry wall without a cavity	0.6	
Solid timber wall no less than 60 mm thick	0.6	
Roof or ceilings	1.5	2.97

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Design Details

Building Dimensions

Floor Area	202.8	m²
Gross Wall Area	158.7	m²
Net Wall Area	126	m²
Wall (North) Area	29.3	m²
Wall (East, South and West) Area	96.7	m²
Gross Roof Area	202.8	m²
Net Roof Area	202.8	m²
Glazing Area	32.7	m²
Window (North) Area	14.8	m²
Window (East, South and West) Area	17.9	m²
Skylight Area	0	m²

Glazing Areas

Total Vertical Glazing Percentage	20.6	%
East, South and West Window Percentage	15.6	%
Total over 30%	no	
East, South and West over 30%	no	
Total over 50%	no	
max. Skylight Area for Schedule Method	3.04	m²
Skylights over Schedule Method Limit	no	
Decorative Glazing	0	m²
Decorative Glazing over 3m²	no	

Information required for BPI calculation

Living Floor Area	0	m² Note: This includes also internal floors.
Average Room Height	0	m
Thermal Mass Level	Light weight	Suspended timber floor with timber framed walls or a heavily carpeted slab floor with timber framed walls.

Climate

Location	Christchurch
Climate Zone	3

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Heat Loss Details

	ID	Or.	Width	Height	Gross Area	Net Area	R*	Heat Loss	Shad. Coeff **	Solid ***
Floors										
Floor 1					202.8	202.8	1.63	124.4		
Walls										
Wall 1		S	3.4	2.4	8.2	8.2	2.08	3.9		C
Wall 2		E	5.9	2.4	14.1	14.1	2.08	6.8		C
Wall 3		S	13.5	2.4	32.5	26.5	2.19	12.1		C
Window 3-1			1.4	1.2		1.7	0.26	6.5	0.00	
Window 3-2			1.2	1.2		1.4	0.26	5.5	0.00	
Window 3-3			0.6	1.2		0.7	0.26	2.8	0.00	
Window 3-4			1.8	1.2		2.2	0.26	8.3	0.00	
Wall 4		W	8.3	2.4	20.0	16.7	2.19	7.6		C
Window 4-1			1.4	1.2		1.7	0.26	6.5	0.00	
Window 4-2			1.4	1.2		1.7	0.26	6.5	0.00	
Wall 5		N	5.5	2.4	13.1	11.4	2.19	5.2		C
Window 5-1			1.4	1.2		1.7	0.26	6.5	0.00	
Wall 6		W	6.3	2.4	15.2	13.1	2.19	6.0		C
Window 6-1			1.8	1.2		2.2	0.26	8.3	0.00	
Wall 7		N	12.9	2.4	30.9	17.8	2.19	8.1		C
Window 7-1			1.2	2.0		2.4	0.26	9.2	0.00	
Window 7-2			1.2	2.0		2.4	0.26	9.2	0.00	
Window 7-3			4.2	2.0		8.3	0.26	31.9	0.00	
Wall 8		E	6.0	2.4	14.4	10.8	2.19	4.9		C
Window 8-1			1.8	2.0		3.6	0.26	13.8	0.00	
Wall 9		S	1.4	2.4	3.4	3.4	2.19	1.5		C
Wall 10		E	2.8	2.4	6.8	4.0	2.19	1.8		C
Window 10-1			1.4	2.0		2.8	0.26	10.8	0.00	
Roofs										
Roof 1					202.8	202.8	2.97	68.3		
Total Heat Loss								376.6		

* Any concrete slab-on-ground floor regardless of its dimensions can be assumed to have an R-value of at least R-1.3 (H1/AS1 2.1.5).
** The Shading Coefficient is only required for BPI calculations.
*** C: Cavity Construction (any construction that is not solid), T: Solid Timber, S: Other Solid Construction (Note that the use of solid timber and other solid construction types is discretional, i.e. solid timber walls and other solid walls can be treated as if they are non-solid (NZS4218:2009 section 4.1.3.).)

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Floor Construction Details

Name: Floortype 1

1.63 m²°C/W

Type: Floor: Slab Floor

internal surface 0.09

Flooring : none (Example: polished surface of a concrete floor)

R-value: 0.00

Slab Insulation

Slab floor area [m²]:	202.81
Perimeter length [m]:	66.1
External wall thickness [mm]:	90
Soil conductivity [W/m °C]	1.2
Underslab insulation:	none — Insulation :
Piles Footings: Number:	Penetration Diameter [mm]:
Slab edge insulation:	none — Insulation :

Wall Construction Details

Name: Axon

2.19 m²°C/W

Type: Wall: Timber Frame with vented Cavity

external surface 0.03

Cladding : James Hardie Axon Cladding 9mm

R-value: 0.04

Air Barrier : Building paper

R-value: 0.01

Timber Frame & Cavity : 90mm, studs @ 600mm, dwangs @ 800mm

Wall Frame Area: 14.4%	*Cavity Area: 85.6%*
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08	15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08
Framing : *R-value: 0.75*	Pink®Batts® R2.4 Wall 2.4
	still Airgap: 20-90mm airgap (non-reflective) *R-value: 0.16*

Wall Lining : Gypsum plasterboard 10mm

R-value: 0.04

internal surface 0.09

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Name: Internal Garage — 2.08 m²°C/W

Type: Wall: Timber Frame (direct fixed cladding)

external surface 0.03

Cladding : Gypsum plasterboard 10mm into still air (garage, etc.)
R-value: 0.10

Air Barrier : none
R-value: 0.00

Timber Frame & Cavity : 90mm, studs @ 600mm, dwangs @ 800mm

Wall Frame Area: 14.4%	*Cavity Area: 85.6%*
Framing : *R-value: 0.75*	Pink®Batts® R2.4 Wall 2.4
	still Airgap: none *R-value: 0.00*

Wall Lining : Gypsum plasterboard 10mm
R-value: 0.04

internal surface 0.09

Roof Construction Details

Name: Rooftype 1 — 2.97 m²°C/W

Type: Roof: Timber framed truss Roof, direct fixed or battened flat Ceiling

external surface 0.03

Roofing : Corrugate iron with building paper
R-value: 0.01

Insulation :

Timber Frame & Cavity : 90mm rafters or joists @ 900mm, blocking @ 900mm

Roof Frame Area: 9.8%	*Cavity Area: 90.2%*
Roof space (still air) 0.11	Roof space (still air) 0.11
Framing : *R-value: 0.75*	Pink®Batts® R3.6 Ceiling 3.6

Roof Lining : Gypsum plasterboard 13mm
R-value: 0.06

internal surface 0.09

Non-IC-rated recessed downlights

Ceiling Area [m²]: 202.81 Number of downlights: 24 Clearance from lamp holder side [m]:

Glazing Details

Name: Glazingtype 1 — 0.26 m²°C/W

Type: Glazing: Custom - enter R-value manually below

Insulation : 0.26

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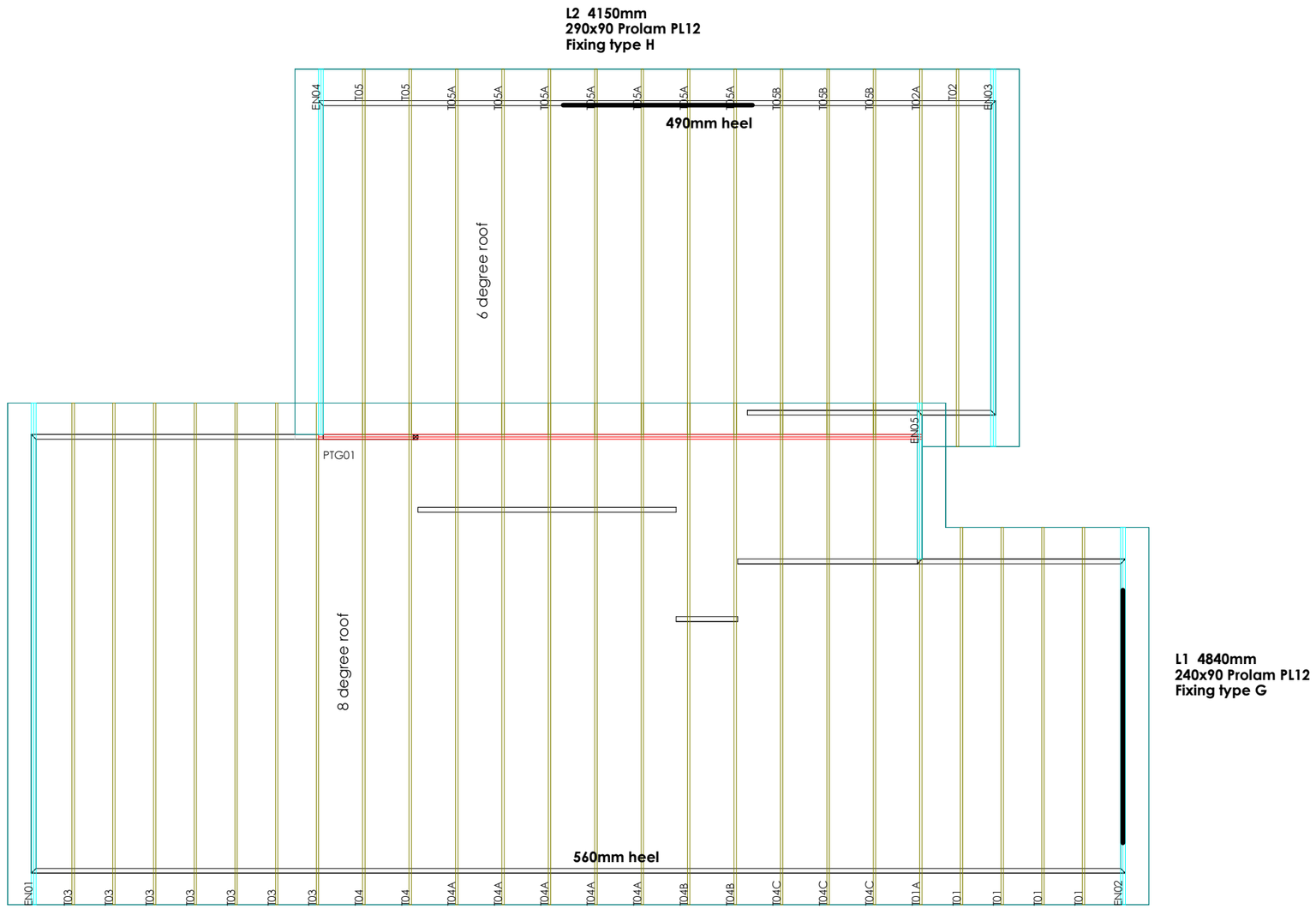
Layout is null and void if trusses not supplied by PlaceMakers



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PlaceMakers® Know how. Can do.

Site Address :
Donnlly Residence
Innes road
Amberley

Sheet Title :
For Building Consent
Buildable Truss Layout

Date : 22 Oct,2021 | Drawn : Brian Mee
Scale : 1: 100 | System : MiTek 20/20

Job Details:

Roof Pitch	: 8.000 Deg		Truss Centres	: 900	mm
Roof Material	: Light		Roof Live Load	: 0.250	kPa
Ceiling Material	: Gib Board 13mm		Floor Live Load	:	kPa
Wind Zone	: High		Wind Speed	: 44.0	m/s
Roof Snow Load	: 0.630 kPa				

MiTek™

Job Title : 211408
Sheet : 1
Revision Number :

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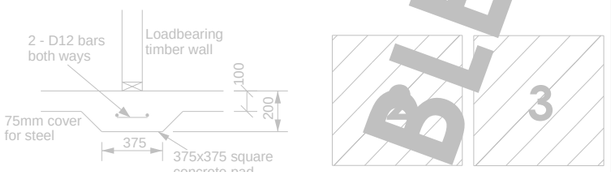
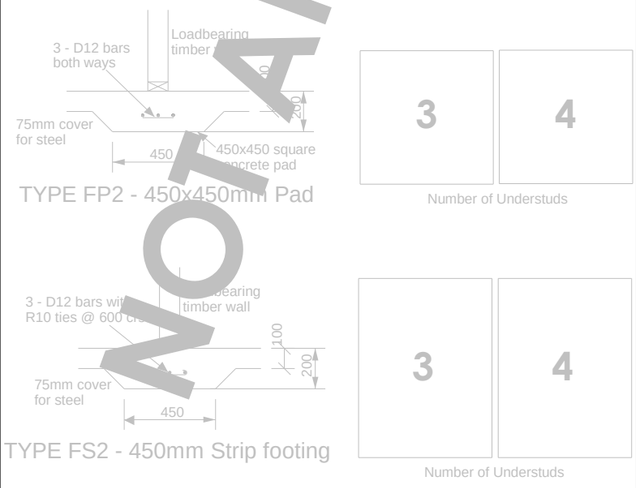
Slab Thickening Details

NOT APPLICABLE



TYPE FP1 - 375x375mm Pad

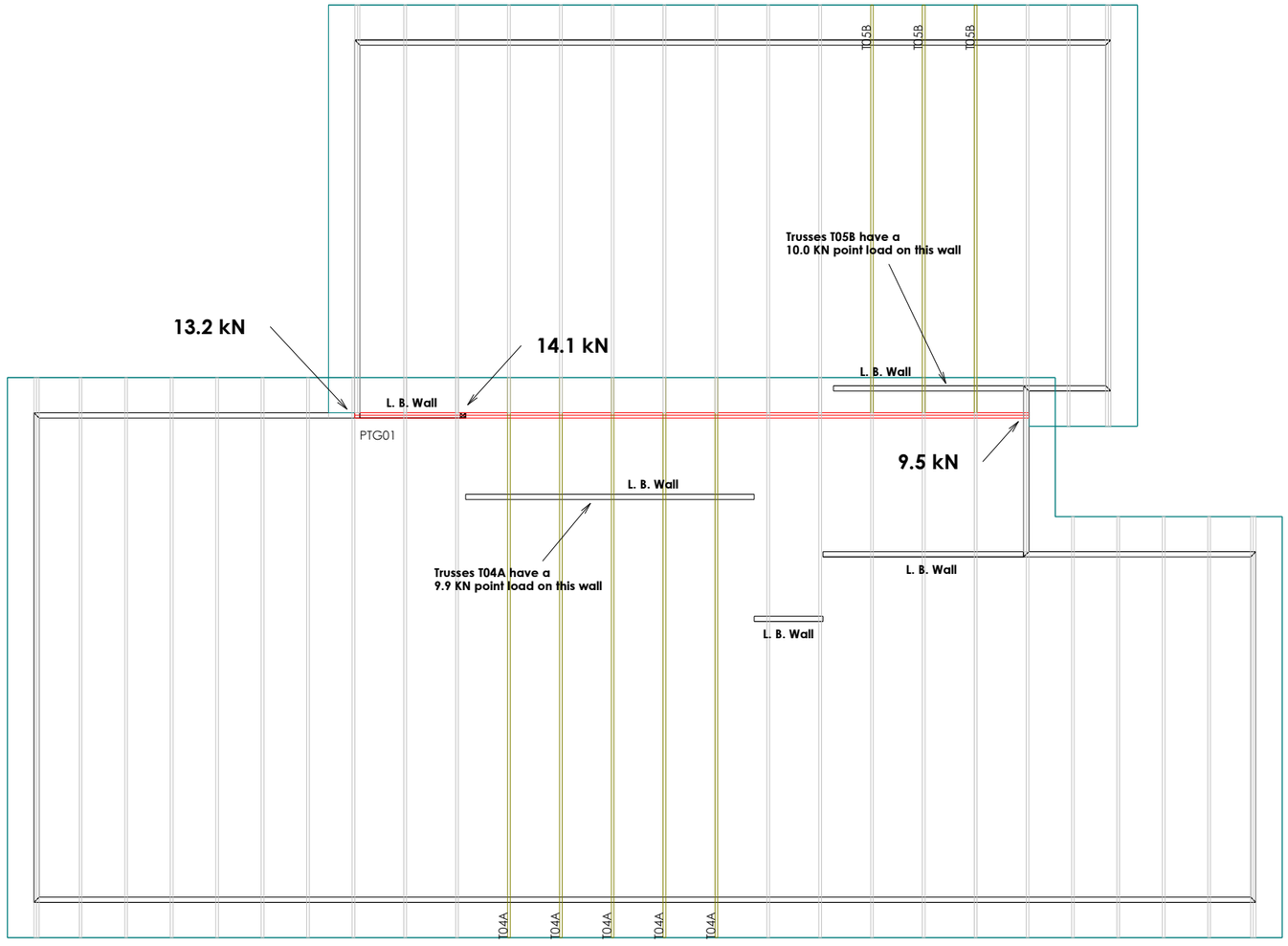
TYPE FS1 - 300mm Strip footing



TYPE FP2 - 450x450mm Pad

TYPE FS2 - 450mm Strip footing

Layout is null and void if trusses not supplied by PlaceMakers



NOTES:

All point loads exceeding 8.0kN are indicated.

All walls shown to be considered load bearing.

Refer to Rib-raft floor design for slab thickening.

PlaceMakers® Know how. Can do.

Site Address :
Donnlly Residence
Innes road
Amberley

Sheet Title :
For Building Consent
Slab Thickening

Date : 22 Oct,2021 | Drawn : Brian Mee
Scale : 1: 100 | System : MiTek 20/20

Job Details:

Roof Pitch	: 8.000 Deg		Truss Centres	: 900	mm
Roof Material	: Light		Roof Live Load	: 0.250	kPa
Ceiling Material	: Gib Board 13mm		Floor Live Load	:	kPa
Wind Zone	: High		Wind Speed	: 44.0	m/s
Roof Snow Load	: 0.630 kPa				

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MiTek™

Job Title : 211408
Sheet : 2
Revision Number :

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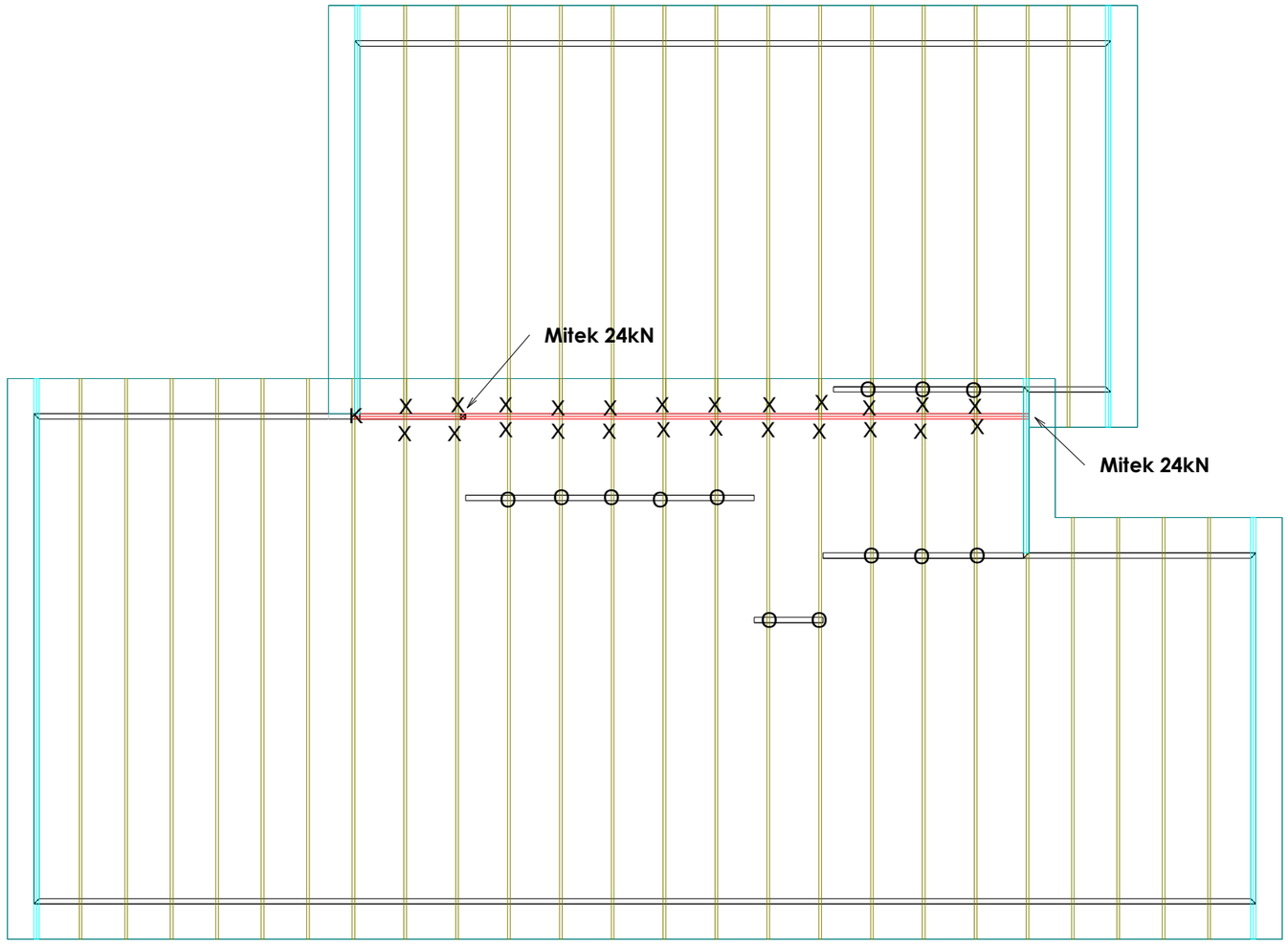
Truss Fixings

- X - LUMBERLOK JH47x90 Joist Hanger
- Z - LUMBERLOK JH47x120 Joist Hanger
- P - LUMBERLOK JH47x190 Joist Hanger
- E - LUMBERLOK JH95x165 Joist Hanger
- O - Pair of LUMBERLOK CT200 Ceiling Ties
- H - LUMBERLOK CT400 Cyclone Tie
- B - LUMBERLOK CT600 Cyclone Tie
- M - Pair of LUMBERLOK Multi Grips
- NP - LUMBERLOK Nailon Plate
- N - LUMBERLOK N21 Diagonal Cleat
- W - Pair of LUMBERLOK CPC40 Cleats
- K - LUMBERLOK TTP 16kN Truss to Top Plate set
- G - LUMBERLOK TTP 9kN Truss to Top Plate set

Layout is null and void if trusses not supplied by PlaceMakers



NOTES:

All other areas must have at the minimum
2/ 90x3.15mm skew nails + 2 wire dogs (4.7kN)
for truss to top plate connections.

Refer to:
LUMBERLOK Timber Connectors Characteristic Loadings Data brochure 03/4

PlaceMakers® Know how. Can do.

Site Address :
Donnlly Residence
Innes road
Amberley

Sheet Title :
For Building Consent
Truss Fixings

Date : 22 Oct,2021
Drawn : Brian Mee
Scale : 1: 100
System : MiTek 20/20

Job Details:

Roof Pitch	: 8.000 Deg		Truss Centres	: 900 mm	
Roof Material	: Light		Roof Live Load	: 0.250	kPa
Ceiling Material	: Gib Board 13mm		Floor Live Load	:	kPa
Wind Zone	: High		Wind Speed	: 44.0	m/s
Roof Snow Load	: 0.630 kPa				

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MiTek™

Job Title :
211408
Sheet :
3
Revision Number :

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01/2017

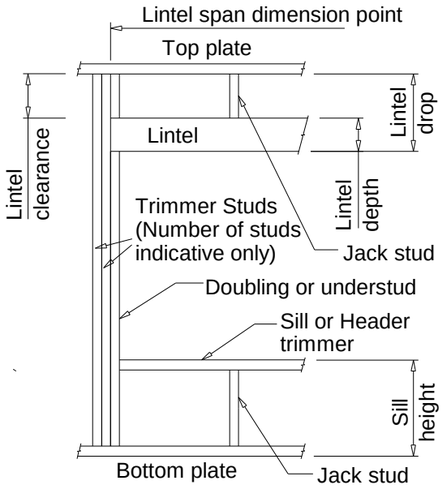
LUMBERLOK®

LINTEL FIXING SCHEDULE
ALTERNATIVE TO TABLE 8.14 & FIGURE 8.12
NZS 3604:2011

NOTE:

- ★ All fixings are designed for vertical loads only. Dead loads include the roof weight and standard ceiling weight of 0.20 kPa.
- ★ Refer to Table 8.19 NZS 3604:2011 for nailing schedule to resist horizontal loads.
- ★ These fixings assume the correct choice of rafter/truss to top plate connections have been made.
- ★ All fixings assume bottom plate thickness of 45mm maximum. Note: TYLOK options on timber species.
- ★ Wall framing arrangements under girder trusses are not covered in this schedule.
- ★ All timber selections are as per NZS 3604:2011

DEFINITIONS



Lintel Supporting Girder Trusses:

Roof Tributary Area	Light Roof Wind Zone			Heavy Roof Wind Zone		
	L, M, H	VH	EH	L, M, H	VH	EH
8.6 m²	G	G	H	G	G	H
11.6 m²	G	H	H	G	G	H
12.1 m²	G	H	H	G	H	H
15.3 m²	H	H	-	G	H	H
19.1 m²	H	-	-	G	H	-
20.9 m²	H	-	-	H	H	-
21.8 m²	H	-	-	H	-	-
34.3 m²	-	-	-	H	-	-

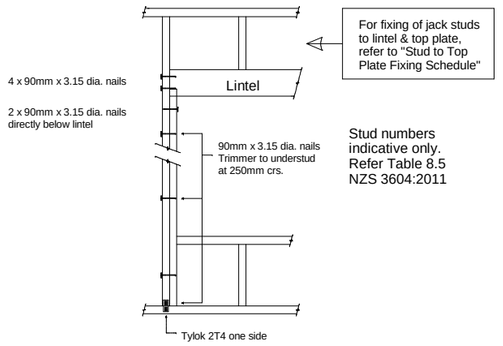
Notes:
1) Roof Tributary Area = approx. 1/2 x (Total roof area on girder and rafter trusses supported by Lintel)
2) Assumed girder truss is at mid-span or middle third span of lintel
3) Use similar fixings for both ends of lintel
4) All other cases require specific engineering design.

SELECTION CHART FOR LINTEL FIXING

Lintel Span	Loaded Dimension (See Fig. 1.3 NZS 3604:2011)	Light Roof Wind Zone					Heavy Roof Wind Zone				
		L	M	H	VH	EH	L	M	H	VH	EH
1.0	2.0	E	E	E	F	F	E	E	E	E	F
	3.0	E	E	F	F	F	E	E	E	F	F
	4.0	E	F	F	F	G	E	E	F	F	F
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	E	F	F	G	G	E	E	F	F	G
1.2	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	E	F	F	F	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	F	F	G	G	H	E	E	F	G	G
1.5	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	F	F	F	G	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	F	F	G	G	H	E	E	F	G	G
	6.0	F	F	G	H	H	E	E	F	G	H
2.0	2.0	E	F	F	F	G	E	E	F	F	F
	3.0	E	F	F	G	G	E	E	F	F	G
	4.0	F	F	G	G	H	E	E	F	G	G
	5.0	F	F	G	H	H	E	E	F	G	H
	6.0	F	G	G	H	H	E	F	G	H	H
2.4	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	G	H	E	E	F	G	G
	4.0	F	F	G	H	H	E	E	F	G	H
	5.0	F	G	G	H	H	E	F	G	H	H
	6.0	F	G	H	H	-	E	F	G	H	H
3.0	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	H	H	E	E	F	G	H
	4.0	F	G	G	H	H	E	F	G	H	H
	5.0	F	G	H	H	-	E	F	G	H	H
	6.0	F	G	H	-	-	E	F	G	H	-
3.6	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	F	G	H	H	E	F	G	G	H
	4.0	F	G	H	H	-	E	F	G	H	H
	5.0	F	G	H	-	-	E	F	G	H	-
	6.0	G	H	H	-	-	E	F	H	-	-
4.2	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	H	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.5	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.4	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.8	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.2	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
5.1	2.0	F	F	G	H	H	E	F	G	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.5	F	G	H	-	-	E	F	G	H	-
	4.0	G	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-
5.4	2.0	F	F	G	H	H	E	F	G	G	H
	2.8	F	G	H	H	-	E	F	G	H	H
	3.0	F	G	H	-	-	E	F	G	H	-
	4.0	G	H	H	-	-	E	F	H	-	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-

LINTEL FIXING OPTIONS

TYPE E 1.4kN



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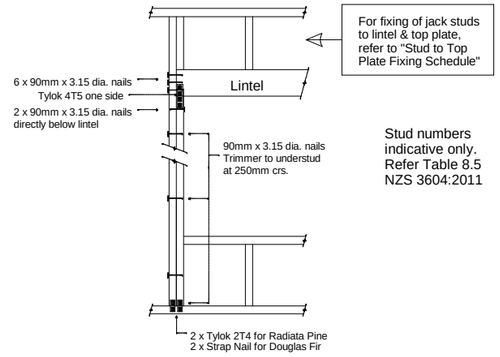

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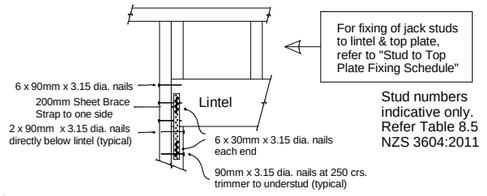

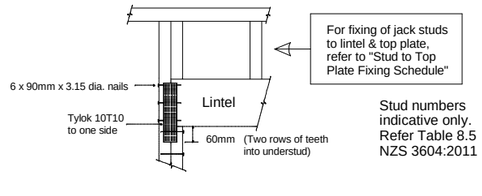

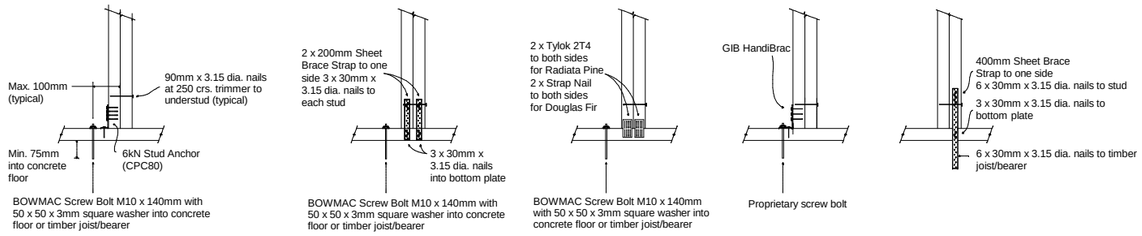

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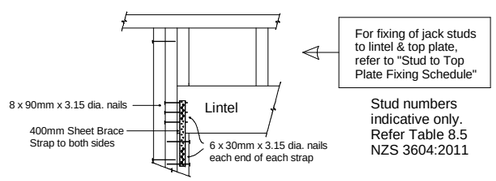

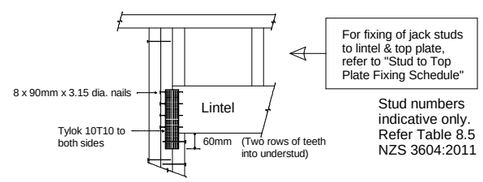

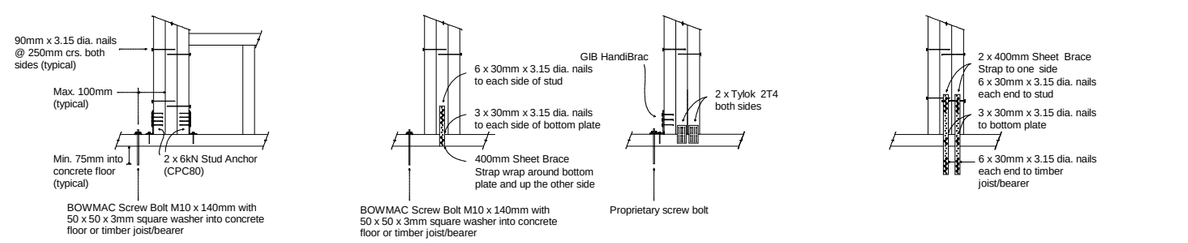

MiTek New Zealand Limited
AUCKLAND
PO Box 58-014, Botany 2163
Phone: 09-274 7109
Fax: 09-274 7100
www.miteknz.co.nz
CHRISTCHURCH
PO Box 8387, Riccarton 8440
Phone: 03-348 8691
Fax: 03-348 0314

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GANG-NAIL® LUMBERLOK® BOWMAC®

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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.miteknz.co.nz

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

ISSUED BY: **MiTek New Zealand Limited**

TO: **Placemakers National Estimating Unit (NEU)**

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 **211408** 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: Friday, 22 October 2021**

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

Job: 211408 Client: A1 Homes Site: Donnlly Residence
Phone: Innes road
Amberley

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

Description:
Building Consent No.: Phone:

MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MiTek accredited fabricator **Placemakers National Estimating Unit (NEU)**, 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

Timber Group:	NEU-H1.2	Pitch:	8.000 deg	Nominal Overhang:	600 mm
Roof		**Ceiling**		**Wind**	
Material:	Light	Material:	Gib Board 13mm	Area:	High (44.0 m/s)
Dead Load:	0.250 kPa	Dead Load:	0.200 kPa	Pressure Coeff:	Cpe = varies; Cpi = -0.30, 0.20
Restraints:	900 mm centres	Restraints:	600 mm centres	**Snow**	
Live Load:	Qur = 0.250 kPa Qc = 1.100 kN	Live Load:	Qc = 1.400 kN	Location:	Christchurch (N4) at 100 m
				Open Ground Load:	0.900 kPa
				Basic Roof Load:	0.630 kPa

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, ~~Txx~~ = failed design, Ø = non certified, Unmarked trusses = designed successfully, LB = lateral bracing required
GB = gable brace required

Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
EN05	1D	2280	8.000	900	T05B	3	6350	6.000	900	T02A	1	5980	6.000	900
PTG01	1D	11490	0.000	900 LB	EN01	1D	8350	8.000	900	T05	2	6350	6.000	900
T03	7	8350	8.000	900	EN02	1D	5980	8.000	900					
T04	2	8260	8.000	900	EN03	1D	5980	6.000	900					
T04A	5	8260	8.000	900	EN04	1D	6350	6.000	900					
T04B	2	8260	8.000	900	T01	4	5980	8.000	900					
T04C	3	8260	8.000	900	T01A	1	5980	8.000	900					
T05A	7	6350	6.000	900	T02	1	5980	6.000	900					

Total quantity : 44

The computer design input has been carried out by:

Signed: .....

Date: ...Friday, 22 October 2021....

Name of Detailer: B Mee.....

Qualifications and Title: Estimator

On behalf of: Placemakers National Estimating Unit (NEU)

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Job No: 211408 Client: Site:
Job Name: Building Consent No:

DESIGN STATEMENT
MiTek Beam Program v1.11 September 2017

Certification of MiTek Beam Program v1.11 September 2017

The MiTek Beam Program v1.11 September 2017 has been developed by MiTek New Zealand Ltd for the design of these beams: Timber, Glulam, GANGLAM and GANG-NAIL FLITCH BEAMS. The beam designs calculated by this program 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 to satisfy the requirements of Clause B1 of the Building Code. We believe on reasonable grounds that these beams for the proposed building, if constructed in accordance with the drawings, specifications and other documents provided will comply with the relevant provisions of the NZ Building Code. This is subject to all proprietary products meeting their performance specification requirements; the provision of adequate bracing and fixings; and the correct input of design data carried out by suitably trained personnel. This document may be used by the Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

Summary of MiTek Beam Program v1.11 September 2017 Data and Output

Roof
Weight: light + ceiling
Dead Load: 0.45 kPa
Live Load: 0.25 kPa

Wind
Area/Speed: high (44.0 m/s)

Snow
Area: 0.63 kPa

Wall
Type: NA

Floor
Live Load: NA

Beam List

Opening Label	Beam Material	Beam Size	Beam Length	Design Status	Opening Label	Beam Material	Beam Size	Beam Length	Design Status
L1	PROLAM PL12	240x90	4840	OKAY					
L2	PROLAM PL12	290x90	4150	OKAY					

GANGLAM plating details indicated with RD (regular duty plating), HD (heavy duty plating) and SHD (super heavy duty plating)

The design input has been carried out by:

Signed .....

Date: 29/07/2021

Name of Computer Operator:

Qualifications and Title:

Company:

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MiTek Beam v1.10 June 2011

Date:	Thursday, 29 July 2021
Job Number	211408
Job Name	
Client	
Calculated By	
Roof Weight	light + ceiling
Wind Zone	high (44.0 m/s)
Snow Load	0.63 kPa

Beam Details

Beam Label	L1	L2
Beam Span (mm)	4840	4150
Roof Span "S" (mm)	1500	6400
Overhang (mm)	450	600
Wall Type		
Wall Height (mm)		
Floor Live load	NA	NA
Floor Span "F" (mm)		

MiTek Bearing Reactions

Not in use in this version

Point Load 1		
Girder Span (mm)		
Setback (mm)		
Location (mm)		
Point Load 2		
Girder Span (mm)		
Setback (mm)		
Location (mm)		
Point Load 3		
Girder Span (mm)		
Setback (mm)		
Location (mm)		
Beam Status	OKAY	OKAY
Beam Material	PROLAM PL12	PROLAM PL12
Beam Size	240x90	290x90
Beam Deflection	4.85mm	4.71mm
Beam Length	4840	4150

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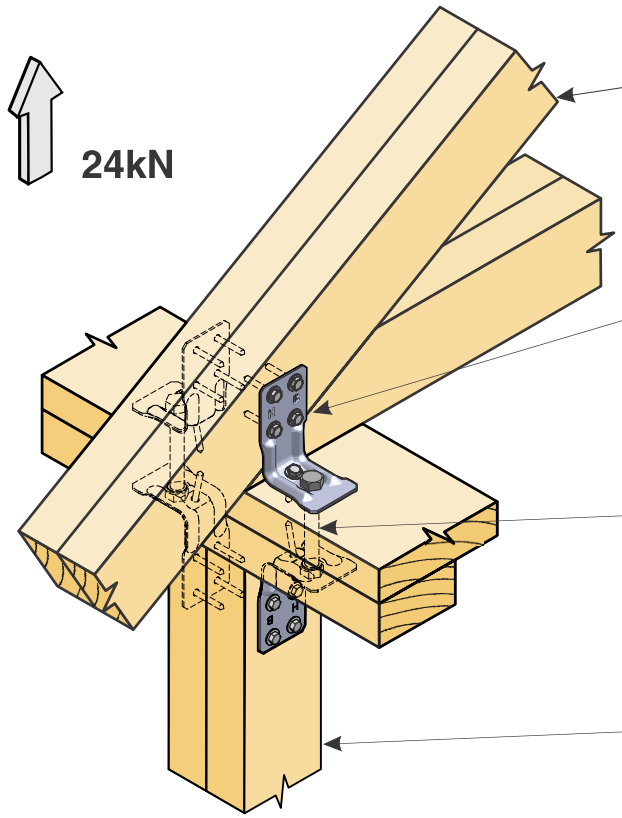
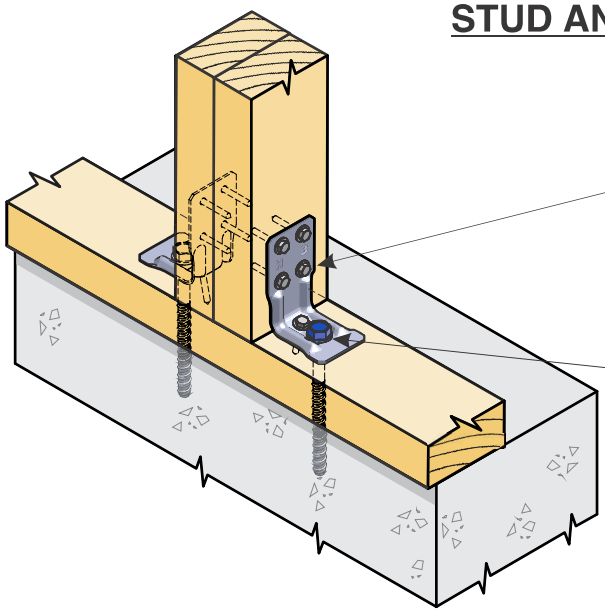
MiTek®

TECHNICAL BULLETIN No. 4

SED Truss Uplift Fixing - 24kN Characteristic



STUD AND BOTTOM PLATE FIXING



Rev. D: 16 May 2018

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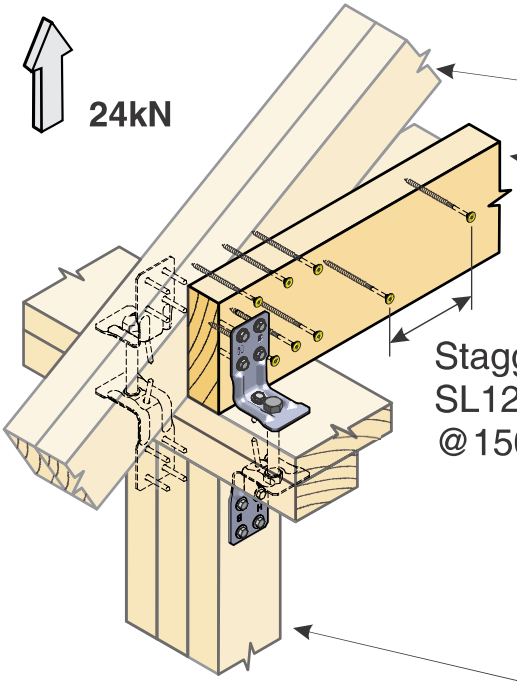
MiTek®

DOUBLE TRUSS TO TRIPLE STUDS - EXTERNAL WALL CONNECTION

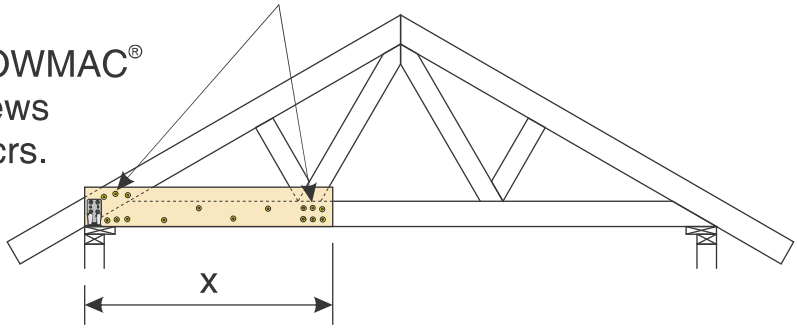


Double truss

Timber scab minimum 140mm x 45mm SG8

Fix 6 x BOWMAC® SL125 Screws as shown

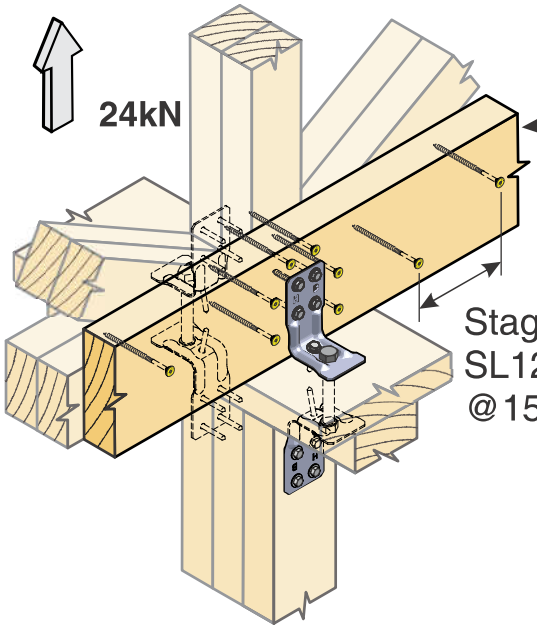
Stagger BOWMAC® SL125 screws @150mm crs.



x - minimum of 600mm or 1 panel length

Triple studs

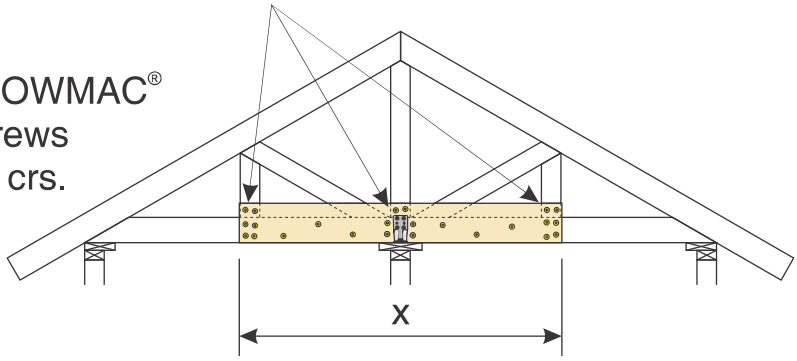
DOUBLE TRUSS TO TRIPLE STUDS - INTERNAL WALL CONNECTION



Timber scab

Fix 6 x BOWMAC® SL125 Screws as shown

Stagger BOWMAC® SL125 screws @150mm crs.



x - minimum of 600mm or 2 panel lengths

Note: Refer to page 1 for stud and bottom plate fixings

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DESIGN CERTIFICATE

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

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

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

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

Futurebuild LVL and SG8 components, when used and treated to the required treatment levels prescribed in NZS 3602 and NZS 3604, as modified by Acceptable Solution B2/AS1, will comply with the requirements of the NZBC (Acceptable Solution B2/AS1, 3.2).

References:
1. NZS 3603:1993 Timber Structures Standard.
2. NZS 3604:2011 Timber-framed buildings.
3. AS/NZS 1170:2002 Structural design actions, Parts 0 and 1.
4. AS/NZS 1170:2011 Structural design actions, Part 2: Wind actions.
5. AS/NZS 1170:2003 Structural design actions, Part 3: Snow and ice actions.
6. AS 1720.1:2010 Timber structures. Part 1: Design methods.
7. AS 1720.3:2016 Timber structures. Part 3: Design criteria for timber-framed residential buildings.

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

Version date: 26 July 2021

For further information or advice contact:
Carter Holt Harvey LVL Limited,
173 Captain Springs Road, Onehunga. Auckland
Telephone: 0800 808 131
Email: designit@futurebuild.co.nz
Web: https://futurebuild.co.nz/

Specifier details:

Specifier:	GW
Business name:	I Design Architecture
Email:	grace@idesignarchitecture.co.nz

Project & site details:

Project:	Copy of CH1054
Site address:	153 Innes Road Amberley
For (owner/s):	Donnelly
Design wind zone	High
Snow loading	Design snow zone: N4, Altitude: 120 m (sub-alpine), Ground snow load, $S_g^{1,2}$ = 1.0 kPa

1. designIT does not include any allowance for the effects of drifting and sliding of snow.
2. Snow loads are applied to roofed over structures only, the design of exposed floors/decks are not covered by designIT.

MEMBER DESIGN DETAILS

Member 1

1) Member code and description	JS1 - Jamb studs - In single or upper storey load bearing walls
2) Date prepared	30 August 2021

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

4) Design inputs

Opening width	4840 mm
Stud height	2420 mm
Roof type and mass	Light roof and ceiling - 40 kg/m²
Roof load width 'RLW'	0.9 m
Roof snow load	0.7 kPa (μ_i=0.7 , C_e=1.0)

5) Member specification

Size, stress grade/product	Use 2/90 x 45 hyCHORD
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit[3] on average deflection[2]	Estimated average deflection[2]	Rigidity ratio[4]
Wind load - W_s*	16.1 mm	10.7 mm	1.5

*Critical serviceability load case
See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

		Limit States Design Reaction[2,3]	
Load case	k_1[1]	End kN[4]	Horizontal kN
1.35G	0.60	-1.3	
1.2G + 1.5Q	0.80	-2.1	
1.2G + S_u + Ψ_cQ	0.80	-3.1	
1.2G + W_u + Ψ_cQ	1.00	-3.4	2.4
0.9G + W_u	1.00	0.6	1.9

8) Installation requirements

- Jamb studs to be nogged at maximum 1350 mm
- Notching of the jamb studs not permitted
- Nail Laminate studs in accordance with NZS 3604 Clause 2.4.4.7
- Provide 1 full length stud plus 1 secondary Jamb Stud to Detail H19

Notes for interpretation of serviceability data

1. 'average deflection' is an engineering concept based upon a notional estimated load, notional member rigidity and, in some cases, an approximate model of material response to environmental conditions. These parameters are, 'standardised' in AS 1170 and AS 1720.

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

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

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

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

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

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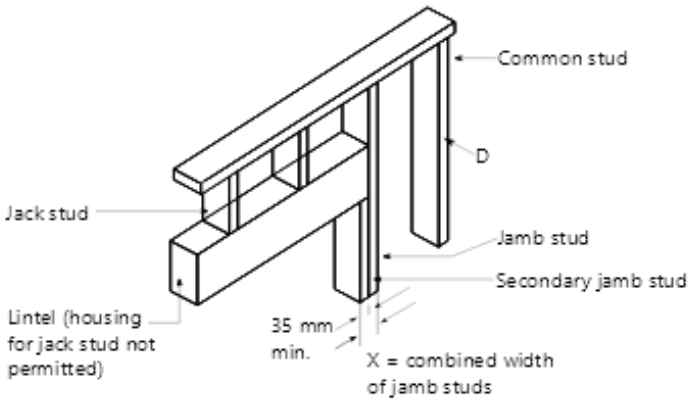
Notes for interpretation of reaction data

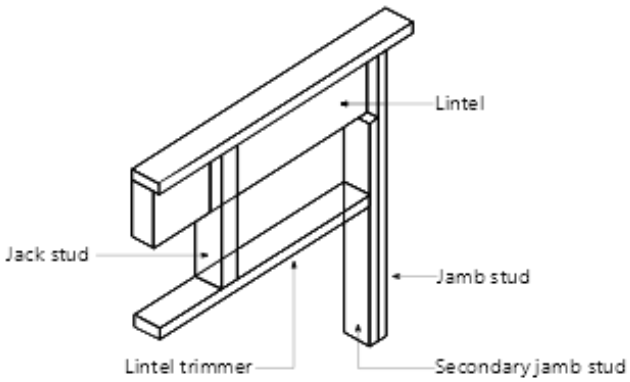
1. Duration of load factor 'k_1' for strength as per NZS 3603:1993
2. Negative (-) reactions relate to the 'gravity' or 'downwards' force on the support
3. Positive reactions relate to the 'upwards' forces or 'tie-down' requirement on the support
4. End reaction includes allowance for overhang/cantilever where one has been designed

Detail H19: Multiple Stud Configuration

Lintels having breadth greater than half stud depth



Lintel directly below top plate



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Firth

JANUARY 2020

+RibRaft®

TECHNICAL MANUAL

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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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THIS MANUAL CONSISTS OF 3 SECTIONS:

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Contains information principally useful for the specifier or building designer

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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/m^2, 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.

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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).

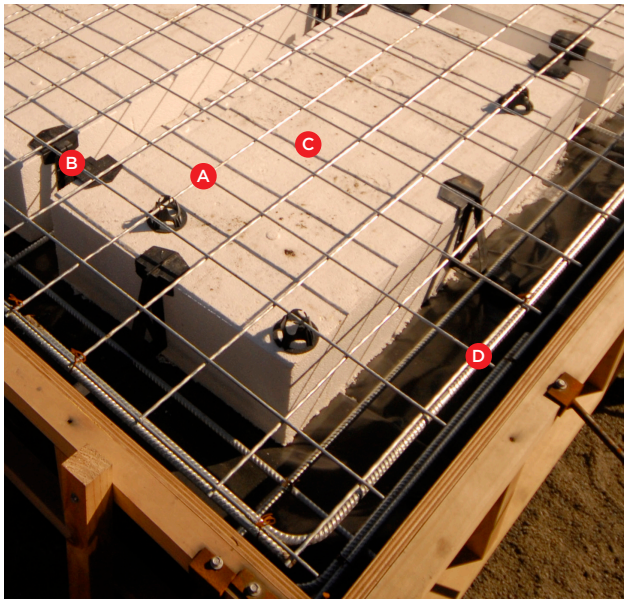
3.3 Snow Loading

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/m^2 – e.g. timber framing with weather boards and interior wall linings.
- Heavy external walls with total mass greater than 60kg/m^2 but not exceeding 290kg/m^2 – e.g. timber framing with masonry veneer or partially filled 20 series masonry blocks.
- Internal walls with total mass not exceeding 45kg/m^2 – e.g. timber framing and linings.
- Light roofs with total mass not exceeding 45kg/m^2 – e.g. ceiling linings and metal roof, including framing.
- Heavy roofs with total mass greater than 45kg/m^2 but not exceeding 85kg/m^2 – e.g. ceiling lining and concrete tiles or slates, including framing.
- Mid-floors with total mass not exceeding 60kg/m^2 – 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

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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).

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Figure 1 Building Check Flow Diagram

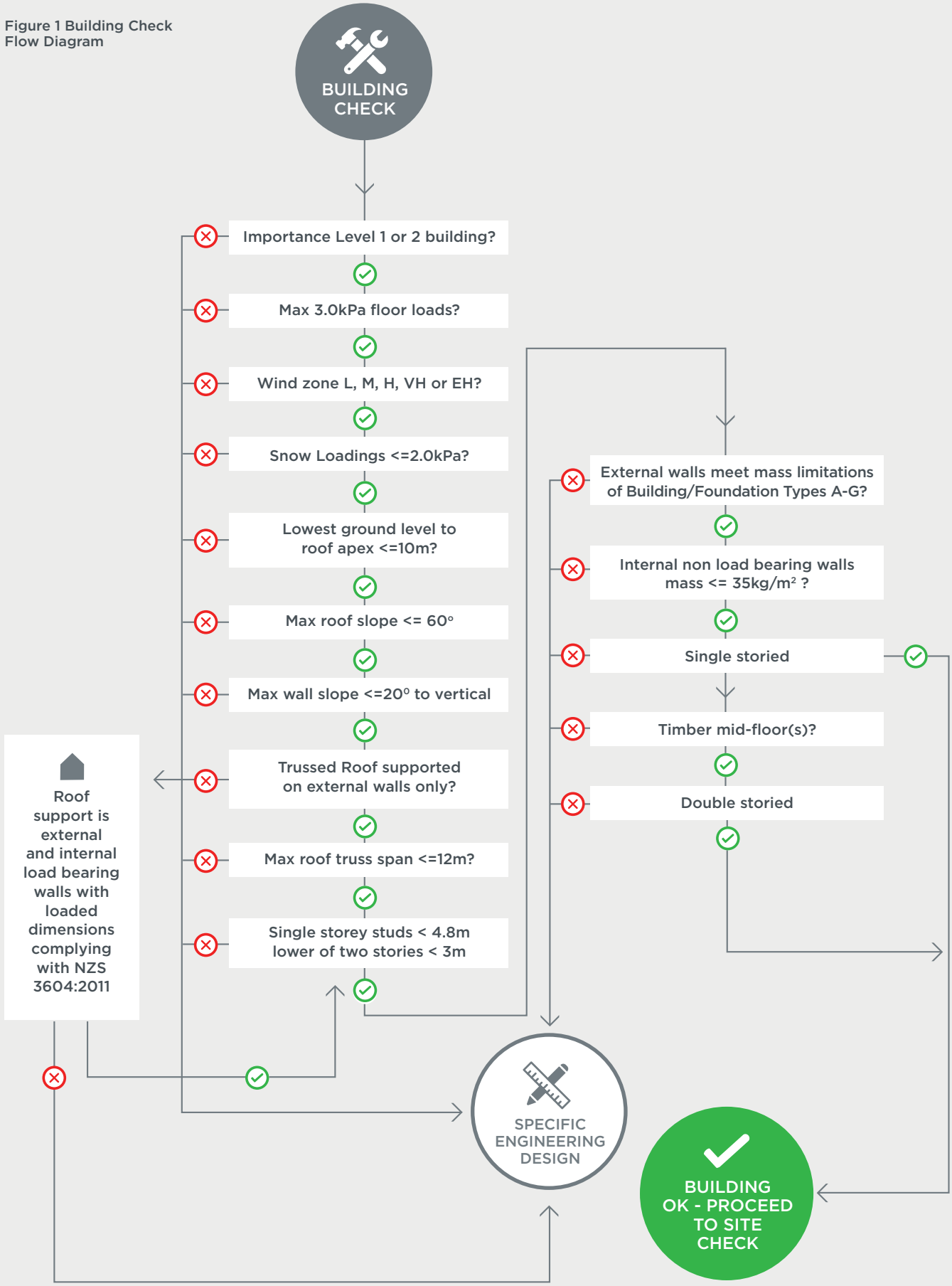

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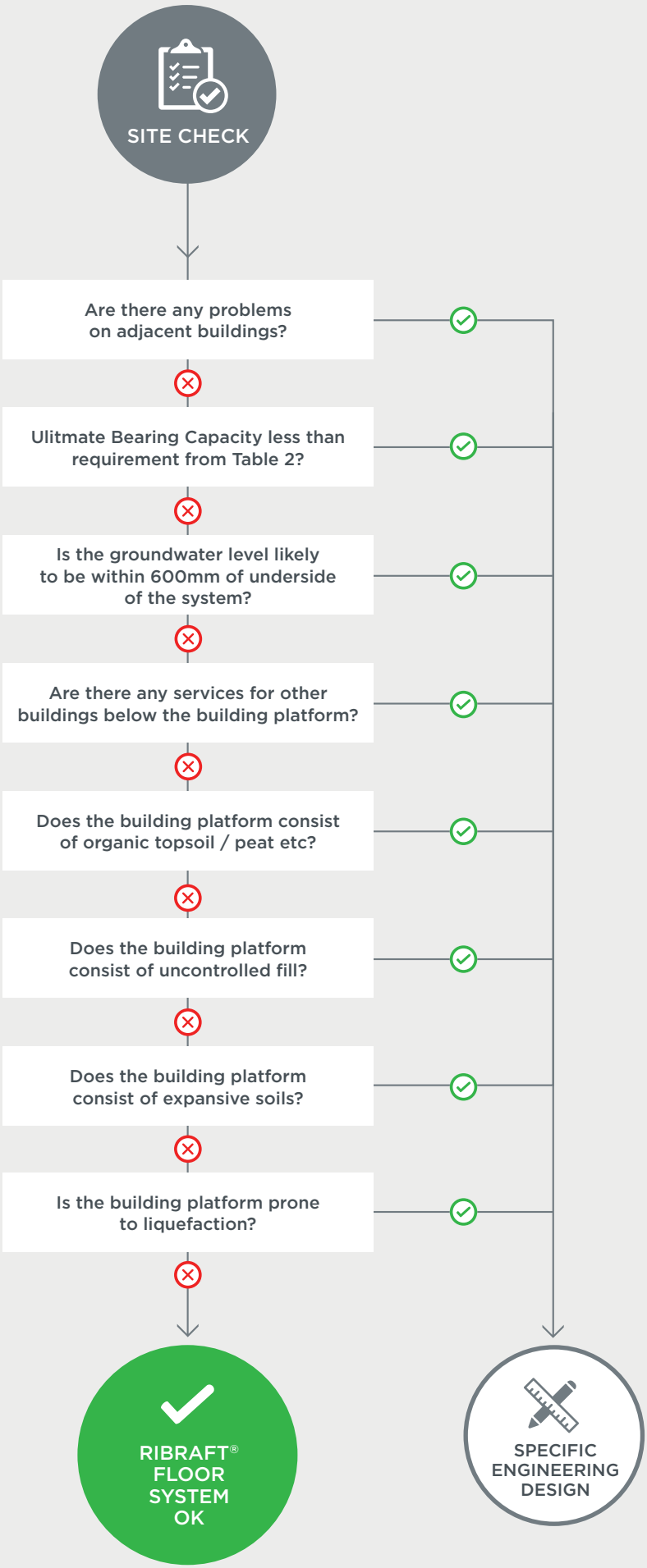
Figure 2 Building Check
Flow Diagram



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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

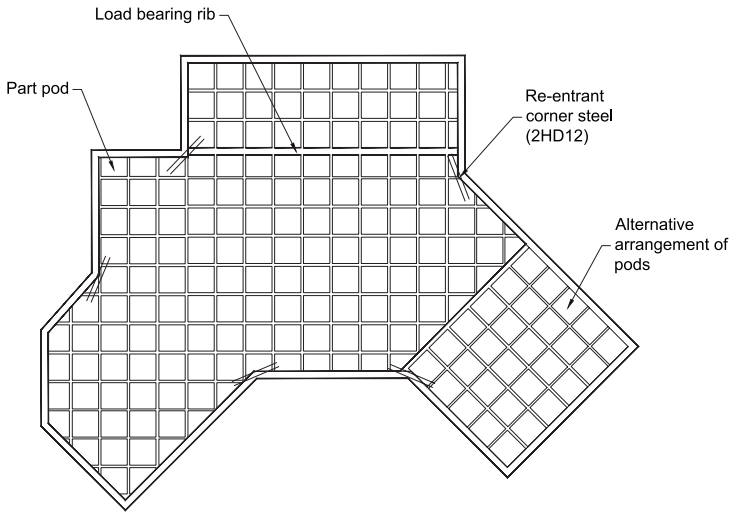
RibRaft® polystyrene pods supplied by Firth (1100 x 1100 x 220mm thick) shall be placed on levelled ground and arranged in a waffle pattern. The pods are used as void formers while the concrete is curing. These pods are an integral component of the system and shall not be substituted.

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.

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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

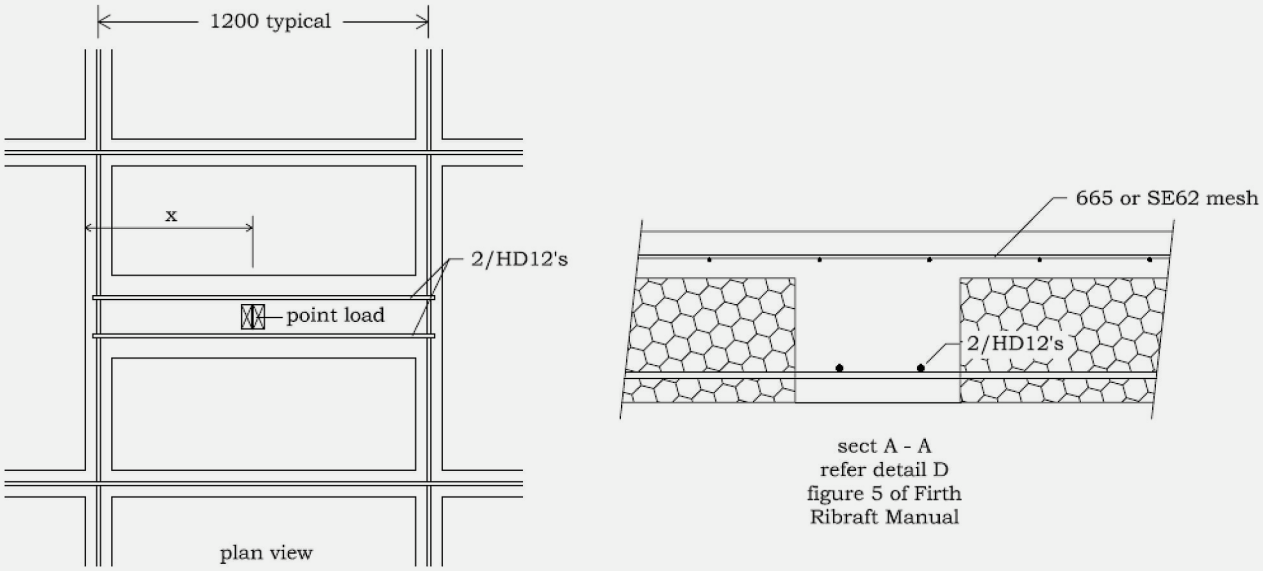
	FOUNDATION OPTIONS BELOW POINT LOAD:	
ULTIMATE LIMIT POINT LOAD REACTION	PAD OPTION, GOOD GROUND	BEAM OPTION, BEARING CAPACITY GREATER THAN 140KPA [3]
Up to 10kN	No thickening required	No thickening required
Up to 20 kN	375x375 pad[1]	300mm wide load under point load as detailed in Figure 5
Up to 30kN	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



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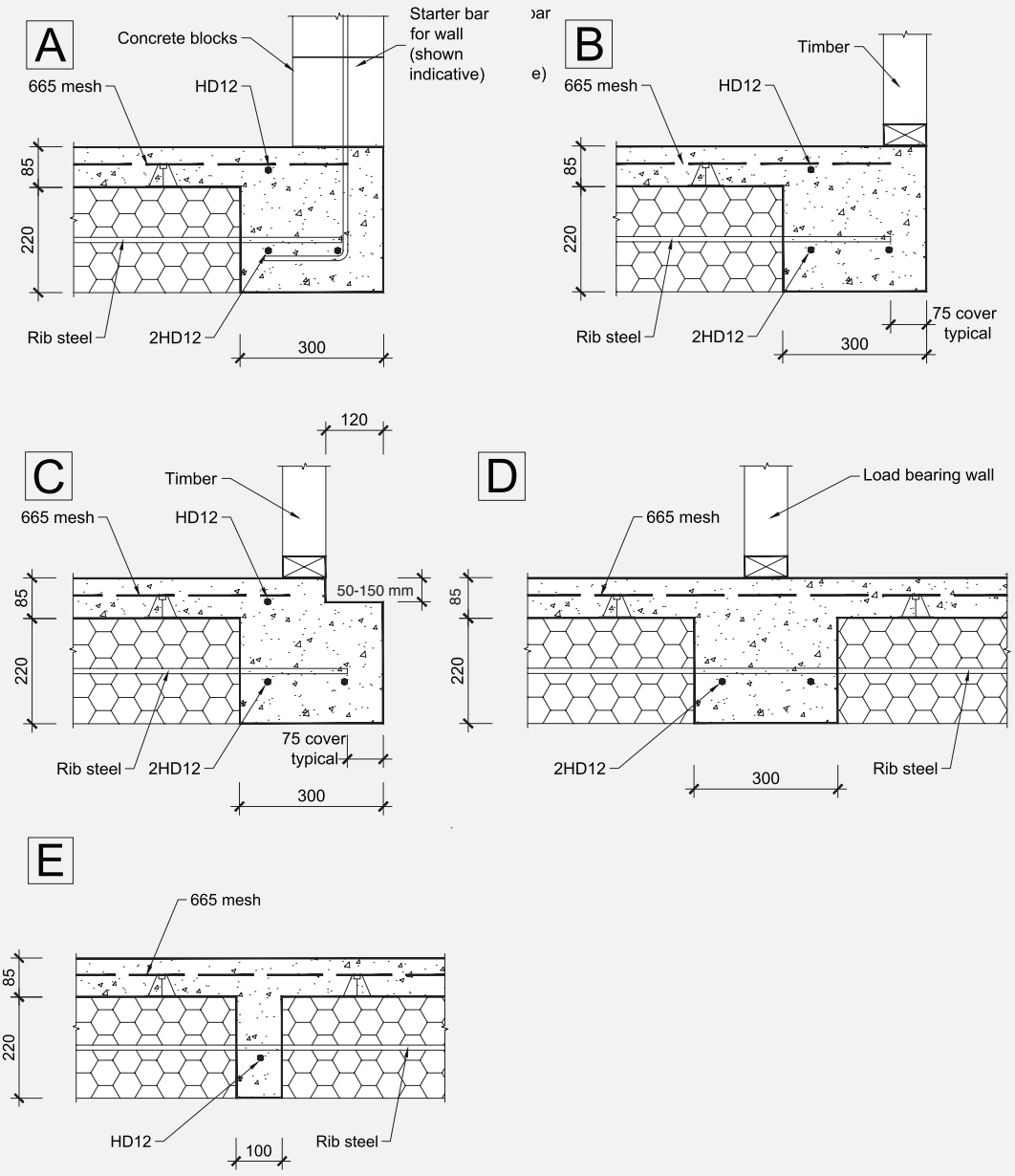
4.6 Mesh Reinforcement

The entire floor slab shall be reinforced with 665 or SE62 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



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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.

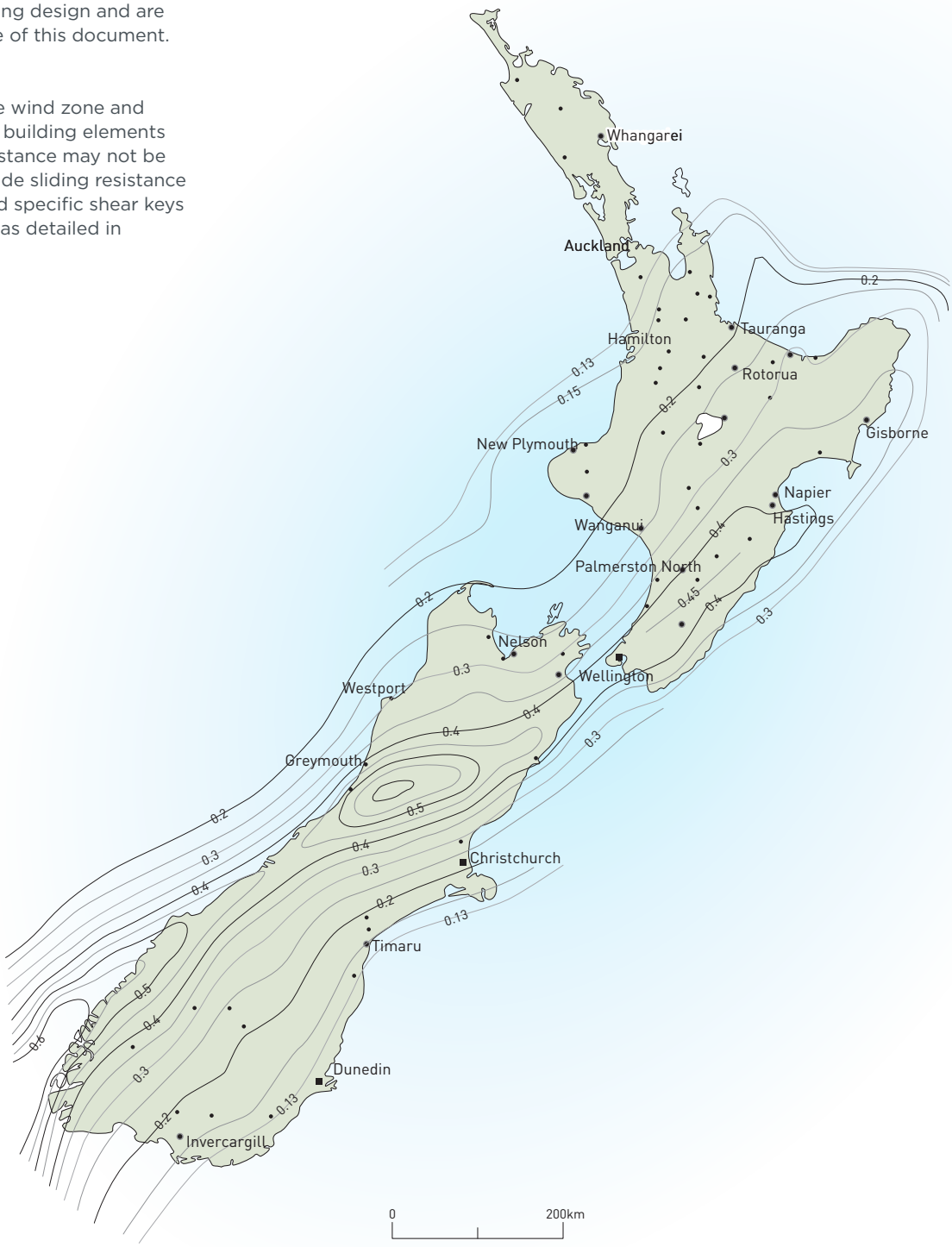

Figure 6
Seismic Hazard Factor Z to NZS 1170.5

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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 100M² 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

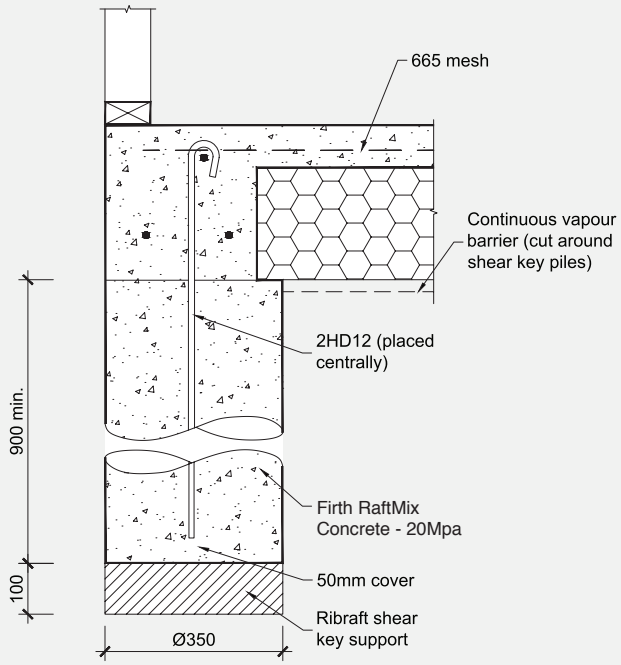
Table 4 Bracing Capacity Provided By Frictional Resistance Per 100m² Of Ground Floor Area

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



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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 180m^2 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 x 1.3 x 15 = 1853BU
The BU demand along the building = 90 x 1.3 x 12 = 1404BU

From Table 4 for a single storey light weight roof with 1.5kPa live load the capacity is 1630BU per 100m^2. Therefore for 180m^2 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 refrerence in H1. However, more technically robust calculation methodologies exist and 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 compatable 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.

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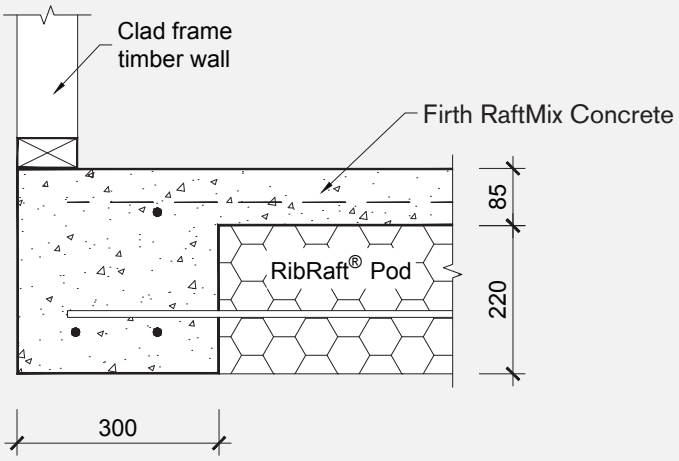

Figure 8
RibRaft® R Values For 90mm Thick Walls On The Floor Edge

	FLOOR AREA TO PERIMETER RATIO M²/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 m² °C/W	1.28	1.40	1.52	1.64	1.75	1.86	1.97	2.07	2.17	2.38	2.57

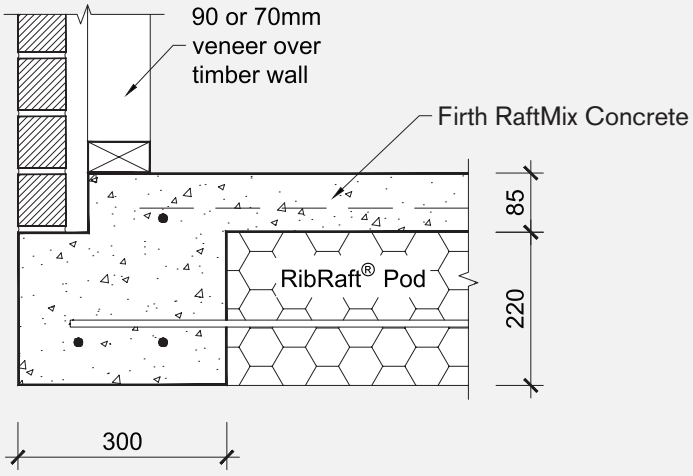

Figure 9
RibRaft® R Values For 70-90mm Thick Veneer, Cavity, and 90mm Walls.

	FLOOR AREA TO PERIMETER RATIO M²/M									
	1.25	1.50	1.75	2.00	2.25	2.5	2.75	3.0	3.5	4.00
R-Value m² °C/W	1.54	1.67	1.80	1.93	2.05	2.17	2.28	2.40	2.62	2.84

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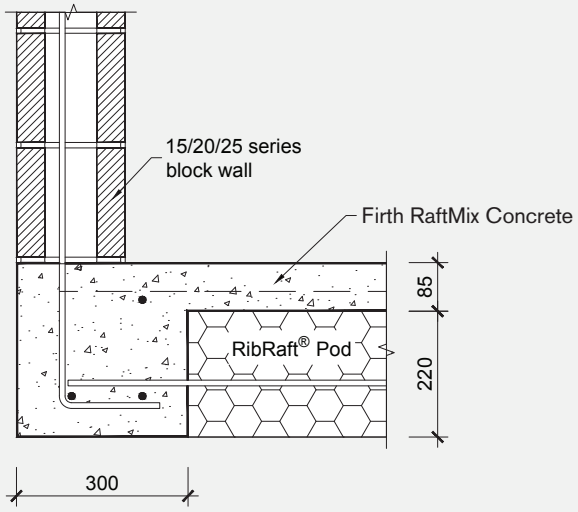

Figure 10
RibRaft® R Values For Various Thicknesses Of Masonry Walls

	BLOCK	FLOOR AREA TO PERIMETER RATIO M²/M									
		1.25	1.50	1.75	2.00	2.25	2.5	2.75	3.0	3.5	4.00
R-Value m² °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

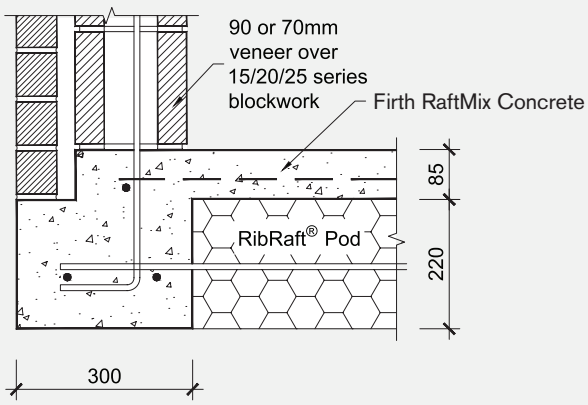

Figure 11
RibRaft® R-Values For 70-90mm Thick Veneer, Cavity, And Various Thickness Masonry Walls

	BLOCK	FLOOR AREA TO PERIMETER RATIO M²/M									
		1.25	1.50	1.75	2.00	2.25	2.0	2.75	3.0	3.5	4.00
R-Value m² °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

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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 positons 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.

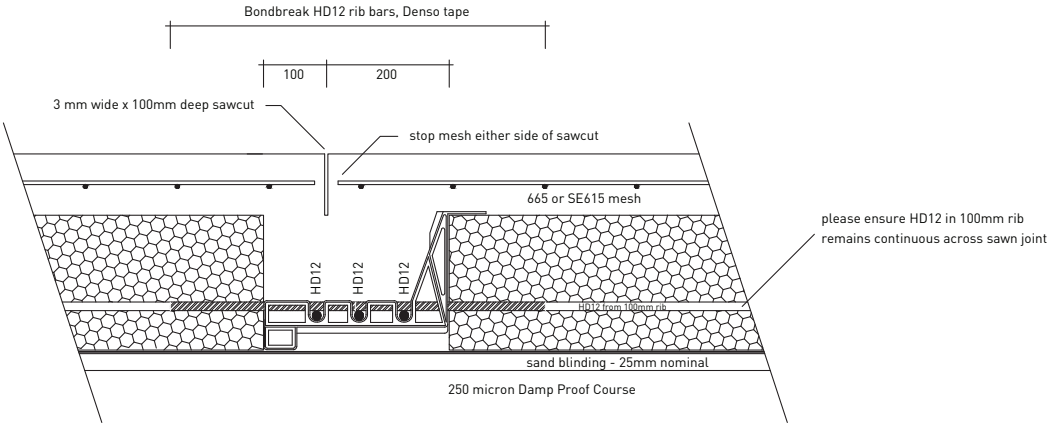
In order to limit the width of cracks at re-entrant, or internal corners, extra steel shall be placed on top of the mesh. These shall be 2-HD12 bars (Grade 500E), 1200mm long tied to the top of the mesh at 200mm centres, with 50mm cover to the internal corner – refer Figure 3.

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

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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.

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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

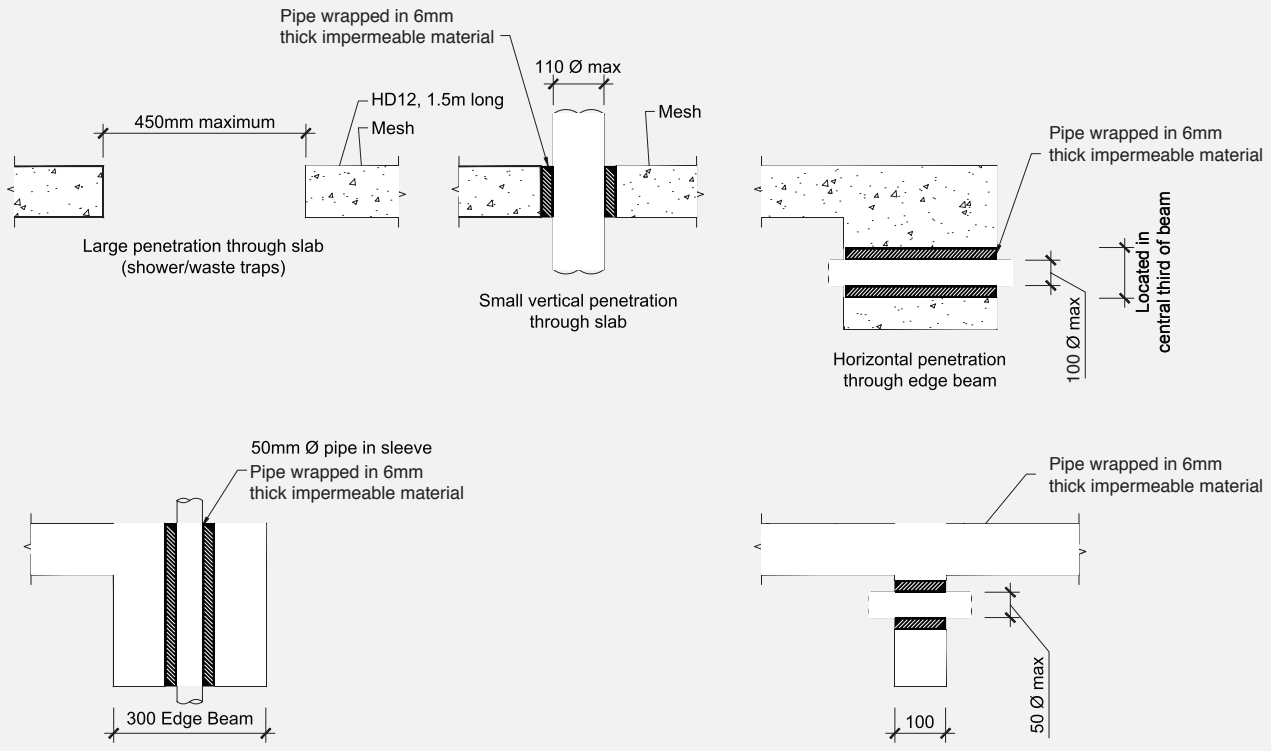

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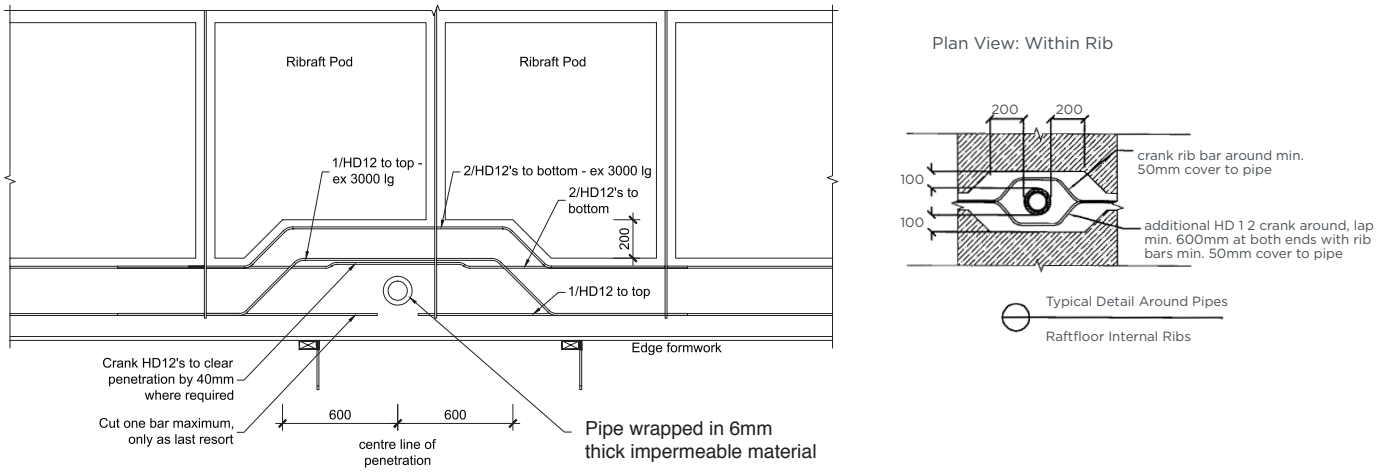
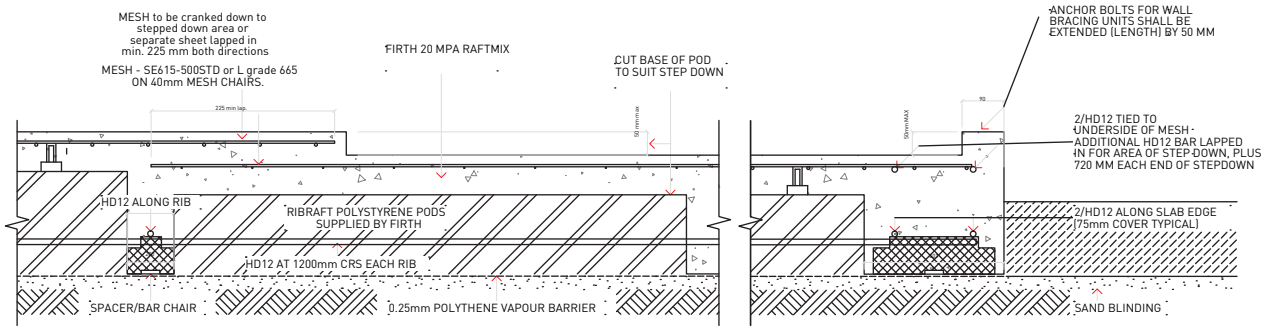
Figure 14
Localised Increase In Width At Edge Beam Where Vertical Service Up To 100mm Diameter Are Required



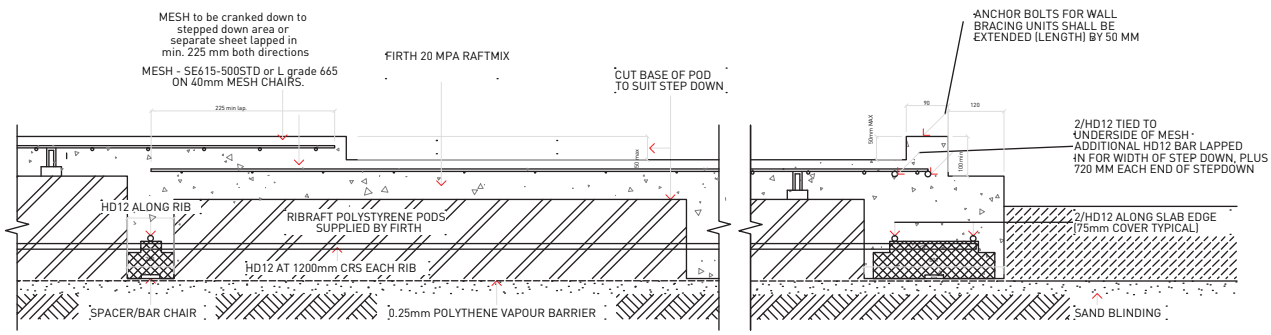
6.3.3 Recesses for Showers

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

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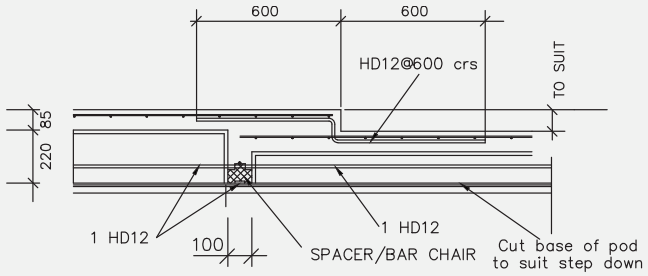
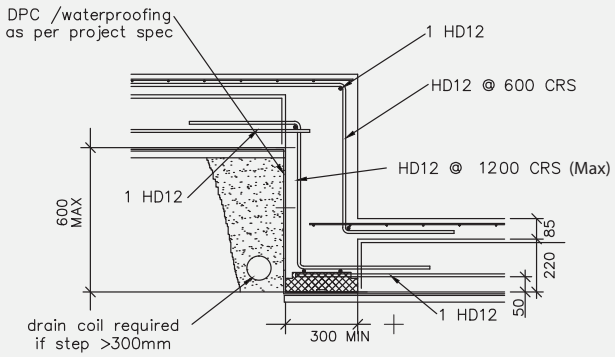
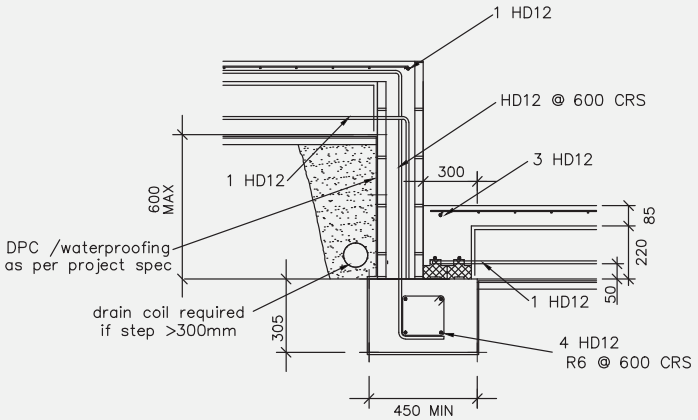
Figure 16 Details where step downs are required in the floor



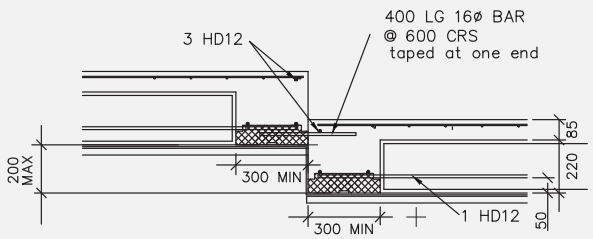
7/S2 SET–DOWN DETAIL FOR STEP UP TO 100mm
1:20



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.

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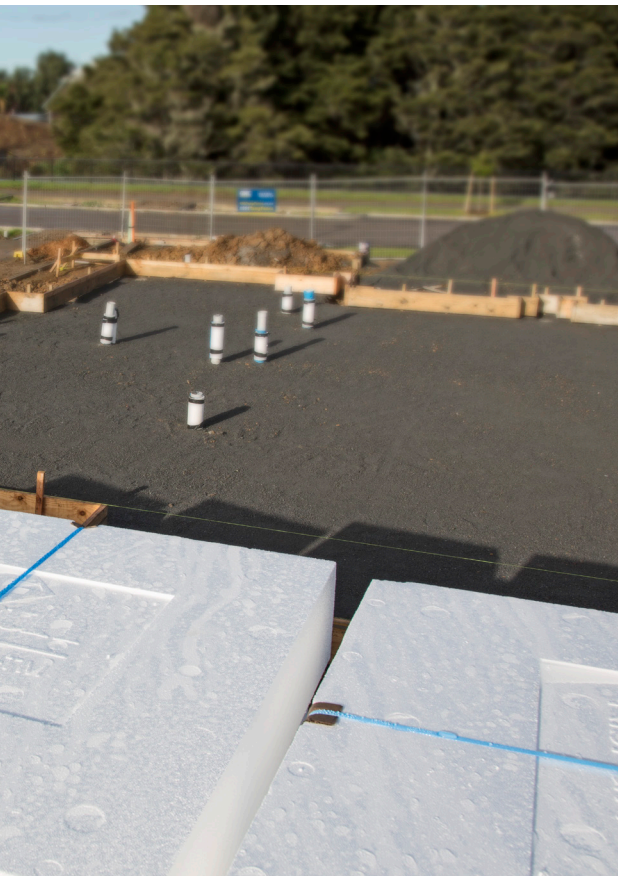
2

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 INTHIS 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.

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Figure 1
Relationship
Of RibRaft®
To Sloping
Ground Surface

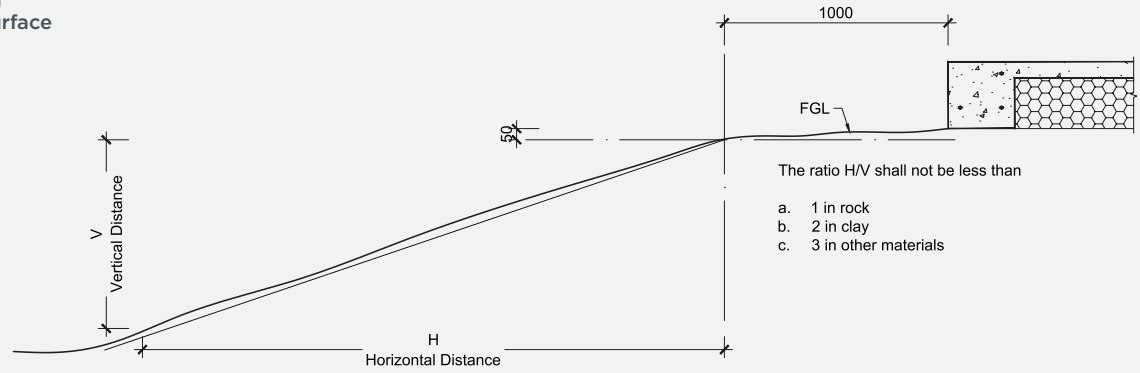


Figure 2
Temporary
Excavation
Limited

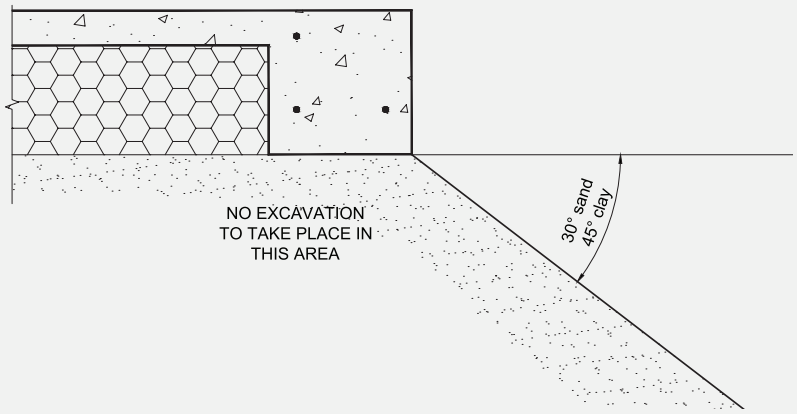
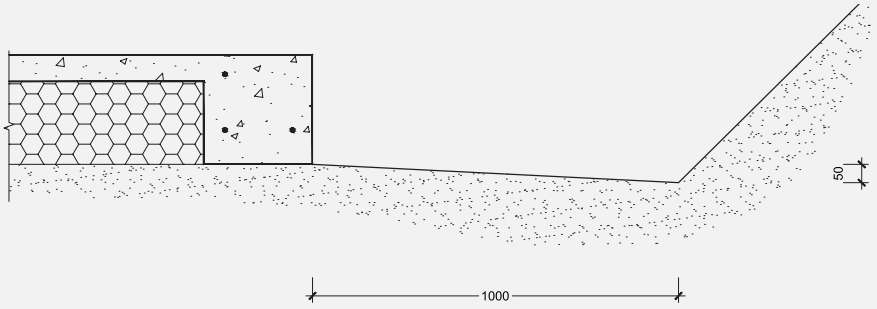


Figure 3
Site Grading



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3.0 INSTALLATION PROCEDURE

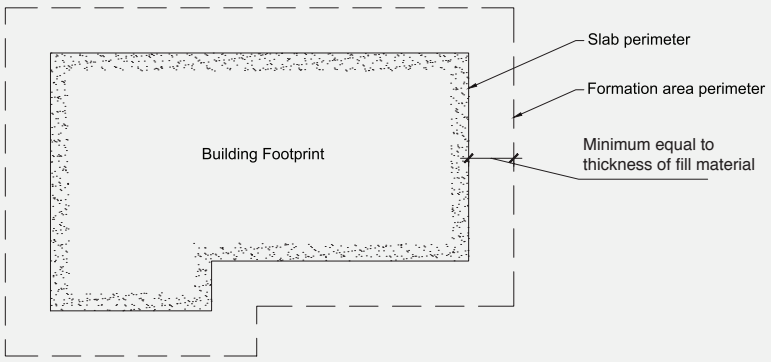
3.1 Site Preparation

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).

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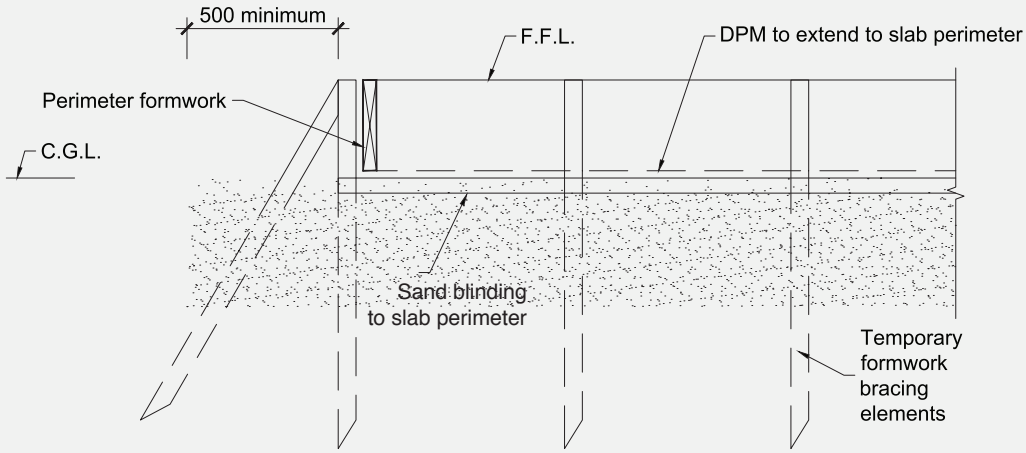
3.5 Sand Blinding

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.

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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.

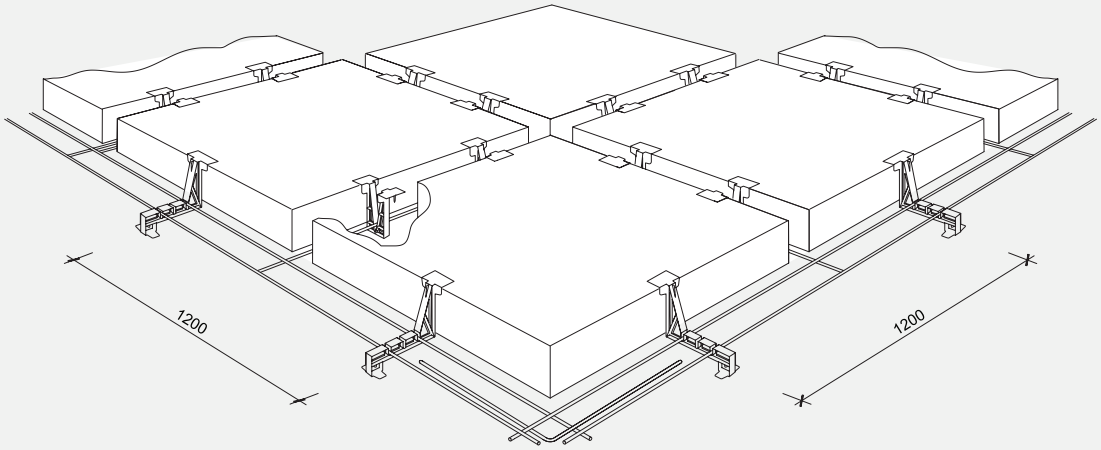
Except where a 300mm wide rib is required, each pod or part pod shall always be separated by 100mm using a minimum of one Firth approved 100mm spacer along each edge of each pod or part pod. The ribs in both directions shall form a waffle pattern throughout the slab. It is essential that the ribs and 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 omitted for clarity)



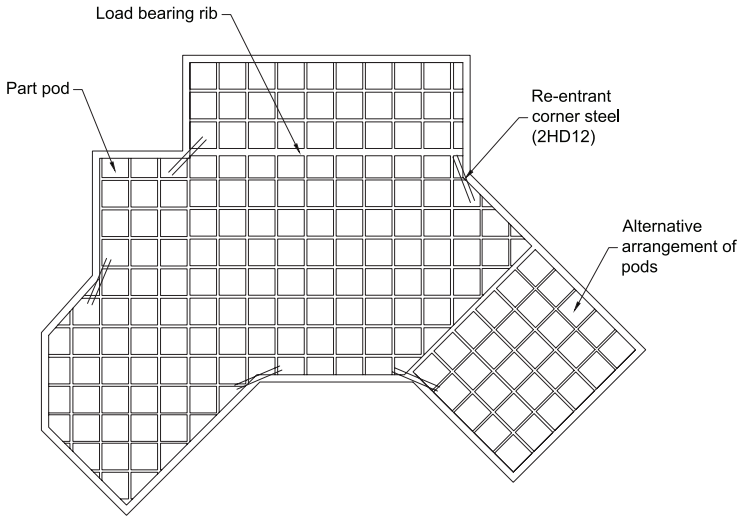


Figure 7 Typical Pod And Rib Layout

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.

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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)

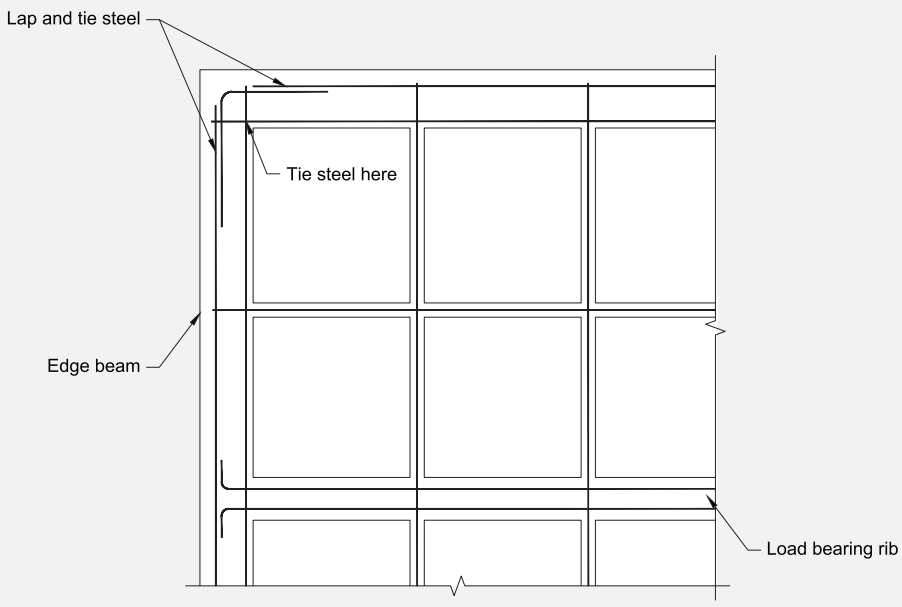

Figure 8 Corner steel layout

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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.

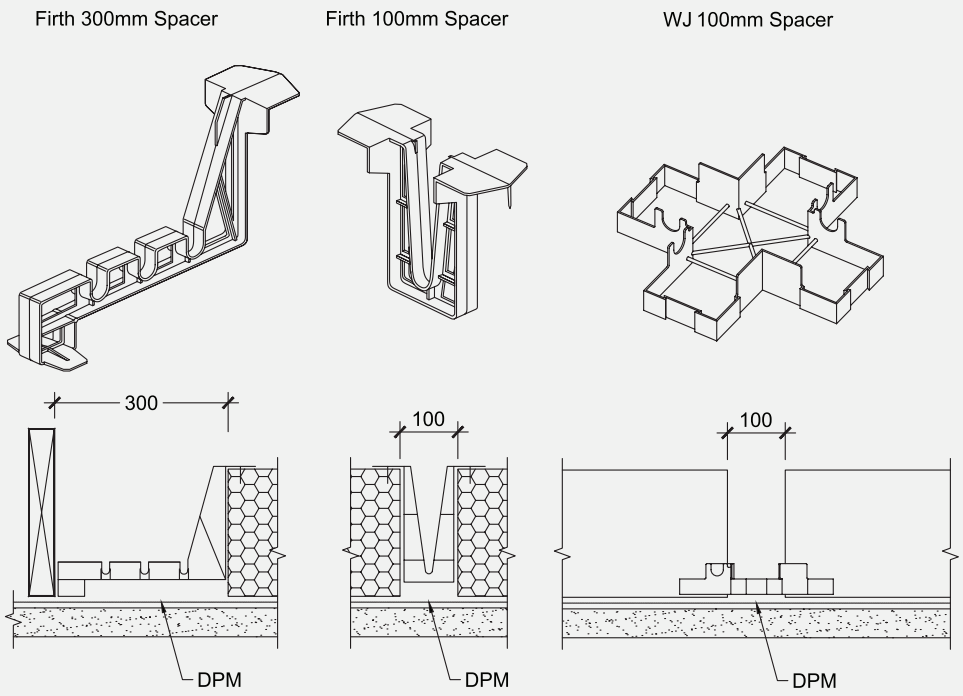
3.10.1 Placing

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.

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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 positons 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.

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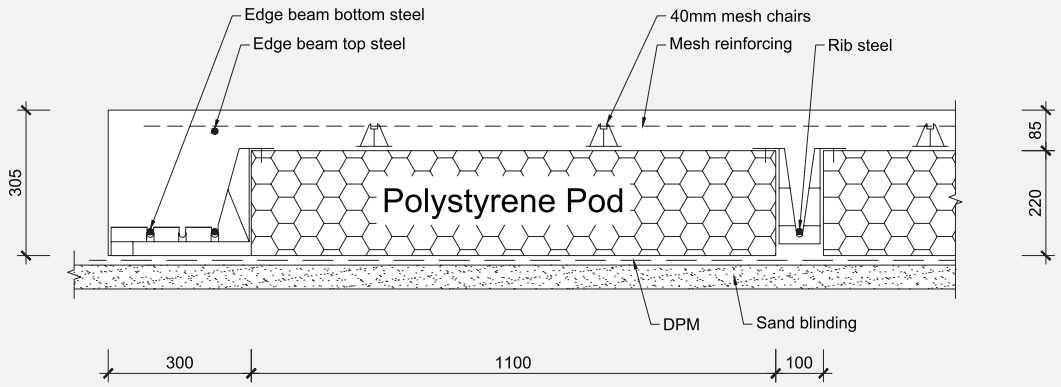
3.11.2 Free Joints

Where the length of the floor exceeds 30m a free joint shall be provided as detailed in Section 1, 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 10 Detailed Section



3.12 Removal of Formwork

The formwork shall not be removed prior to 12 hours after the slab has been finished. No installation loads are to be placed on the system before adequate curing has taken place.

3.13 Masonry Veneer

Where the building is to be clad with masonry veneer, the rebate in the edge beam shall be waterproofed with a bituminous sealer due to the possibility of ponding of water. Firth recommends a Flintcote® or equivalent coating on both the vertical and horizontal faces of the rebate.

3.14 Landscaping/Paving

Landscaping and/or paving adjacent to the slab shall be kept as a minimum the specified distance below finished floor level as required by NZS 3604:2011. The landscaping shall allow for large trees to be kept sufficiently away from the edge of the slab.This is to prevent the tree roots from disturbing the soil moisture conditions under the slab. As a guide, trees should be as far away from the edge of the slab as they are tall when fully grown.

3.15 Ongoing Maintenance

The building owner shall ensure that the ground surrounding the system be maintained so that the integrity of the system is not jeopardised. In other words, at no time shall the ground immediately adjacent to the system be allowed to settle away to expose the underside of the slab.

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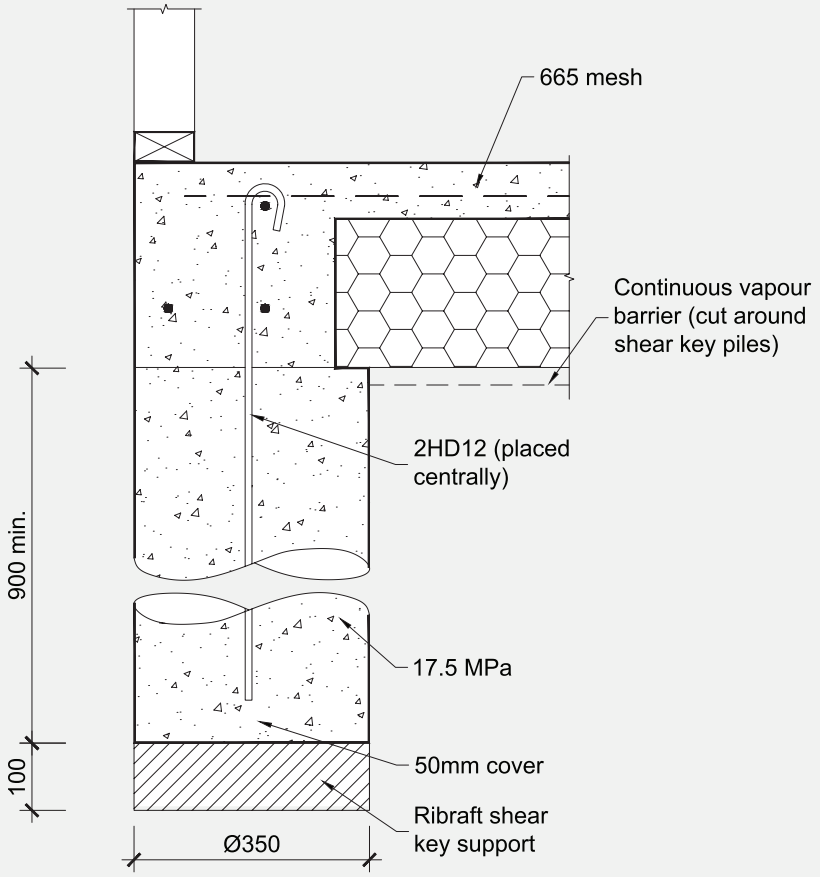
4.0 SHEAR KEYS

Shear keys, if required, shall be provided to conform to the requirements of Section 1 of this Manual. Holes for the shear keys shall be drilled at least 1000mm deep. Into the bottom of each hole a RibRaft® Shear Key Support shall be placed. Every precaution shall be taken to ensure that the shear key support is laid level and at the base of the hole. The minimum depth of concrete placed on the support shall be 900mm. Refer to Figure 11 for construction details.

The connection steel (2HD12 Grade 500E) shall be secured in place and held during pouring to ensure the bars are correctly located. The concrete for the shear keys can be placed separately to the rest of the floor and shall be finished level to the top of the sand blinding layer, or poured in one pour with the RibRaft® floor. If poured separately the top surface of the shear key shall be finished rough to ensure a good join to the Firth Raftmix concrete in the system and the DPM shall be neatly cut around the shear keys.

Figure 11 Shear Pile Construction Detail



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3

1.0 DESIGN

Verification that the design complies with the structural limitation outlined in this Manual is the responsibility of the designer, and shall be confirmed by the Building Control Authority issuing the Building Consent. Solutions outside the limitations outlined in this Manual will require specific engineering design.

2.0 CONSTRUCTION

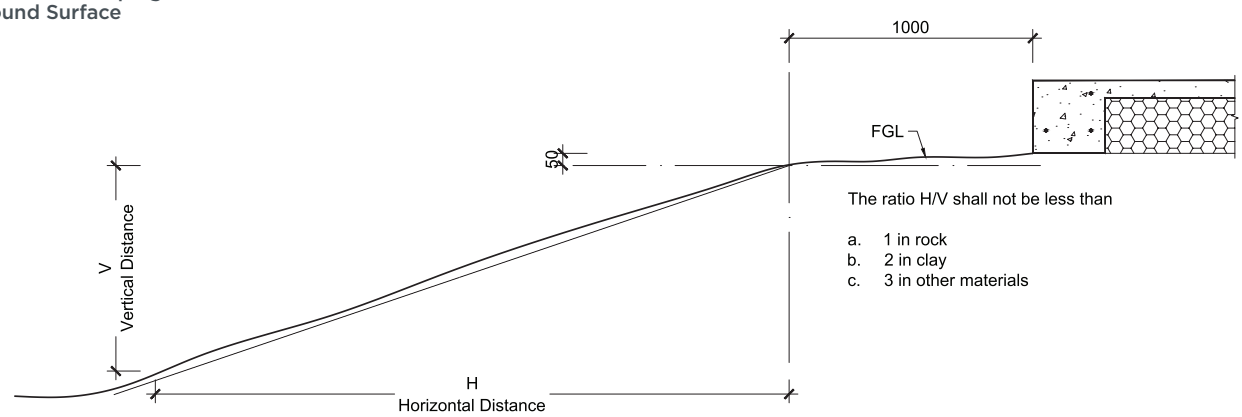
The RibRaft® foundation system has been designed to accommodate structures complying with the non specific design standards NZS3604 or NZS4229. With these types of structures the Building Control Authority specifies the inspections required and often conducts these. A similar construction verification process shall be applied to the RibRaft® system.

To assist inspection the following check list has been prepared for structures complying with the limitation:

PRE-POUR INSPECTION CHECK LIST

- GOOD GROUND CONFIRMED AS PER NZS3604, CLAUSE 3.1.3. OR SCALA OR SHEAR VANES TESTS CONFIRM ADEQUATE BEARING CAPACITY.
- VEGETATION, TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL REMOVED.
- PROXIMITY TO SLOPE-GROUND SURFACE IS ALWAYS ABOVE DASH LINE SHOWN IN FIGURE 1.
- SHEAR PILES (WHERE REQUIRED) IN PLACE AND REINFORCEMENT PROTRUDING.
- FORMATION AREA EXTENDS AT LEAST THE DEPTH OF GRANULAR FILL BEYOND BUILDING FOOTPRINT.
- STEPS IN THE FORMATION ARE DETAILED IN ACCORDANCE WITH THIS MANUAL.

Figure 1
Relationship of RibRaft® To Sloping Ground Surface



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CODEMARK
CM70056

PRE-LAYOUT INSPECTION CHECK LIST: DAMP PROOF MEMBRANE IN PLACE

PERIMETER FOUNDATION	○	WIDTH 300MM(1)
	○	REINFORCEMENT 2 X HD12 BOTTOM, 1 X HD12 TOP
	○	FIRTH SUPPLIED SPACER USED AT 1.2M MAXIMUM CENTRES
INTERNAL RIBS	○	WIDTH 100MM
	○	REINFORCEMENT 1 X HD12
	○	FIRTH SUPPLIED SPACER, MAX SPACING OF ONE PER POD OR PART POD
LOAD BEARING RIBS	○	WIDTH 300MM
	○	REINFORCEMENT 2 X HD12 BOTTOM
	○	FIRTH SUPPLIED SPACER, MAX SPACING OF ONE PER POD OR PART POD
PODS	○	FIRTH SUPPLIED RIBRAFT® POD
MESH	○	40MM CHAIRS, 1.2M MAX CENTRES, MIN TWO PER POD OR ONE PER PART POD
	○	MESH IN PLACE AND 665 OR SE62
	○	MESH LAPS OVERLAP OF OUTERMOST CROSSWIRE = MESH SPACING + 50MM
REINFORCEMENT	○	2 X HD12 BARS 1.2M LONG PROVIDED AT RE-ENTRANT CORNERS
	○	LAPS FOR 12MM REINFORCEMENT MINIMUM OF 720MM
CONCRETE	○	COVER TO PODS MINIMUM OF 85MM OR 110MM IF INFLOOR HEATING USED.
	○	FIRTH RAFTMIX ORDERED
SERVICE PENETRATIONS	○	NO REINFORCEMENT (WITH EXCEPTION OF MESH) CUT TO ALLOW PASSAGE OF SERVICE PIPES. REFER CLAUSE 6.3 OF SECTION 1 FOR EXCEPTIONS
	○	PIPES WRAPPED WITH MINIMUM 6MM THICKNESS OF IMPERMEABLE COMPRESSIBLE MATERIAL WHERE IN CONTACT WITH CONCRETE
	○	DIAMETER/SIZE OF PENETRATIONS AS PER TABLE 6, SECTION 1 OF THIS MANUAL

(1) At locations of service penetrations the width of the perimeter foundation maybe locally increased. Refer Figure 14 Section 1 for details.

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CONCRETE & MASONRY PRODUCTS: A SUSTAINABLE BUILDING OPTION & SOLUTION

- ✓ Environmentally compliant manufacturing plants
- ✓ Surplus water and some aggregates recycled
- ✓ Low transport impacts
- ✓ Leftover concrete returned from construction sites
- ✓ Passive solar heated thermal mass makes completed buildings more energy-efficient
- ✓ Most wash water returned from construction sites
- ✓ Highly durable, low maintenance buildings and no rot
- ✓ High degree of noise control
- ✓ Inherent fire resistance
- ✓ Overall longer effective building life
- ✓ Demolished concrete can be recycled as hard fill or aggregate

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VOC Content Test Certificate

Tuesday April 17th, 2007

Manufacturer: Ardex Australia Pty Ltd

Unit 7, 20 Powers Road

Seven Hills NSW 2147

Sample Description: Ardex WPM 001 waterproofing membrane

Production Date: March 2007

Date Tested: April 2007

Test Method: SCAQMD Method 304-91 Determination of Volatile Organic Compounds (VOC) in Various Materials as referenced by South Coast Air Quality Management Division (SCAQMD) Rule 1168.

Test Data:

Specification **Green Building Council of Australia Green Star IEQ-13**	**Ardex WPM 001**
Architectural Sealant 250 grams per Litre	**18 grams per Litre**

Vyt Garnys

Dr. Vyt Garnys
PhD, BSc(Hons) AIMM, ARACI, ISIAQ
ACA, AIRAH, FMA
Managing Director and Principal Consultant

Cetec Pty Ltd
ABN 44 006 873 687
2/27 Normanby Road,
Clayton North, Victoria 3168
AUSTRALIA
Telephone: (03) 9544 9111
Facsimile: (03) 9544 9122
International: (+613)
Email: info@cetec-foray.com.au
www.cetec-foray.com.au

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ARDEX WPM 001

(Superflex Bathroom and Balcony Premixed)

Single component undertile waterproofing membrane

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

Fast drying one part acrylic membrane

Class III membrane, conforms to the requirements of AS4858:2004 Wet Area Membranes

ARDEX Australia Pty Ltd
20 Powers Road
Seven Hills NSW 2147
Ph: (02) 9851 9199
Fax: (02) 9674 5621
Email: techinfo@ardexaustralia.com
Internet: www.ardex.com

ARDEX New Zealand Ltd
32 Lane St, Woolston
Christchurch, New Zealand
Ph: (03) 373 6900
Fax: (03) 384 9779
Email: techinfo@ardexaustralia.com
Internet: www.ardex.com

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ARDEX WPM 001

(Superflex Bathroom and Balcony Premixed) Single Component Undertile Waterproofing Membrane

PRODUCT DESCRIPTION

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

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

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

FEATURES/BENEFITS

- Fast drying ARDEX WPM 001 can be tiled over in 48 hours in non critical areas*.
- Fibre reinforced: Excellent strength, eliminates need for reinforcing mat.
- Flexible: Accommodates normal building movement class 3 membrane as per AS 4858: 2004 Wet Area Membranes.
- Advanced acrylic: Will not re-emulsify once cured.
- Designed for tiling – Fully compatible with ARDEX tile adhesive systems.
- Water based, safe to use, low odour and easy cleaning.
- Conforms to the requirements of Australian Standards 4858: 2004 Wet Area Membranes.

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

APPLICATION RANGE

Performance levels

Commercial and residential.

Location

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

Surfaces

Walls and floors.

Substrates

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

Contact ARDEX for use over existing membranes, covering materials, and any other substrates not listed.

SPECIFICATION CLAUSE

ARDEX WPM 001 (Superflex Premixed)

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

PACKAGING

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

SHELF LIFE

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

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TABLE 1

	Thickness per coat		Total dry film thickness (2 coats)	Theoretical coverage		Per unit
	Dry film	Wet film		Per coat	For 2 coats	
FLOORS	0.5mm	1.0mm	1.0mm	15m²	7.5m²	20kg(15L) unit
WALLS	0.25mm	0.5mm	0.5mm	30m²	15m²	20kg(15L) unit

COVERAGE

Two coats are recommended for an effective waterproof membrane.

Coverage will vary depending on the porosity of the surface.

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

DRYING TIMES

Recoat time

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

Dry through

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

Fully cured

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

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

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

CLEANING

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

SAFETY PRECAUTIONS

Do not use the product in the following situations:

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

For substrates or situations other than those listed contact ARDEX.

SAFETY DATA

ARDEX WPM 001 is non-hazardous and non dangerous. In case of skin contact, flush with running water. In case of irritation seek medical advice. If swallowed, immediately give a glass of water.

Additional information is listed in the Material Safety Data Sheet.

QUALITY PRODUCT

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

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ARDEX WPM 001

(Superflex Bathroom and Balcony Premixed) Single Component Undertile Waterproofing Membrane

USER NOTES

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

APPLICATION

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

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

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

Critical areas:

INTERNAL WET AREAS

1. Construction should be in accordance with Australian Standards 3740 – 2004 Waterproofing of wet areas within residential buildings.
2. All render and tile bed requirements should be completed before application of the membrane and tiles or other floor coverings should be direct bonded to the membrane.
3. Ensure wall and floor sheets are installed as per sheet manufacturer's recommendations.
4. Ensure suitable brick/concrete hobs are used (do not use timber), and that the top of the hob does not slope outwards.
5. Ensure that falls to the waste are min 1:60 (ie. approx. 30mm in 2mtr) before waterproofing. Ensure outlet pipes are fixed securely and that the waste or drainage flanges are recessed into the floor.
6. Avoid sheet joints in shower recess floor. Ensure that sheets are securely fixed to the wall at the bottom edge, and sheet joints are sealed with a neutral cure silicone sealant spread approximately 6mm on either side of the joint.
7. Treat nail and screw holes with neutral cure silicone sealant.
8. Seal the perimeters of taps, shower outlets and waste outlets with neutral cure silicone sealant.
9. Apply a bead of neutral cure silicone sealant to all horizontal and vertical corners.
10. Apply a bead of neutral cure silicone sealant to the junction of the hob or angle and walls.
11. Waste outlets shall incorporate a puddle flange or similar in accordance with AS 3740 and the top surface shall be set flush with the surface to which the membrane is to be applied. A bead of neutral cure silicone shall be applied across the intersection of the puddle flange and the screed/floor.
12. Apply the membrane to the entire shower recess floor and down into waste or drainage flange. Apply the membrane over the hob and at least 100mm beyond the outside edge of the hob (ideally to entire wet area floor).
13. Plastic (eg. PVC) fittings should be primed with a solvent based plumbers primer. Prime metal surfaces with a suitable metal primer.
14. Apply the membrane 1800mm up the walls or 80mm above the height of the shower rose within the shower recess.
15. Install the shower screen to inside edge of the hob.

Fig.1 – Shower recess – Critical areas

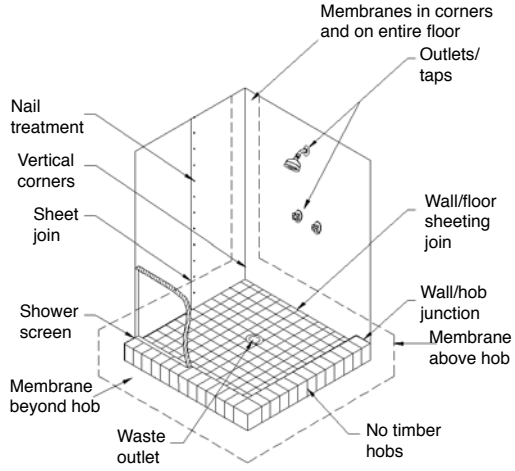
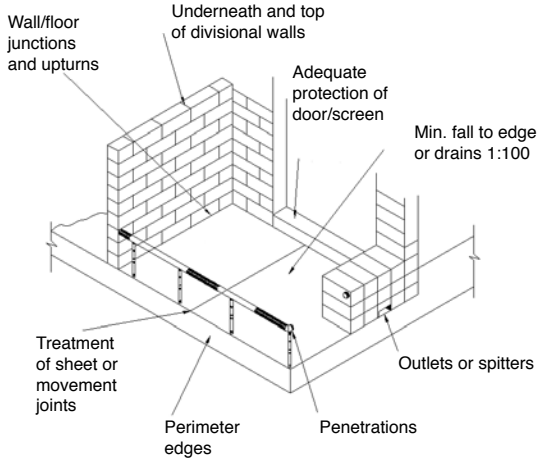


Fig.2 – Balcony – Critical areas



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BALCONIES AND DECKS

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

APPLICATION NOTES

Surface preparation

- Ensure all surfaces are structurally sound and totally dry. The pores of concrete surfaces should be open (absorbent surface). All sheet substrates must be securely fixed in accordance with the manufacturers instructions.
- Falls to outlets of at least 1:60 or approx. 30mm in 2 metre (wet areas) or 1:100 externally, must be achieved prior to tiling.
- The surface to be coated should be free from dust, oil, paint, curing compounds and any other contaminating materials.
- Damaged concrete should be repaired (leveled) and surface defects including all cracks and sharp protrusions should be treated prior to the application of the membrane.
- Remove laitance on concrete or screeds by mechanical means.
- Highly dense (>40MPa) or steel trowelled concrete should be roughened by suitable mechanical means (shot blasting, grinding, etc).

Priming

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

GENERAL APPLICATION

Crack preparation

Cracks <2mm:

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

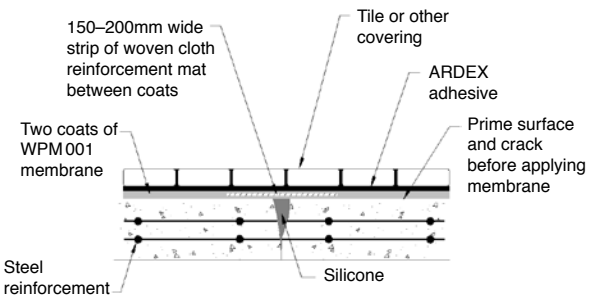
Cracks 2–6mm:

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

Cracks >6mm:

Contact your local ARDEX representative.

Fig.3 – Crack treatments



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ARDEX WPM 001

(Superflex Bathroom and Balcony Premixed) Single Component Undertile Waterproofing Membrane

MOVEMENT/CONSTRUCTION JOINTS

Movement joints (<6mm)

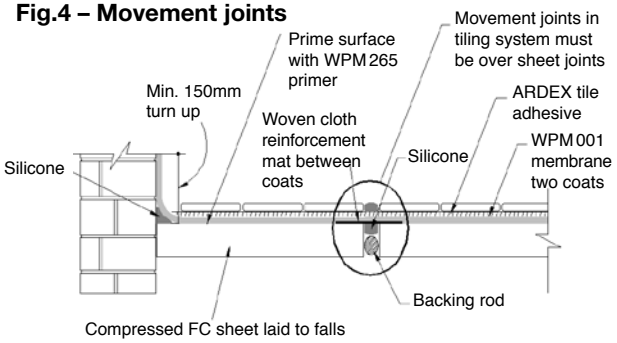
Use same procedure as in crack preparation.

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

Construction joints (>6mm)

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

Fig.4 – Movement joints



Corners and coving areas

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

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

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

WALL/FLOOR JUNCTION

After priming with ARDEX WPM 265 water based primer and allowing to dry, apply a generous bead (12mm) of neutral cure silicone sealant to seal all junctions between two substrates. Smooth over the silicone so that it extends 6mm up the wall and 6mm over the floor and allow to touch dry. Place a 190mm wide band of ARDEX Deckweb woven mat reinforcement over the applied membrane. Thoroughly wet out the cloth and remove all creases in, or air pockets under the mat. Immediately apply a second coat to completely fill the mat. The ARDEX WPM 001 should be applied to at least 150mm up the wall surfaces as per the recommendations for the application of ARDEX WPM 001 to floors.

Walls

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

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

Floors

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

Prime the surface with ARDEX WPM 265 water based primer and allow to dry.

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

Waste outlet

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

Plastic (eg. PVC) fittings should be primed with a solvent based plumbers primer. Prime metal surfaces with a suitable metal primer.

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

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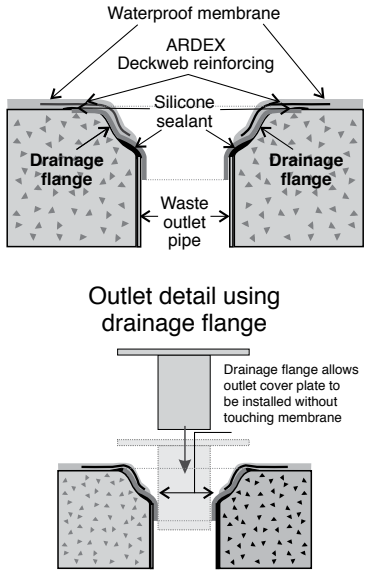
Fig.5 – Waste outlet



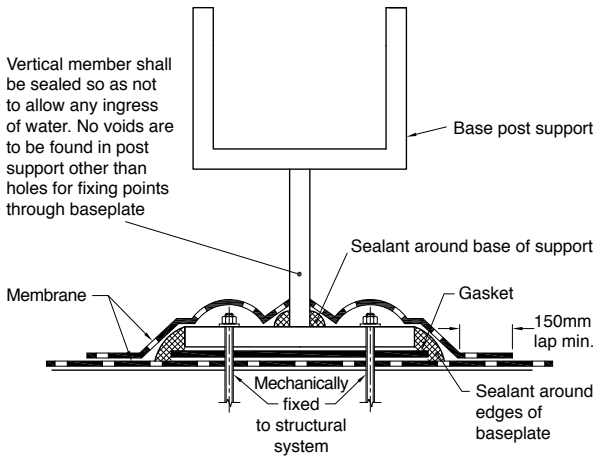
Balcony penetrations (Refer Fig.6)

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

Prime the metal with an appropriate metal primer such as an epoxy polyamide primer and allow to dry. Apply a 12mm bead of neutral cure silicone around the perimeter of the penetration. Apply the first coat of ARDEX WPM 001 on the substrate and the flanged metal.

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

Fig.6 – Post membrane installation



Tiling systems

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

TECHNICAL DATA

ARDEX WPM 001 (Superflex Premixed)
Characteristics of liquid

Form and colour	Blue viscous paste
Type	Single part
Specific gravity	Approx. 1.3kg/litre
pH of liquid	8.5
Tensile strength 7 days dry AS1145	1.04 MPa
Full cure	1.92 MPa
Elongation at break 7 days dry AS1145	780%

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

VOC content	18g/L

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

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DISCLAIMER

The technical details, recommendations and other information contained in this data sheet are given in good faith and represent the best of our knowledge and experience at the time of printing. It is your responsibility to ensure that our products are used and handled correctly and in accordance with any applicable Australian Standard, our instructions and recommendations and only for the uses they are intended. We also reserve the right to update information without prior notice to you to reflect our ongoing research and development program.

Country specific recommendations, depending on local standards, codes of practice, building regulations or industry guidelines, may effect specific installation recommendations.

The supply of our products and services is also subject to certain terms, warranties and exclusions, which may have already been disclosed to you in prior dealings or are otherwise available to you on request. You should make yourself familiar with them.

ARDEX Australia Pty Ltd

Technical Services Toll Free: 1800 224 070

New South Wales	Ph (02) 9851 9100	Fax (02) 9838 7970
Queensland	Ph (07) 3817 6000	Fax (07) 3881 3188
Victoria/Tasmania	Ph (03) 8339 3100	Fax (03) 9308 9332
South Australia	Ph (08) 8406 2500	Fax (08) 8345 3207
Western Australia	Ph (08) 9256 8600	Fax (08) 9455 1227

ARDEX New Zealand Ltd

Technical Services Toll Free: 0800 227 339

Auckland	Ph (09) 580 0005	Fax (09) 579 9963
Wellington	Ph (04) 568 5949	Fax (04) 568 6376
Christchurch	Ph (03) 373 6900	Fax (03) 384 9779

March 2012

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Ardex WPM 001 Superflex Premix

Ardex (Ardex Australia)

Chemwatch Hazard Alert Code: **0**

Chemwatch: **4594-2**
Version No: **6.1.1.1**
Safety Data Sheet according to HSNO Regulations

Issue Date: **20/05/2016**
Print Date: **23/05/2016**
Initial Date: **Not Available**
S.GHS.NZL.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	Ardex WPM 001 Superflex Premix
Synonyms	formerly: superflex bathroom & balcony premix
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Water-proofing agent which dries to form a tough and flexible membrane. Application is via brush or roller over conventional surfaces in internal wet areas and balconies.

Details of the supplier of the safety data sheet

Registered company name	Ardex (Ardex Australia)
Address	20 Powers Road NSW Seven Hills 2147 Australia
Telephone	1800 224 070
Fax	1300 780 102
Website	Not Available
Email	Not Available

Emergency telephone number

Association / Organisation	Not Available
Emergency telephone numbers	1800 224 070 (Mon-Fri, 9am-5pm)
Other emergency telephone numbers	Not Available

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

Not considered a Hazardous Substance according to the criteria of the New Zealand Hazardous Substances New Organisms legislation. Not regulated for transport of Dangerous Goods.

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	0	
Toxicity	0	
Body Contact	0	
Reactivity	0	
Chronic	0	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Classification	Not Applicable
Determined by Chemwatch using GHS/HSNO criteria	Not Available

Label elements

GHS label elements	Not Applicable
SIGNAL WORD	**NOT APPLICABLE**

Continued...

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Hazard statement(s)

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	30-60	co-polymer emulsion
Not Available	10-60	fillers
Not Available	1-10	additives, non hazardous
Not Available	0-1	bacteriacide
7732-18-5	30-60	water

SECTION 4 FIRST AID MEASURES

NZ Poisons Centre 0800 POISON (0800 764 766) | NZ Emergency Services: 111

Description of first aid measures

Eye Contact	If this product comes in contact with eyes: ▸ Wash out immediately with water. ▸ If irritation continues, seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary.
Ingestion	▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- There is no restriction on the type of extinguisher which may be used.
- Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves in the event of a fire. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ Use fire fighting procedures suitable for surrounding area.
Fire/Explosion Hazard	▸ Non combustible. ▸ Not considered a significant fire risk, however containers may burn. May emit poisonous fumes.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb spill with sand, earth, inert material or vermiculite.

Continued...

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Major Spills	Minor hazard. ▸ Clear area of personnel. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Control personal contact with the substance, by using protective equipment as required.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Limit all unnecessary personal contact. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ When handling **DO NOT** eat, drink or smoke.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Polyethylene or polypropylene container. ▸ Packing as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	Avoid contamination of water, foodstuffs, feed or seed.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
Ardex WPM 001 Superflex Premix	Not Available	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
co-polymer emulsion	Not Available	Not Available
fillers	Not Available	Not Available
additives, non hazardous	Not Available	Not Available
bacteriacide	Not Available	Not Available
water	Not Available	Not Available

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience.
Skin protection	See Hand protection below
Hands/feet protection	Wear general protective gloves, eg. light weight rubber gloves. The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and.has to be observed when making a final choice. Suitability and durability of glove type is dependent on usage.
Body protection	See Other protection below
Other protection	No special equipment needed when handling small quantities. **OTHERWISE:** ▸ Overalls.

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	▸ Barrier cream. ▸ Eyewash unit.
Thermal hazards	Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
Ardex WPM 001 Superflex Premix

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Blue viscous liquid; mixes with water.

Physical state	Liquid	**Relative density (Water = 1)**	1.33-1.35
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Applicable
pH (as supplied)	9	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	100	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	38
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water (g/L)	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models).

Continued...

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	Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
Ingestion	The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
Eye	Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course.

	TOXICITY	IRRITATION
Ardex WPM 001 Superflex Premix	Not Available	Not Available
water	Oral (rat) LD50: >90000 mg/kg[2]	Not Available

Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*

WATER	No significant acute toxicological data identified in literature search.

Acute Toxicity	⊘	**Carcinogenicity**	⊘
Skin Irritation/Corrosion	⊘	**Reproductivity**	⊘
Serious Eye Damage/Irritation	⊘	**STOT - Single Exposure**	⊘
Respiratory or Skin sensitisation	⊘	**STOT - Repeated Exposure**	⊘
Mutagenicity	⊘	**Aspiration Hazard**	⊘

Legend: ✗ *– Data available but does not fill the criteria for classification*
✓ *– Data required to make classification available*
⊘ *– Data Not Available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Ingredient	Endpoint	Test Duration (hr)	Species	Value	Source
water	EC50	384	Crustacea	199.179mg/L	3
water	EC50	96	Algae or other aquatic plants	8768.874mg/L	3
water	LC50	96	Fish	897.520mg/L	3
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
water	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	▸ Recycle wherever possible. ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▸ Dispose of by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or incineration in a licenced apparatus (after admixture with suitable combustible material). ▸ Decontaminate empty containers.

Continued...

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Ensure that the disposal of material is carried out in accordance with Hazardous Substances (Disposal) Regulations 2001.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (UN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

This substance is to be managed using the conditions specified in an applicable Group Standard

HSR Number	Group Standard
Not Applicable	Not Applicable

WATER(7732-18-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

New Zealand Inventory of Chemicals (NZIoC)

Location Test Certificate

Subject to Regulation 55 of the Hazardous Substances (Classes 1 to 5 Controls) Regulations, a location test certificate is required when quantity greater than or equal to those indicated below are present.

Hazard Class	Quantity beyond which controls apply for closed containers	Quantity beyond which controls apply when use occurring in open containers
Not Applicable	Not Applicable	Not Applicable

Approved Handler

Subject to Regulation 56 of the Hazardous Substances (Classes 1 to 5 Controls) Regulations and Regulation 9 of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations, the substance must be under the personal control of an Approved Handler when present in a quantity greater than or equal to those indicated below.

Class of substance	Quantities
Not Applicable	Not Applicable

Refer Group Standards for further information

Tracking Requirements

Not Applicable

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (water)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (water)
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Continued...

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Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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Product Technical Statement

Product Description: Axon™ Panel is a 9mm thick vertical grooved ship-lapped edge panel manufactured using low density fibre cement formulation.

Scope of Use: Axon Panel installed using CLD™ Structural Cavity Battens or timber cavity battens is suitable for use as external wall cladding in residential buildings within the scope of E2/AS1, or in residential/commercial buildings exposed to design wind pressure up to 2.5kPa (ULS) maximum covered by a specific engineering design (SED).

Axon Panel can also be installed direct to the framing (without cavity) for residential buildings within or up to the risk score 6 calculated as per Table-2 of E2/AS1. Axon Panel can also be used for external wall bracing applications in residential buildings as per NZS 3604.

Limitations: Axon Panel must not be installed horizontally or in curved wall applications or in situations where it stays in contact with ground moisture.

Compliance with NZBC: The following clauses of the NZBC are applicable to Axon Panel and it complies with these requirements as explained below;

Structure - B1: Uniform Distributed Load tests have been completed at a NATA accredited James Hardie laboratory.

Axon Panel installed as per its technical specifications is suitable for use up to design wind pressures of 2.5kPa and meets the requirements of Clause-B1.3.1, B1.3.2 and B1.3.3 of NZBC.

Axon™ Panels have been tested as per BRANZ P21 test method and are suitable for structural bracing.

Durability - B2**:** Axon Panel and CLD Structural Cavity Battens have been tested at a NATA accredited laboratory in accordance with AS/NZS 2908.2 and meets the durability performance requirements as per Clause B2.3.1(a) and B2.3.2 of NZBC.

Fire Performance - C: Axon Panel has been assessed and is classified as 'non-combustible' material and is suitable for use on external walls close to boundaries.

External Moisture - E2: Axon Panel has been tested as per the details published for weathertightness as per E2/VM1 (as contained within NZBC Clause E2).

Hazardous Building Materials - F2*:* Axon Panel complies with the requirements of F2.3.1 and will not present a health hazard when handled as per its technical specifications.

Energy Efficiency - H1: Axon Panel walls constructed using bulk insulation meets the construction R-Value requirements as per Table 1 of Clause H1.

Installation: Axon Panel must be installed in accordance with the current Axon Panel Technical Specification. The specification and details are available at James Hardie web site www.jameshardie.co.nz or Ask James Hardie™ at 0800 808 868 for further information.

Warranty: Axon Panel has a product warranty of 15 years when installed and maintained as per the current technical specification.

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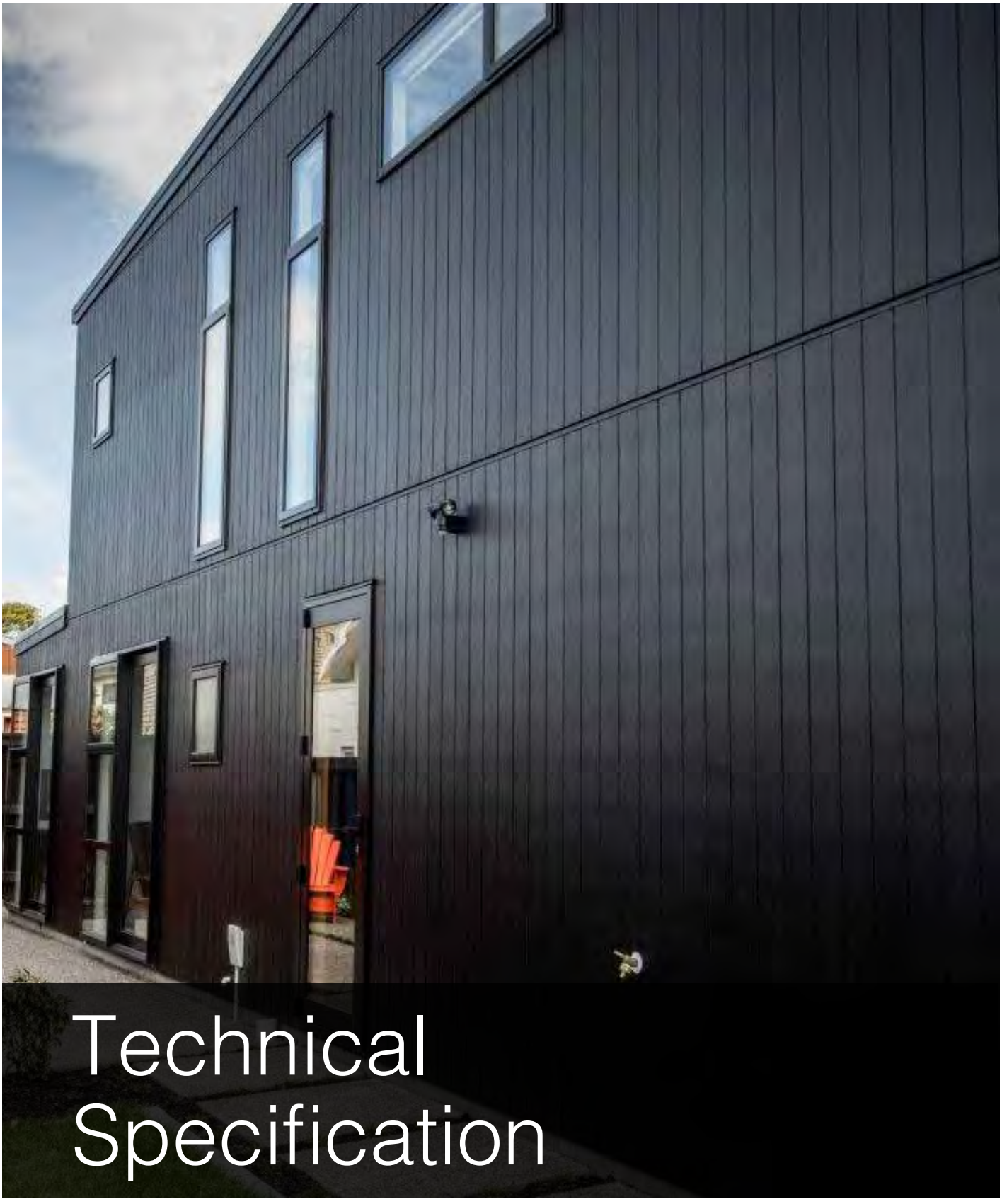
Axon™ PANEL | JH™



Technical Specification

MARCH 2017 | NEW ZEALAND

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WE VALUE YOUR FEEDBACK

To continue with the development of our products and systems, we value your input. Please send any suggestions, including your name, contact details, and relevant sketches to:

Ask James Hardie™
literaturefeedback@jameshardie.co.nz

THIS TECHNICAL SPECIFICATION IS FOR AXON™ PANEL DIRECT FIXED AND FIXED TO CLD™ STRUCTURAL CAVITY BATTEN.

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1 Application and scope

1.1 APPLICATION

Axon™ Panel is manufactured by James Hardie using an advanced lightweight cement composite. Base composition is portland cement, ground sand, cellulose fibre and water. Axon Panel has vertical grooves along the panel. It is classified as lightweight wall cladding suitable for residential and light commercial buildings using timber framing.

- Axon Panel is ideal for achieving feature walls in areas such as gable ends and entrance ways.
- Axon Panel is primed on the face to take a suitable paint finish in any colour.
- Axon Panel 133 Smooth - the grooves on the face panel are nominal 10mm wide x 2.25mm deep and spaced at 133mm centres.
- Axon Panel 133 Grained - the grooves on the face panel are nominal 10mm wide x 2.25mm deep and spaced at 133mm centres. Between the grooves is a look of traditional wood-grain texture.
- Axon Panel 400 Smooth - the grooves on the face panel are nominal 10mm wide x 2.25mm deep and spaced at 400mm centres.

Specifier

If you are a specifier or other responsible party for a project, ensure that the information in this document is appropriate for the application you are planning and that you undertake specific design and detailing for areas which fall outside the scope of these specifications.

Installer

If you are an installer ensure that you follow the design, moisture management principles, associated details and material selection provided by the designer. All of the details provided in this document must be read in conjunction with this specification.

Make sure your information is up to date

When specifying or installing James Hardie products, ensure you have the current manual. If you're not sure you do, or you need more information, visit www.jameshardie.co.nz or Ask James Hardie™ on 0800 808 868.

1.2 SCOPE

The scope of this specification for the use of Axon Panel is limited to buildings which fall within the scope limitations of 'Acceptable Solution E2/AS1 paragraph 1.1' of the New Zealand Building Code (NZBC).

This document is intended for use by architects, designers and specifiers who may be involved with the specification of Axon Panel.

This manual covers the use of Axon Panel for both construction methods i.e. direct fixed to framing or cavity construction, used in external walls of timber framed buildings up to 2.5kPa.

Please refer to E2/AS1 for further information regarding the selection of construction methods to be used for fixing claddings.

1.3 DETAILS

Various Axon Panel figures are provided in the Details section of this document. This specification and details in dwg, dxf, jpg and pdf file format are also available for download at www.jameshardie.co.nz.

All dimensions shown are in millimetres unless noted otherwise.

1.4 SPECIFIC DESIGN

For use of Axon Panel outside this published scope, the architect, designer or engineer must undertake specific design.

For advice on designs outside the scope of this specification, Ask James Hardie on 0800 808 868.

2 Design

2.1 COMPLIANCE

Axon Panel complies with E2 of the NZBC as an alternate solution.

Axon Panel cladding has been tested as per E2/VM1 of the NZBC and it passes the test performance requirements. Axon Panel also complies with durability requirements of 'B2' clause of the NZBC.

2.2 RESPONSIBILITY

The specifier or other party responsible for the project must run through a risk matrix analysis to determine which construction method is to be used. The designer must also ensure that the figures published in this specification are appropriate for the intended application and that additional detailing is performed for specific design or any areas that fall outside the scope of this specification. The designers should ensure that the intent of their design meets the requirements of the NZBC.

All New Zealand Standards referenced in this manual are current edition and must be complied with.

James Hardie conducts stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets aesthetic requirements before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation.

2.3 SITE AND FOUNDATION

The site on which the building is situated must comply with the NZBC Acceptable Solution E1/AS1 'Surface Water'.

Foundations design must comply with the requirements of NZS 3604 'Timber-framed Buildings' or be as per specific engineering design.

The grade of adjacent finished ground must slope away from the building to avoid any possibility of water accumulation in accordance with the NZBC requirements.

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2.4 SURFACE CLEARANCES

The clearance between the bottom edge of cladding and paved/unpaved ground must comply with section 9.1.3 of E2/AS1. The finished floor level must also comply with these requirements These clearances must be maintained throughout the life of the building.

Axon Panel must overhang the bottom plate on a concrete slab by a minimum of 50mm as required by NZS 3604.

Axon Panel must have a minimum clearance of 100mm from paved ground, and 175mm from unpaved ground. On roofs and decks, the minimum clearance must be 50mm.

Do not install external cladding such that it may remain in contact with water or ground. Refer Figures 3 and 18.

2.5 MOISTURE MANAGEMENT

It is the responsibility of the specifier to identify moisture related risks associated with any particular building design.

Wall construction design must effectively manage moisture, considering both the interior and exterior environments of the building, particularly in buildings that have a higher risk of wind driven rain penetration or that are artificially heated or cooled.

Walls must include those provisions as required by the NZBC Acceptable Solution E2/AS1 'External Moisture'. In addition all wall openings, penetrations, junctions, connections, window sills, heads and jambs must incorporate appropriate flashings for waterproofing. The other materials, components and installation methods used to manage moisture in external walls, must comply with the requirements of relevant standards and the NZBC.

For further guidance on designing for weathertightness refer to BRANZ Ltd, and the Ministry of Business Innovation and Employment (MBIE) updates on the following websites respectively, www.branz.co.nz and www.building.govt.nz

2.6 STRUCTURE

2.6.1 Timber framing

Timber-framed buildings must be designed in accordance with NZS 3604 (Timber-framed Buildings). When the framing is provided as per the specific engineering design, the framing stiffness must be either equivalent to or more than the stiffness requirements of NZS 3604.

For timber frame walls longer than 12m it is best pratice to allow for construction joints to accommodate movements generated due to timber shrinkage or deflections etc.

2.6.2 Wind loading

Axon Panel is suitable for use in all wind zones in New Zealand up to and including EH as defined in NZS 3604.

A specific design is required for all situations where the buildings falls outside the scope of NZS 3604 and E2/AS1.

2.7 BRACING

Axon Panel direct fixed can be used to achieve structural bracing when fixed with stainless steel HardieFlex™ nails. For further information refer to the James Hardie Bracing Design Manual.

Axon Panel installed to CLD™ Structural Cavity Battens as per this specification cannot be used to achieve structural bracing. However, bracing can be achieved by using James Hardie rigid air barrier board installed direct to framing instead of a flexible underlay or by using Villaboard® Lining bracing system on the internal face.

2.8 FIRE RATED WALLS

Axon Panel when direct fixed with HardieFlex nails to external walls can achieve fire ratings up to 60/60/60 to comply with C/AS1 of the NZBC when the walls are constructed in accordance with the current James Hardie 'Fire and Acoustic Design Manual'.

When using Axon Panel fixed to CLD Structural Cavity Battens, a fire rating of up to 60 minutes can be achieved using RAB® Board in conjunction with the fire rated system requirements as specified in the James Hardie 'Fire and Acoustic Design Manual'. Ask James Hardie on 0800 808 868 for further information.

Axon Panel is classified as a non-combustible material suitable for use on walls close to boundary.

2.9 ENERGY EFFICIENCY

External walls constructed as per this technical specification using Axon Panel, bulk insulation, where the area of glazing is 30% or less of the total wall area comply with the requirements for walls in the NZBC Acceptable Solution H1/AS1 (NZBC Clause H1 Energy Efficiency), Replacement Table 1. To meet thermal insulation requirements for the construction, the bulk insulation as specified in Table-1 must be used. This insulation may be substituted with insulations having higher R-values. The thermal insulation of a wall gets affected when the depth of the timber framing is increased or decreased. The calculation used in Table 1 is based on a timber framing size 90 x 45mm and using an internal lining material such as James Hardie Villaboard® Lining or a 10mm plasterboard.

Table 1

Insulation capability

Climate Zone	Construction R-Value Requirement	Minimum R-Value of Insulation Required
1 and 2	1.9 m^2 °C/W	#R2.0
3	2.0 m^2 °C/W	#R2.2

Total construction R-Value depends on the insulation material used and the framing ratio. The insulation material R-Values specified in this table are for studs spaced at 600mm c/c and nogs spaced at 800mm c/c.

To achieve higher R-Values of construction the wall insulation material must be replaced with an insulation material having higher R-Values to suit the requirements.

For further guidance on insulation requirements refer to the current edition of 'House Insulation Guide' published by BRANZ.

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3 Framing

3.1 GENERAL

This Axon Panel technical specification is only suitable for timber-framed buildings. Other framing materials are subject to a specific engineering design.

3.2 TIMBER FRAMING

3.2.1 Dimensions

A minimum 45mm wide stud is required.

3.2.2 Structural grade

Minimum timber grade requirement is No. 1 framing grade or MSG6 as per NZS 3604. The grading of timber must comply with the AS/NZS 1748 and NZS 3631 requirements.

3.2.3 Durability

The external framing must be treated to a minimum H1.2 treatment. Refer to the NZBC Acceptable Solution B2/AS1 'Durability' for further information about the durability requirements.

For timber treatment and allowable moisture content information refer to NZS 3602 (Timber and Wood-Based Products for use in Buildings) and NZS 3640 (Chemical Preservation of Round Sawn Timber) for minimum timber treatment selection and treatment requirements.

Also refer to the framing manufacturer's literature for further guidance on timber selection. Framing must be protected from moisture at site in accordance with the recommendation of the framing manufacturers.

3.2.4 Frame construction

The framing must fully support all panel edges. The framing must be rigid and not rely on the cladding panel for stability.

Timber framing sizes and its set-out must comply with NZS 3604 and as specified in this specification.

In case of gable end trusses sitting on top plates of the external wall frame, the frame size must comply with the minimum timber sizes stipulated for wall frames in Section 8 of the NZS 3604.

For timber frame walls longer than 12m, it is best practice to allow for construction joints to accommodate movements generated due to timber shrinkage or deflections generated by loadings etc.

3.3 STEEL FRAMING

Refer to James Hardie Steel Frame Technical Specification about the installation of Axon Panel to steel frame.

3.4 CONSTRUCTION METHODS

3.4.1 Direct fixed

For direct fixed construction method the following framing is required:

- Studs at 600mm c/c maximum
- A minimum 45mm stud width is required at vertical panel joints
- Nogs/dwangs are required at 1200mm c/c maximum.

3.4.2 CLD Structural Cavity Batten

For cavity construction method the following framing is required:

- When studs are spaced at 600mm centres maximum, the nogs/dwangs must be provided at 800mm centres maximum
- When studs are spaced at 400mm centres then the nogs/dwangs may be provided at 1200mm centres
- An extra stud is required in internal corners. Refer to Figure 21.

3.5 TOLERANCES

In order to achieve the required performance and an acceptable wall finish, it is imperative that framing is straight and true.

Framing tolerances must comply with the requirements of NZS 3604. All framing shall be made flush.

4 Preparation

4.1 FLEXIBLE UNDERLAY OR HOMERAB PRE-CLADDING

Flexible underlay or HomeRAB® Pre-Cladding must be provided as per the requirements of the NZBC Acceptable Solution E2/AS1 'External Moisture' and NZS 3604. The flexible underlay must comply with Table 23 of E2/AS1 and AS/NZS 4200.1. The flexible underlay must be fixed in accordance with E2/AS1, NZS 3604 and AS/NZS 4200.2 and the underlay manufacturer's recommendations.

Walls which are not lined on the inside face (e.g. garage walls or gable ends) must include a rigid sheathing or an air barrier behind the cladding which complies with the requirements of the NZBC Acceptable Solution E2/AS1 Table 23. For attached garages, flexible underlays must be selected in accordance with the NZBC Acceptable Solution E2/AS1, paragraph 9.1 3.4. HomeRAB Pre-Cladding is suitable for use in these applications. It must be installed in accordance with the James Hardie Rigid Air Barriers installation manual.

4.2 RIGID AIR BARRIER

For EH wind zone or Specific Engineering Design projects where the wind pressures are higher than 1.5kPa (ULS), RAB Board (6mm) must be used. Refer to the James Hardie rigid air barriers installation manual for information regarding its installation. For buildings within the scope NZS 3604 HomeRAB Pre-Cladding Lining (4.5mm) or flexible underlays can be used.

4.3 VENT STRIP

The James Hardie uPVC cavity vent strip must be installed at the bottom of all walls constructed using the drained and ventilated cavity construction method. It is important that the openings in the vent strip are kept clear and unobstructed to allow free drainage and ventilation of cavities. James Hardie uPVC vent strip has an opening area of 1000mm²/m length.

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4.4 FLASHING

All wall openings, penetrations, intersections, connections, window sills, heads and jambs must be flashed prior to panel installation. Please refer to moisture management requirements in Clause 2.5. The flexible underlay or RAB Board must be appropriately taped around the penetrations and lapped/taped to flashings. Materials must be lapped in such a way that water tracks down to the exterior of a building. James Hardie will assume no responsibility for water infiltration within the wall due to poor installation of flashings or flexible underlays. The selected flashing materials must comply with the durability requirements of the NZBC. For information refer to Table 20 of clause E2 of the NZBC.

When using a James Hardie rigid air barrier board the entire framing around window opening must be sealed with a flashing tape. The tape must be finished over the face of James Haride rigid air barrier board. The flashing tapes like SUPER-STICK Building Tape® by Marshall Innovations or 3M™ All Weather Flashing Tape 8067 by 3M™ are recommended for use with James Hardie rigid air barrier board. Refer to the tape manufacturer's literature for further information regarding their installation.

4.5 JUNCTIONS AND PENETRATIONS

Refer to Clause 2.5 of this specification for moisture management requirements. All windows and doors must be detailed as per the requirements of this specification. James Hardie has developed the window details for Axon Panel which meet the requirements of E2 'External Moisture', an approved document of the NZBC. Refer to Figures 8 to 10 and 24 to 26.

5 Batten installation

Note: This specification is not for timber cavity battens. Refer to separate technical specification from James Hardie.

5.1 CLD STRUCTURAL CAVITY BATTENS

Buildings with a risk score of 7-20 calculated in accordance with Table 2 of Acceptable Solution E2/AS1 of the NZBC, require Axon Panel to be installed on a cavity. CLD Structural Cavity Battens provide airspace between the frame and the panel and are used to fix cladding into them.

CLD Structural Cavity Battens are made of a low density fibre cement formulation which enables them to have extra strength and durability. CLD Structural Cavity Batten is sealed on all sides and is suitable to fix Axon Panel installed as per this technical specification, and it can withstand the design wind pressures exerted on a cladding within the scope of NZS 3604.

The CLD Structural Cavity Battens are made 2450mm long and 19mm thick. The battens are fully sealed on all sides.

5.2 BATTEN LAYOUT

CLD Structural Cavity Battens must be fixed to the wall framing over flexible underlay or James Hardie rigid air barrier. The smoother face of batten should face towards the cladding.

CLD Structural Cavity Battens are suitable to withstand wind pressures up to 2.5kPa (ULS). For batten fixing, refer to section 5.4. Ensure the battens are straight and provide a flat surface to fix Axon Panel to. Site cut ends of battens must be sealed on site with Dulux® Acraprime 501/1 sealer or Resene Quick Dry.

The battens are run continuously over the studs but they must not be run continuously over the floor joists. There must be a 15mm gap between the battens at floor joist level to allow for structural shrinkages and deflections. Refer to Figure 27.

CLD Structural Cavity Battens can be butt jointed over the studs within the floor height. The batten ends must be cut between 20º to 45º and be installed in a way that the butt joint deflects the moisture to the exterior. The ends must be sealed and jointed with the adhesive sealant before butting them together. Refer to Figure 23.

The designer must ensure that the CLD Structural Cavity Battens are not used in situations where design wind pressures are above 2.5kPa (ULS).

CLD Structural Cavity Battens must always be at least 300mm in length.

5.3 INTERMEDIATE SUPPORT

Where studs are at 600mm centres an intermediate means of restraining the flexible underlay and insulation from bulging into the cavity shall be installed. An acceptable method to achieve this is using a:

- 75mm galvanised mesh; or
- polypropylene tape at 300mm centres fixed horizontally and drawn taut.

No intermediate supports are required:

- when studs are spaced at 400mm centres; or
- when RAB Board instead of flexible underlays are used.

5.4 BATTEN FASTENERS

The CLD Structural Cavity Batten must be fixed to the framing as specified in Table 2. The fasteners must be driven at a minimum distance of 50mm from the batten ends.

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Table 2

Batten fixing				
Fixing Type	**Framing**	**Basic Wind Pressure kPa (ULS)**	**Batten centres max. (mm)**	**Fixings centres max. (mm)**
65mm x 2.8mm RounDrive ring shank nail hot dip galv./ s.steel	Timber	Up to 1.5 (Up to and including VH wind zone)	600	250
		Up to 2.5 (>VH wind zone)	400	200
50mm x 9-10g Countersunk head steel screw class 3/4	*Steel 0.55 to 1.6mm BMT	Up to 1.5 (Up to and including VH wind zone)	600	250
		Up to 2.5 (>VH wind zone)	400	200

For fastener durability information, refer to Clause 6.2 of this document.

CLD Structural Cavity Battens less than 400mm in height must have fixings at maximum 150mm centres.

Battens must be fixed over studs.

6 Panel fixing

6.1 GENERAL

Axon Panel must be kept dry and under cover whilst in storage or during the installation. Every endeavour must be made to keep framing dry once panel fixing commences. All site-cut panel edges must be sealed prior to installation.

- The shiplap jointing of panels is only suitable for vertical fixing of panels.
- Do not fix in the groove of Axon Panel.
- Ensure the sheets are from the same batch.
- It is recommended to fix from the centre of the panel and work outwards.
- Do not overdrive fasteners.
- Fixings must be finished flush with the panel surface.

6.2 FASTENER DURABILITY

Fasteners must meet the minimum durability requirements of the NZBC. NZS 3604 specifies the requirements for fixing material to be used in relation to exposure conditions and are summarised in Table 3.

Table 3

Exposure conditions and nail selection prescribed by NZS 3604		
NAIL MATERIAL		
Zone D*	Zone C* outside sea spray zone, Zone B and Geothermal hot spots	Bracing — All Zones
Grade 316 Stainless	Hot-dipped galvanised or Grade 316 stainless	Grade 316 Stainless

*(Zone C areas where local knowledge dictates that increased durability is required, appropriate selection shall be made). Microclimate conditions as detailed in NZS 3604, paragraph 4.2.4 require SED.

Also refer to the NZBC Acceptable Solution E2/AS1 Table 20 and 21 for information regarding the selection of suitable fixing materials and their compatibility with other materials.

6.3 FASTENER — TYPE, SIZE AND LAYOUT

6.3.1 Direct fix

Axon Panel must be fixed to framing using the fixings as specified in Table 4 below and follow the edge distance required for nails as shown in the details. Refer to Figures 2 and 4.

Table 4

Panel fixing	
DIRECT FIXED TO FRAME USING HARDIEFLEX NAILS OVER FLEXIBLE UNDERLAY	
40 x 2.8mm HardieFlex nails.	Fix @ 200mm centres to all framing. Stud width 45mm min. required at vertical joint.

DIRECT FIXED TO FRAME USING BRAD NAIL OVER FLEXIBLE UNDERLAY		
ND 50 stainless steel straight brad nail	Up to 1.5kPa (Up to and including VH wind zone)	Fix 150mm c/c on panel edges and intermediate framing

Notes:

1. Brad nail fixing method is only suitable up to very high wind speed zones. Do not use this method for EH wind zones described in NZS 3604 or SED projects.
2. Nails must be finished flush with panel surface.
3. Special fixing arrangements are required for bracing and fire-resistance rated wall systems.

For more information Ask James Hardie on 0800 808 868.

When fixing the panels using nail guns, refer to the nail gun manufacturer for information about nails and the type of nail gun to be used.

Note: Do not use 'D' head nails.

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6.3.2 CLD Structural Cavity Batten Method

This panel fixing method can be used up to 2.5kPa wind pressure. Axon Panel is only fixed into the CLD Structural Cavity Batten as per this method.

Adhesive sealant

A polyurethane adhesive sealant Seal N Flex-1 manufactured by Bostik or SikaFlex 11FC by Sika are recommended for use in the installation of these products. Apply a 6mm continuous bead of this adhesive sealant over the face of the CLD Structural Cavity Batten before fixing the Axon Panel. Refer to Figure 19, 20 and 21.

When using external box corner flashing, use a 10mm thick bead of adhesive over the aluminium box corner flanges. Refer to Figure 22.

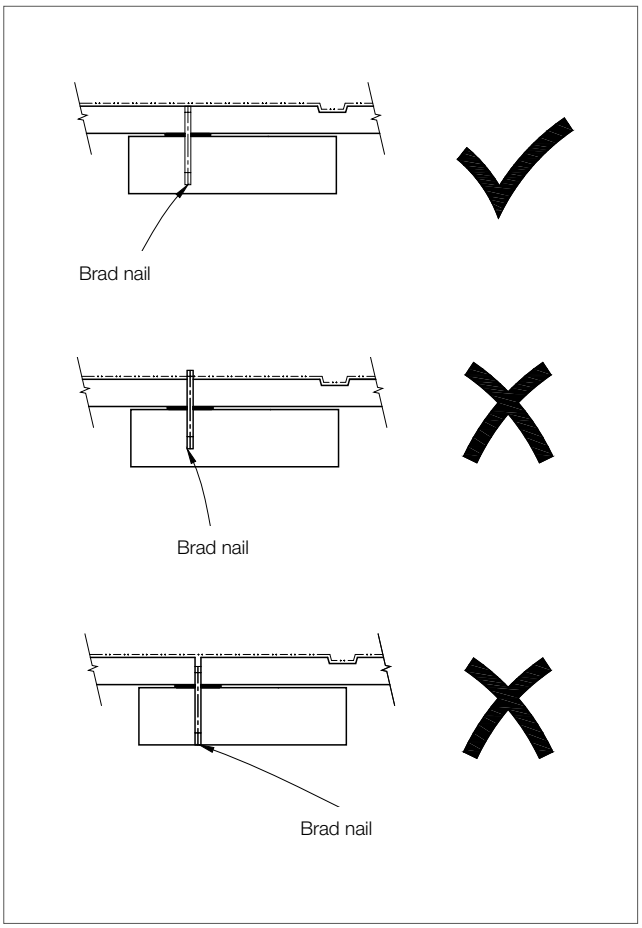
Note: Do not use excessive adhesive.

6.3.3 Cavity construction using timber cavity battens

When fixing Axon Panel using timber cavity battens, these details are available at www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

6.4 PANEL LAYOUT

All panel edges must be supported by the framing. The shiplap joint must be formed vertically. The framing centers must be checked before the panel installation.



Fix Axon Panel to CLD Structural Cavity Battens using one of the following fixings specified in Table 5. The edge distance at panel corner must be minimum 75mm vertically from panel corners. Refer Figure 17.

Table 5

Axon Panel Fixing		
Types of fixings to be used with adhesive sealants	**Suitable up to Basic Wind Pressure kPa (ULS)**	**Fixing to CLD Structural Cavity Battens c/c (mm)**
C-25 straight 'T'- Head stainless steel brad nail	1.5 (Up to and including VH wind zone)	150
25 x 2.5mm annular threaded fibre cement nail	2.5 (> VH wind zone)	200
25mm x 10g counter sunk screw class 3/4 or stainless steel	2.5 (> VH wind zone)	200

Notes:

1. Brad nail fixing method is only suitable up to 1.5kPa.
2. Nails must be finished flush with panel surface.

7 Jointing

7.1 GENERAL

Axon Panels are fixed to form a shiplap joint at vertical edges. The panels have factory-made edges to suit this jointing.

7.2 VERTICAL JOINT

Direct fixed

Axon Panels are shiplap jointed keeping a gap of 1-2mm between the panels. A 50mm wide 3259 Inseal sealing tape is used under the joint over the face of the timber stud where direct fixed construction method is used. A flexible sealant must be applied to the full length of the shiplap joint before the panels are jointed. The edge distance for a HardieFlex nail must be 18mm min. Refer to Figure 4.

Cavity construction

Fix the CLD Structural Cavity Batten over the studs and it runs behind the entire length of the shiplap joint with a 50mm overhang below the bottom plate and finishes flush with the bottom edge of panel. Refer to Figures 16 and 17. The vertical shiplap joint is formed along the centre line of the batten. A bead of sealant is applied to the vertical edge of the Axon Panel to seal the shiplap joint before fixing the panels. Refer to Figure 19. The edge distance for a brad nail must be 16mm and 18mm. Refer Figures 14 and 19.

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8 Finishing

7.3 HORIZONTAL JOINT

At floor joist levels a horizontal joint must be provided to accommodate the movement resulting from timber joist shrinkage and settlement. A JH 9mm panel aluminium horizontal 'h' mould is used to form a horizontal joint. Use the aluminium 'h' mould jointer to cover over the butt joint of 'h' mould. A purpose made metal 'Z' flashing or a James Hardie uPVC flashing could also be used to flash the horizontal joint. Refer to Figures 11, 12 and 27.

7.4 EXTERNAL CORNER

A JH 9mm panel aluminium box corner mould is used to form the external box corner. The site-cut sheet edges must be sealed before butting them into the box corner. Refer to Figure 7.

Do not run the box corner flashing continuously over the floor joist. On a two storey construction the aluminium box corner is finished under the aluminium 'h' mould. A uPVC corner under flashing must be used under the box corner when in this situation. Refer to Figure 12.

For CLD Structural Cavity Batten external corner refer to Figure 22.

The bead of adhesive must be 10mm thick to accommodate for the thickness of the aluminium.

7.5 INTERNAL CORNER

Direct fixed internal corner is formed using a uPVC corner under flashing or an 80mm wide Inseal sealing strip behind the panel edges. The joint is filled with the flexible sealant. Refer to Figure 6.

For CLD Structural Cavity Batten internal corner joint detail refer to Figure 21.

7.6 FLASHING MATERIAL DURABILITY

Please refer to Table 20 of E2/AS1 of the NZBC regarding the durability requirements of various flashing materials.

8.1 PREPARATION

Painting of Axon Panel is mandatory to meet the durability requirements of the NZBC and 15 year James Hardie product warranties. Axon Panel must be dry and free of any dust or grime before painting. The panels must be painted within 90 days of their installation. There is no restriction on the LRV of paint to be applied on the Axon Panel.

When using uPVC flashings, dark colours should be avoided as it will affect the durability of uPVC flashing. The LRV of paint must be above 40% when using uPVC flashings.

Dark paints can be used when using the aluminium flashings.

Panels are pre-primed and are suitable for site applied acrylic paints. Pre-finished panels can also be installed using exposed head fasteners.

In order to seal cut edges or sanded patches, Dulux 1 Step, Resene quick dry, Taubmans Underproof Acrylic Primer Undercoat or a similar product should be applied. The primer should be compatible with the paint to be used.

Where panels are fixed with brad nails, the nail heads must be finished flush with panel surface. The nail gun should be set to nail "proud" of the panel surface and nail heads to be manually finished flush with surface. The nail heads can be skimmed over with an exterior grade 2 part builders fill if required. The skimmed area must be primed prior to site-applied finishing.

For site-applied finishes where brad nails are used. James Hardie recommends an undercoat and a minimum of two coats of acrylic paint. Follow the paint manufacturer's recommendations to prepare the surface and to adequately cover and conceal the panel fixings.

8.2 FLEXIBLE SEALANT

All sealants used must comply with the relevant requirements of the NZBC. Their application and usage must be in accordance with manufacturer's instructions. Check with sealant manufacturer prior to coating over sealants. Some sealant manufacturers do not recommend coating over their products.

9 Storage and handling

When storing Axon Panel, boards must be laid flat on a smooth level surface. Edges and corners must be protected from chipping.

To ensure optimum performance, store panels under cover and keep dry prior to fixing. If the panels become wet, allow them to dry thoroughly before fixing.

Do not carry panels on the flat, carry in the vertical position to avoid excessive bending.

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10 Maintenance

The extent and nature of maintenance will depend on the geographical location and exposure of the building. As a guide, it is recommended that basic normal maintenance tasks shall include but not be limited to:

- Washing down exterior surfaces every 6-12 months*
- Re-applying of exterior protective finishes if necessary**
- Maintaining the exterior envelope and connections including joints, penetrations, flashings and sealants that may provide a means of moisture entry beyond the exterior cladding.
- Cleaning out gutters, blocked pipes and overflows as required
- Pruning back vegetation that is close to or touching the building
- The clearance between the bottom edge of Axon Panel and the finished ground must always be maintained.

*Do not use a water blaster to wash down the cladding.

*In extreme coastal conditions or sea spray zones, wash every 3-4 months.

**Refer to your paint manufacturer for washing down and recoating requirements related to paint performance.

11 Product information

11.1 MANUFACTURING AND CLASSIFICATION

Axon Panel is an advanced lightweight cement composite building product. The basic composition is portland cement, ground sand, cellulose fibre and water. The panels are easily identified by the name 'Axon Panel' printed at regular intervals on the back face of panel.

CLD Structural Cavity Battens are manufactured using a low density fibre cement formulation. The basic composition is Portland cement, ground sand, cellulose fibre and water and proprietary additives. The battens are sealed on all sides.

Axon Panel is manufactured to AS/NZS 2908.2 'Cellulose-Cement Products Part 2: Flat Sheets' (ISO 8336 'Fibre Cement Flat Panels') standards in New Zealand. James Hardie New Zealand Limited is an ISO 9001 'Telarc' certified manufacturer.

Axon Panel is classified Type A, Category 3 in accordance with AS/NZS 2908.2 "Cellulose-Cement Products".

For Safety Data Sheets (SDS) visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

11.2 PRODUCT MASS

Axon Panel is manufactured in 9.0mm thickness and has a mass of 12.1kg/m2 at EMC.

Axon Panel cladding is defined as a Light Weight Wall Cladding (not exceeding 30kg/m2) as per NZS 3604.

11.3 DURABILITY

11.3.1 General

Axon Panel installed as per this technical specification will meet the durability requirements for claddings as required under clause 'B2-Durability' of the NZBC.

11.3.2 Resistance to moisture/rotting

Axon Panel has demonstrated resistance to permanent moisture induced deterioration (rotting) and has passed the following tests in accordance with AS/NZS 2908.2:

- Heat Rain (Clause 6.5).
- Water Permeability (Clause 8.2.2).
- Warm Water (Clause 8.2.4).
- Soak Dry (Clause 8.2.5).

11.3.3 Control of External Fire Spread

Axon Panel is assessed as per Appendix C C7.1.1 and is classified as 'Non-Combustible Material' which is suitable for use as external wall cladding and complies with requirements of Paragraph 5.4 of the NZBC Acceptable Solution C/AS1 and Paragraph 5.8.1 of Acceptable Soluations C/AS2 to C/AS6 of the NZBC.

11.3.4 Alpine regions

In regions subject to freeze/thaw conditions, Axon Panel must not be in direct contact with snow or ice build up for extended periods, e.g. external walls in alpine regions must be protected where snow drifts over winter are expected.

The Axon Panel has been tested in accordance with AS/NZS 2908.2 Clause 8.2.3.

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12 Safe working practices

STAY HEALTHY WHEN WORKING WITH BUILDING PRODUCTS CONTAINING CRYSTALINE SILICA

Crystalline Silica
What is it? Why and when is it a health hazard?

Crystalline Silica is
- Commonly known as sand or quartz
- Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

Why is Crystalline Silica a health hazard?
- Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
- Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks.
- The most hazardous dust is the dust you cannot see!

When is Crystalline Silica a health hazard?
- It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica.
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board).

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS AND INSTALLATION INSTRUCTIONS WHEN WORKING WITH JAMES HARDIE PRODUCTS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

AVOID BREATHING IN CRYSTALLINE SILICA DUST!

Safe working practices
- 👎 NEVER use a power saw indoors or in a poorly ventilated area
- 👎 NEVER dry sweep
- 👍 ALWAYS use M Class extractor unit as a minimum and always hose down with water/wet wipe for clean up
- 👎 NEVER use grinders
- 👍 ALWAYS use a circular sawblade specifically designed to minimise dust creation when cutting fibre cement – preferably a sawblade that carries the HardieBlade™ logo or one with at least equivalent performance.
- 👍 ALWAYS follow tool manufacturers' safety recommendations
- 👍 ALWAYS expose only the minimum required depth of blade for the thickness of fibre cement to be cut
- 👍 ALWAYS wear an approved properly-fitted, approved dust mask (P1 or P2) or respirator

Use one of the following methods based on the required cutting rate:

BEST
- Score and snap knife
- Hand guillotine
- Fibreshear

BETTER
- Dust reducing circular saw equipped with HardieBlade™ Saw Blade and M Class extractor unit.

GOOD
- Dust reducing circular saw with HardieBlade™ Saw Blade

Working outdoors
- 👍 Make sure you work in a well ventilated area
- 👍 Position cutting station so wind will blow dust away from yourself and others in the working area
- 👍 Cut products with either a 'Score or snap' knife or fibre cement shears or, when not feasible, use a HardieBlade™ Saw Blade (or equivalent) and a dust-reducing circular saw attached to a M Class extractor unit
- 👍 When sawing, sanding, rebating, drilling or machining fibre cement products, always:
  - Wear your P1 or P2 mask (correctly fitted in accordance with manufacturers' instructions) and when others are close by, ask them to do the same
  - If you are not clean shaven, then use a powered air respirator with a loose fitting head top.
  - Wear safety glasses
  - Wear hearing protection
  - When others are close by, ask them to do the same.

Working indoors
- 👎 Never cut using a circular saw indoors
- 👍 Position cutting station in a well ventilated area
- 👍 Cut ONLY using a score and snap knife, hand guillotine or fibreshears (manual, electric or pneumatic)
- 👍 Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class extractor unit

IF CONCERN STILL EXISTS ABOUT EXPOSURE LEVELS OR YOU DO NOT COMPLY WITH THE ABOVE PRACTICES, YOU SHOULD ALWAYS CONSULT A QUALIFIED INDUSTRIAL HYGIENIST.

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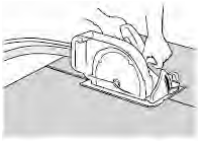
Working Instructions



- Refer to Recommended Safe Working Practices before starting any cutting or machining of product.

HardieBlade™ Saw Blade

The HardieBlade™ Saw Blade used with a dust-reducing saw is ideal for fast, clean cutting of James Hardie fibre cement products. A dust-reducing saw uses a dust deflector or a dust collector connected to a vacuum system. When sawing, clamp a straight-edge to the sheet as a guide and run the saw base plate along the straight edge when making the cut.

Hole-Forming

For smooth clean cut circular holes:

- Mark the centre of the hole on the sheet.
- Pre-drill a 'pilot' hole.
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill.

For irregular holes:

- Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face.
- Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported.

STORAGE & DELIVERY

Keeping products and people safe

Off loading

- James Hardie products should be off-loaded carefully by hand or by forklift.
- James Hardie products should not be rolled or dumped off a truck during the delivery to the jobsite.

Storage

James Hardie products should be stored:

- in their original packaging
- under cover where possible or otherwise protected with a waterproof covering to keep products dry
- off the ground – either on a pallet or adequately supported on timber or other spacers
- flat so as to minimise bending

James Hardie products must not be stored:

- directly on the ground
- in the open air exposed to the elements

JAMES HARDIE IS NOT RESPONSIBLE FOR DAMAGE DUE TO IMPROPER STORAGE AND HANDLING.

TIPS FOR SAFE AND EASY HANDLING

Weatherboard products

- Do not lift planked products flat and in the middle
- Carry the products on the edge
- If only one person is carrying the product, hold it in the middle and spread arms apart to better support the product
- If two people are carrying the plank, hold it near each end and on edge
- Exercise care when handling weatherboard products to avoid damaging the edges/corners

Sheet products

- Carry with two people
- Hold near each end and on edge
- Exercise care when handling sheet products to avoid damaging the edges/corners

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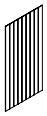
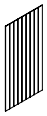
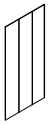
13 Product sizes and accessories

Table 7

Axon Panel information					
Product	**Description**	**Thickness**	**Size**		**Product Code**
			Length	**Width**	
	**Axon Panel 133 Smooth** Is a shiplap jointed panel to hide the panel joints. The panel is face primed. The panel has grooves at 133mm centres. The panel must be installed vertically. Nom. Panel Mass: 12.1kg/m2	9	2450	1200	403780
			2750	1200	403781
			3000	1200	403782
	**Axon Panel 133 Grained** Is a shiplap jointed panel to hide the panel joints. The panel is face primed. The panel has grooves at 133mm centres. The panel must be installed vertically. Nom. Panel Mass: 12.1kg/m2	9	2450	1200	404510
			2750	1200	404511
			3000	1200	404512
	**Axon Panel 400 Smooth** Is a shiplap jointed panel to hide the panel joints. The panel is face primed. The panel has grooves at 400mm centres. The panel must be installed vertically. Nom. Panel Mass: 12.1kg/m2	9	2450	1200	404414
			2750	1200	404415
			3000	1200	404416

Note: The actual width of the panel is 1203mm. All dimensions and masses provided are approximate only and are subject to manufacturing tolerances.

Table 8

Accessories/tools supplied by James Hardie			
Accessories	**Description**	**Quantity/Size (approx)**	**Code**
	CLD Structural Cavity Batten 19mm thick fibre cement cavity batten installed over RAB Board or a flexible underlay. Axon Panels are fixed to the battens.	19 x 70mm, 2450mm long	**403870**
	JH 9mm Panel Aluminium External Box Corner A box corner mould to form the external joints. 9mm etch primed.	2450mm long 2750mm long 3000mm long 4000mm long	**304509** **304510** **305150** **305808**
	JH 9mm Panel Aluminium Horizontal 'h' Mould A horizontal flashing to flash the horizontal joints. 9mm etch primed.	3000mm long	**304508**
	Aluminium 'h' Mould Jointer A jointer to cover the butt joint of 'h' mould.	100mm long	**304512**
	uPVC Corner Under Flashing A 50 x 50mm corner under flashing for internal and external joints.	3000mm long	**303745**
	uPVC Vent Strip Used to provide protection from vermin entering cavity space.	3000mm long	**302490**
	Annular Threaded Nail 25 x 2.5mm nail.	500gm	**300390**
	INSEAL® 3259 Tape Black 50mm tape to be used under the vertical shiplap joint. Black 80mm tape to be used at corners.	50m roll	**300767** **300769**
	CLD Batten Corner Flashing Aluminium Used at internal corner sealant joints at floor joist level.		**304652**
Tools			
	HardieBlade™ Saw Blade Diamond tip 184mm diameter fibre cement circular saw blade. Spacers not included.	Each	**300660**

NOTE: uPVC 'h' mould and jointer accessories are also available from James Hardie.

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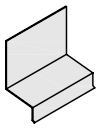
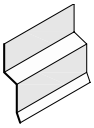
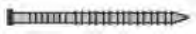
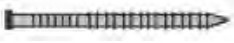
Table 9

Accessories/tools not supplied by James Hardie

James Hardie recommends the following products for use in conjunction with Axon Panel. James Hardie does not supply these products and does not provide a warranty for their use. Please contact component manufacturer for information on their warranties and further information on their products.

Accessories	Description
	Flexible Underlay To comply with Table 23 of E2/AS1.
	Flexible Tape A flexible self-adhesive tape used in preparation of a window. Refer to the Window installation section in this manual for more information. e.g. Tyvek®, Protecto or Thermakraft or similar.
	Joint Sealant Paintable flexible sealants are recommended for filling the joints. Refer to Section 7.2 for information. e.g. Sika Silaflex MS, Sika AT Façade, Bostik Seal N Flex-1 or similar
	**Head Flashing** Required over window heads to be supplied by window installer. Material must comply with Table 20 and 21 of E2/AS1.
	**Flashing Material** as per Table 20, 'E2/AS1'
	HardieFlex™ Hot Dip Galv and Stainless Steel 316 nails For fixing panels direct to framing. 40 x 2.8mm
	**C-25 Stainless Steel Brad Nails** 304SS brad nails used to install Axon Panels to the CLD Structural Cavity Battens used in a straight bradder. Paslode: (09) 477 3000
	**ND 50 Stainless Steel Brad Nails** Used to install Axon Panel direct fix to timber framing. Used in a straight bradder.
	65 x 2.87mm RounDrive Ring Shank Nail For fixing CLD Structural Cavity Battens to the framing. Paslode: (09) 477 3000
	Bostik Seal N Flex-1 'Seal N Flex-1' Polyurethane adhesive sealant manufactured by BOSTIK for applying between the panels and battens, Refer to section 5 for more information. BOSTIK: ALK: (09) 579 6253, WGTN: (04) 567 5119, CHCH: (03) 366 2583.
	Sika Sikaflex 11FC Sika: 0800 SIKA NZ (0800 745 269)
	200mm wide Polypropylene DPC Product used over flexible underlay at external and internal corners. ie. Super Course 500

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14 Details

The following generic details have been provided in this document for both direct fixed and cavity construction methods.

Table 10

Details				
Description	**Direct Fixed**		**CLD Structural Cavity Batten Construction**	
	Figure No.	**Page No.**	**Figure No.**	**Page No.**
Typical framing setout	Figure 1	16	Figure 15	25
Typical panel nail fixing setout	Figure 2	17	Figure 17	27
	Figure 13	24		
Foundation detail	Figure 3	18	Figure 18	28
Vertical shiplap joint	Figure 4	18	Figure 19	29
	Figure 14	25		
Soffit detail	Figure 5	19	Figure 32	39
Internal corner detail	Figure 6	19	Figure 21	30
External corner detail	Figure 7	20	Figure 22	31
Section at sill	Figure 8	20	Figure 24	33
Window jamb	Figure 9	21	Figure 25	34
Window head	Figure 10	21	Figure 26	34
Window head with facings			Figure 27	35
Window jamb with facings			Figure 28	35
Window sill with planted sill			Figure 29	36
Horizontal joint detail	Figure 11	22	Figure 30	37
			Figure 31	38
Corner at ‘h’ mould joint detail	Figure 12	23		
Batten fixing setout			Figure 16	26
Intermediate stud fixing			Figure 20	30
Jointing of CLD Structural Cavity Batten			Figure 23	32
External corner			Figure 33	40
Cavity pipe penetration			Figure 34	40
Internal corner			Figure 35	41
Aluminium ‘h’ mould joiner			Figure 36	42
One piece apron flashing joint			Figure 37	43
Drained flashing joint at floor joist			Figure 38	44
Meter box at sill			Figure 39	45
Meter box at jamb			Figure 40	45
Meter box at head			Figure 41	46
Garage door jamb			Figure 42	47
Garage door head			Figure 43	48
Junction between Axon Panel and fascia board			Figure 44	49
Enclosed roof to wall intersection			Figure 45	50

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Figure 1: Direct fixed typical framing setout

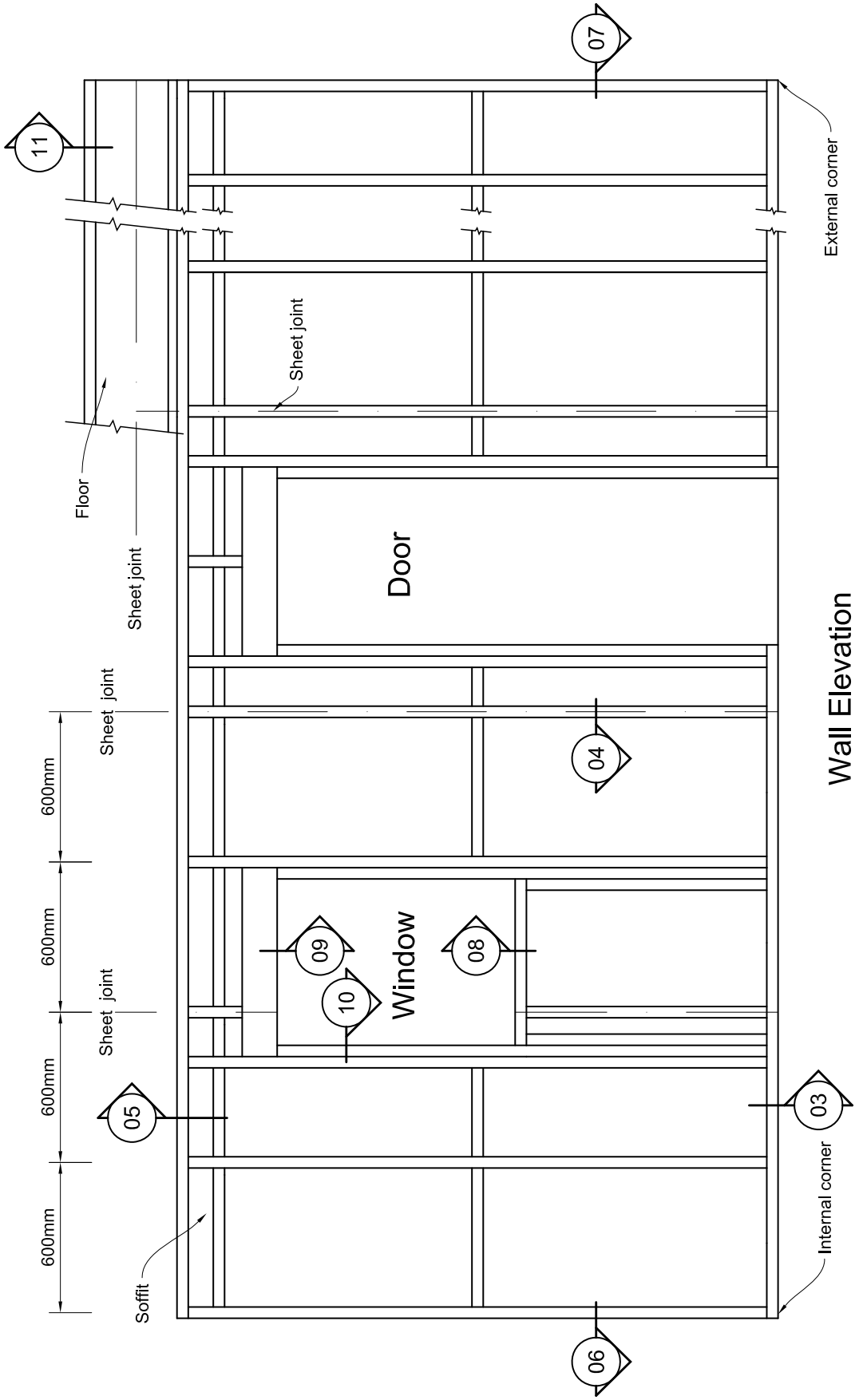

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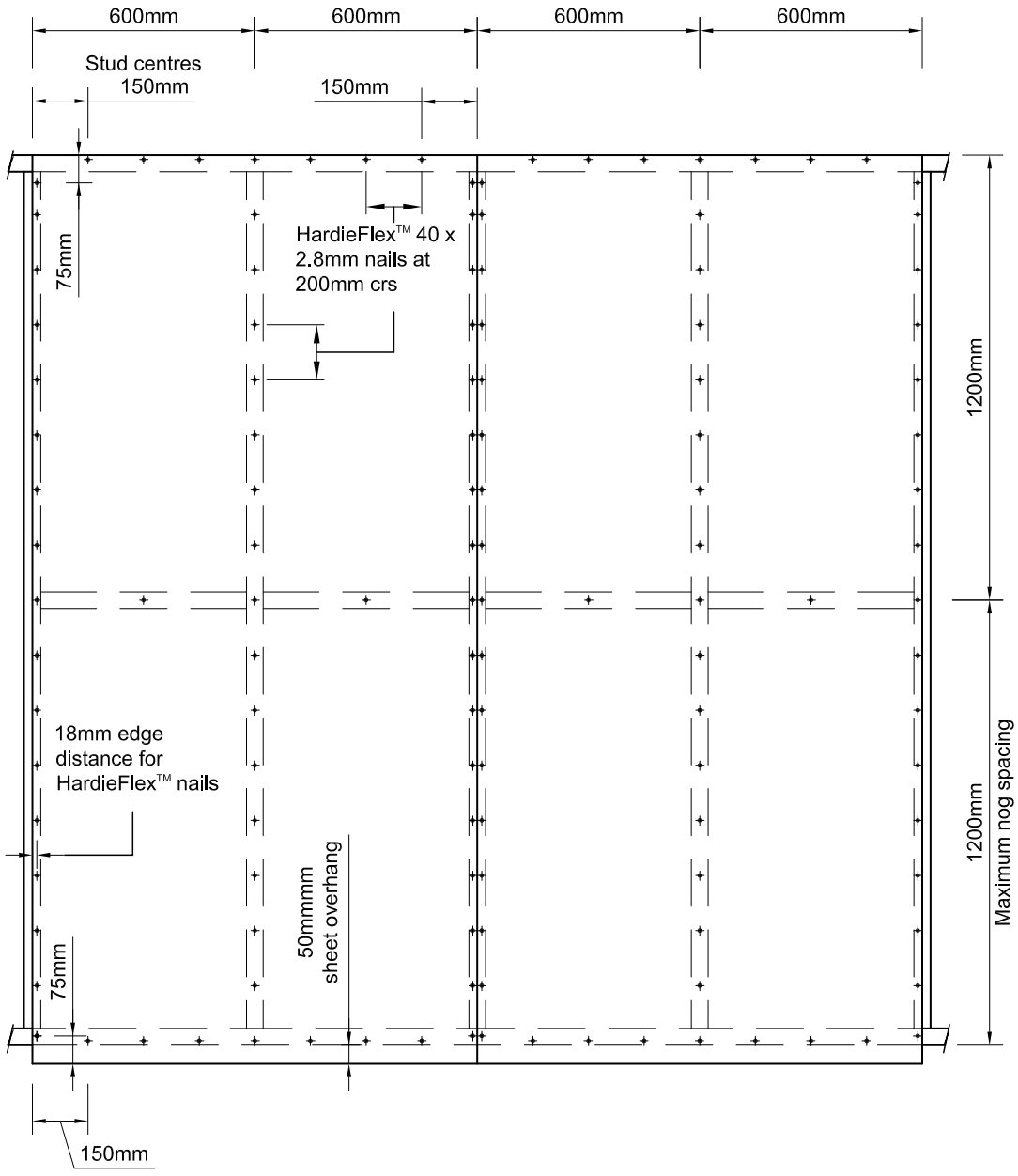
Figure 2: Direct fixed typical panel HardieFlex nail fixing setout



Note: When studs spaced at 400mm centres using Axon® Panel 400, the nail fixings to intermediate studs to be offset 5mm from the groove in Panel.

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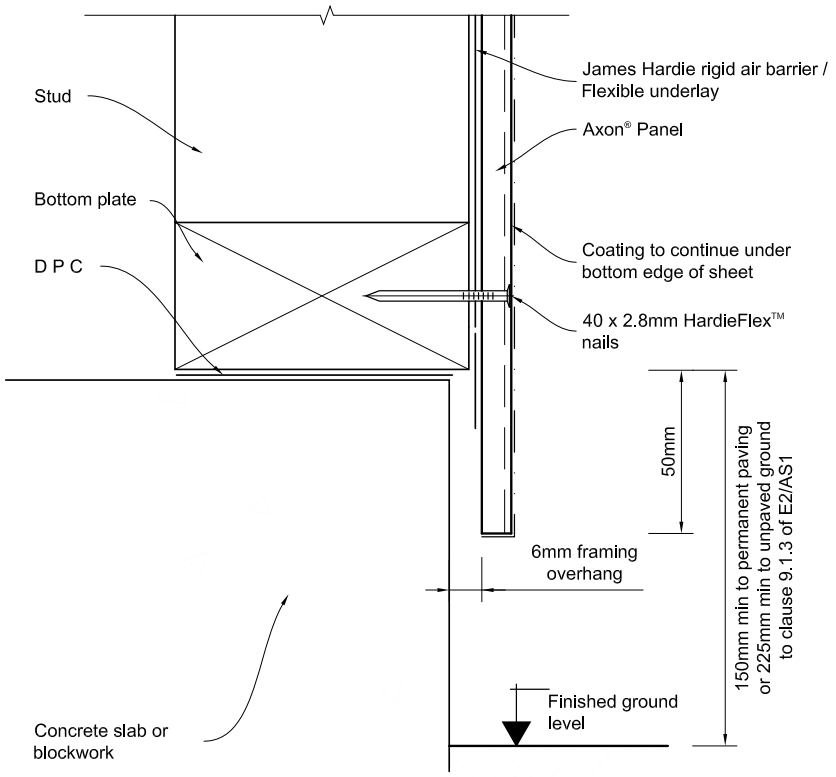
Figure 3: Direct fixed foundation detail



Note: Refer to Section 2.4 for further information

Figure 4: Vertical shiplap joint — HardieFlex nail

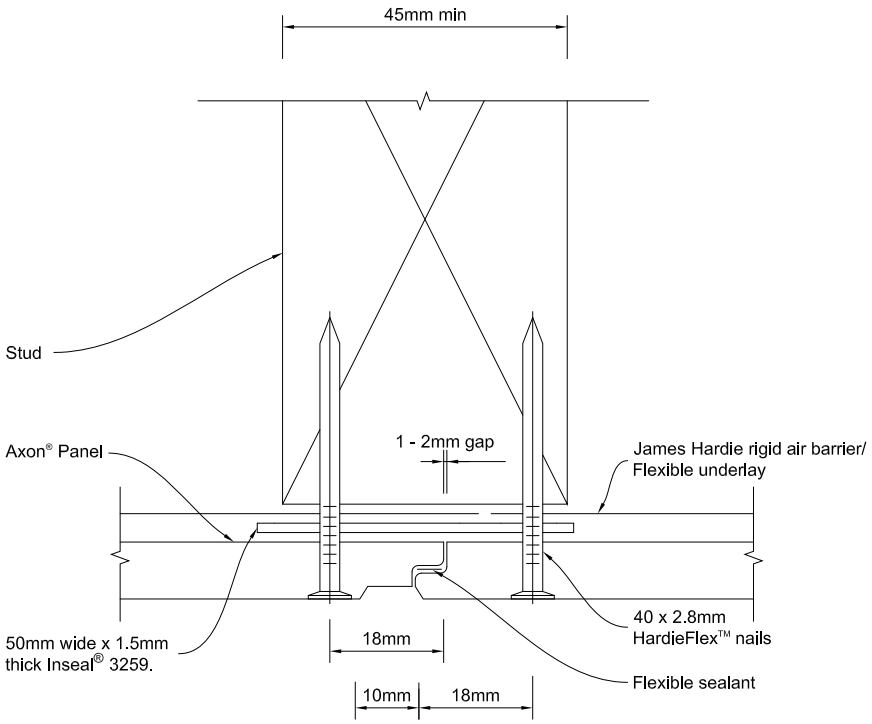


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Figure 5: Soffit detail

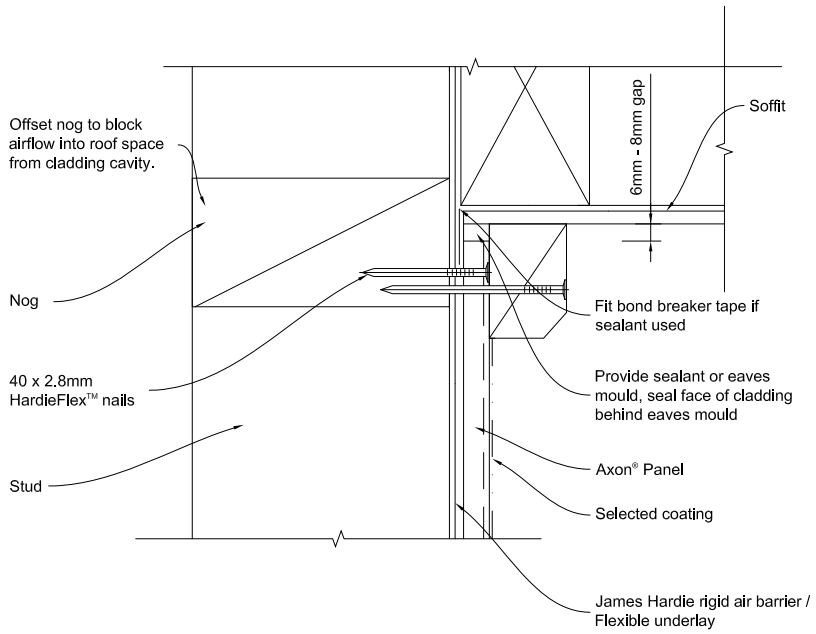

Figure 6: Internal corner detail

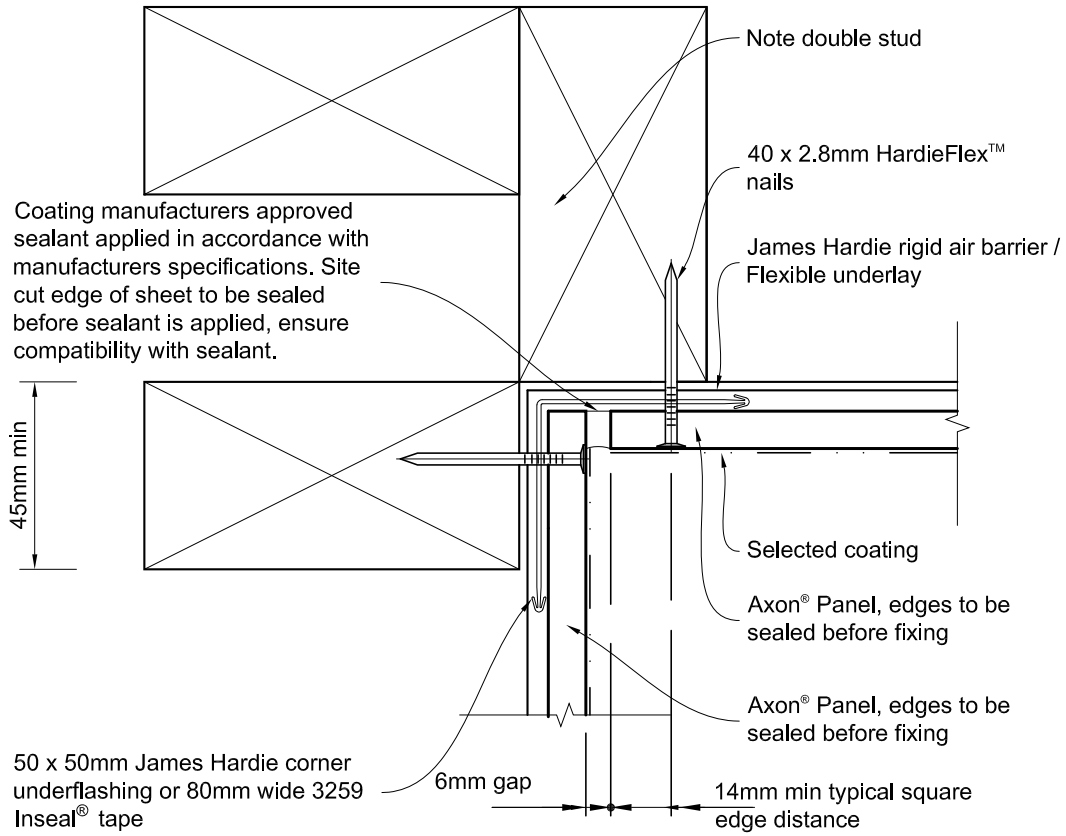

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Figure 7: External corner detail

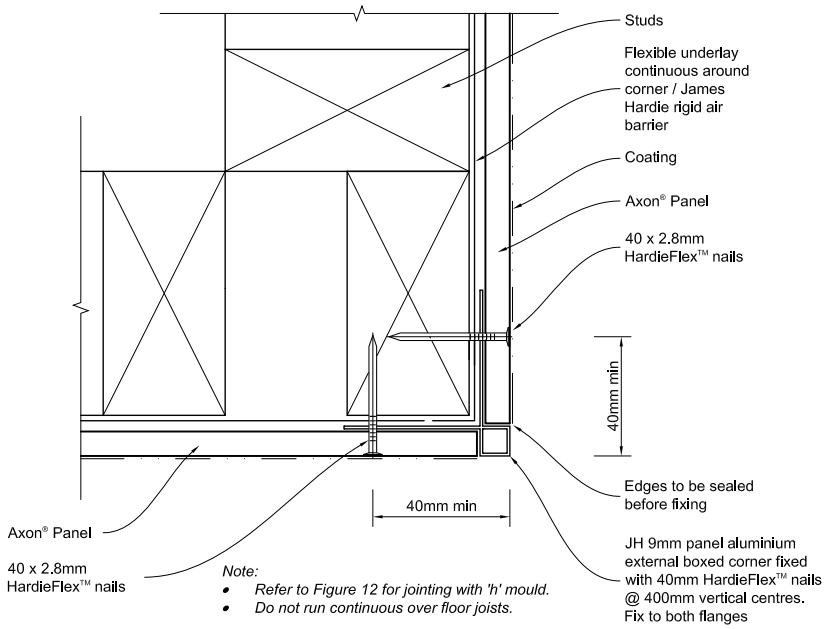
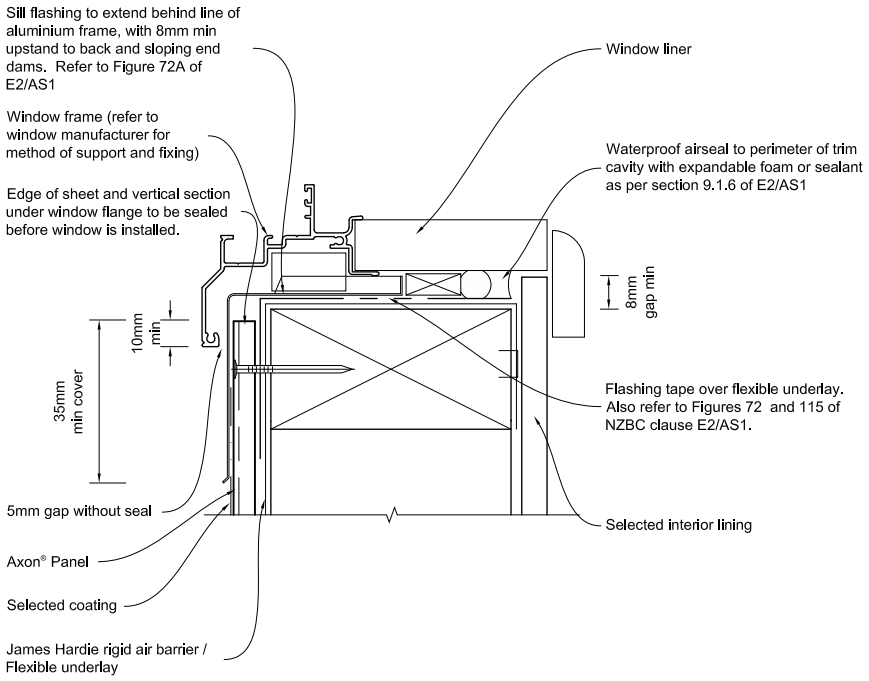


Figure 8: Section at sill



General notes for materials selection

1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of NZBC E2/AS1.
2. Flexible underlay must comply with acceptable solution E2/AS1.
3. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact.

Refer to the manufacturer or supplier for technical information for these materials.

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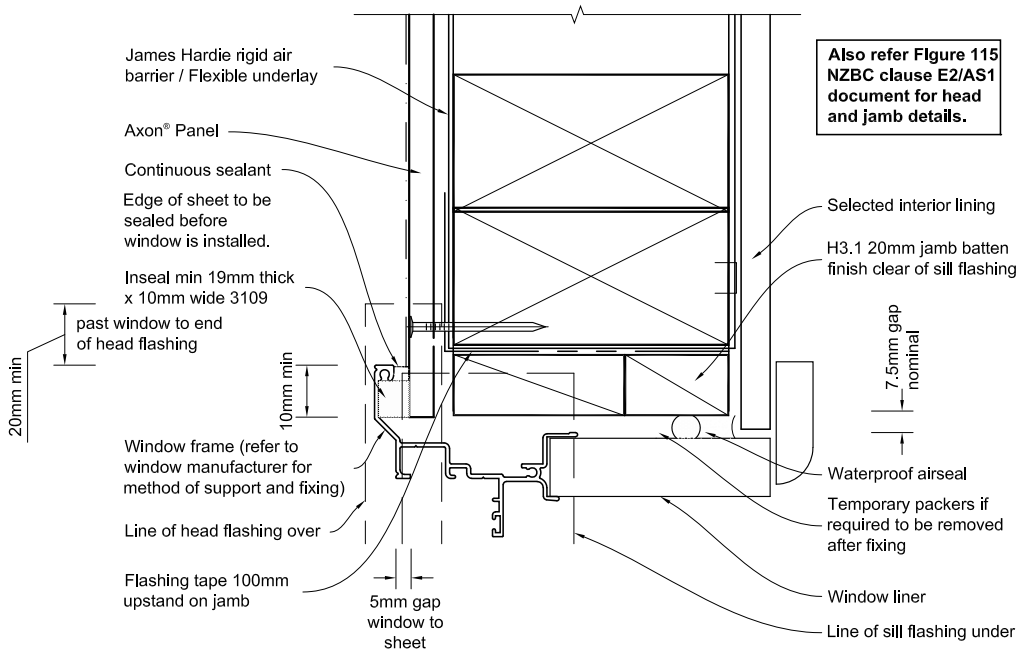
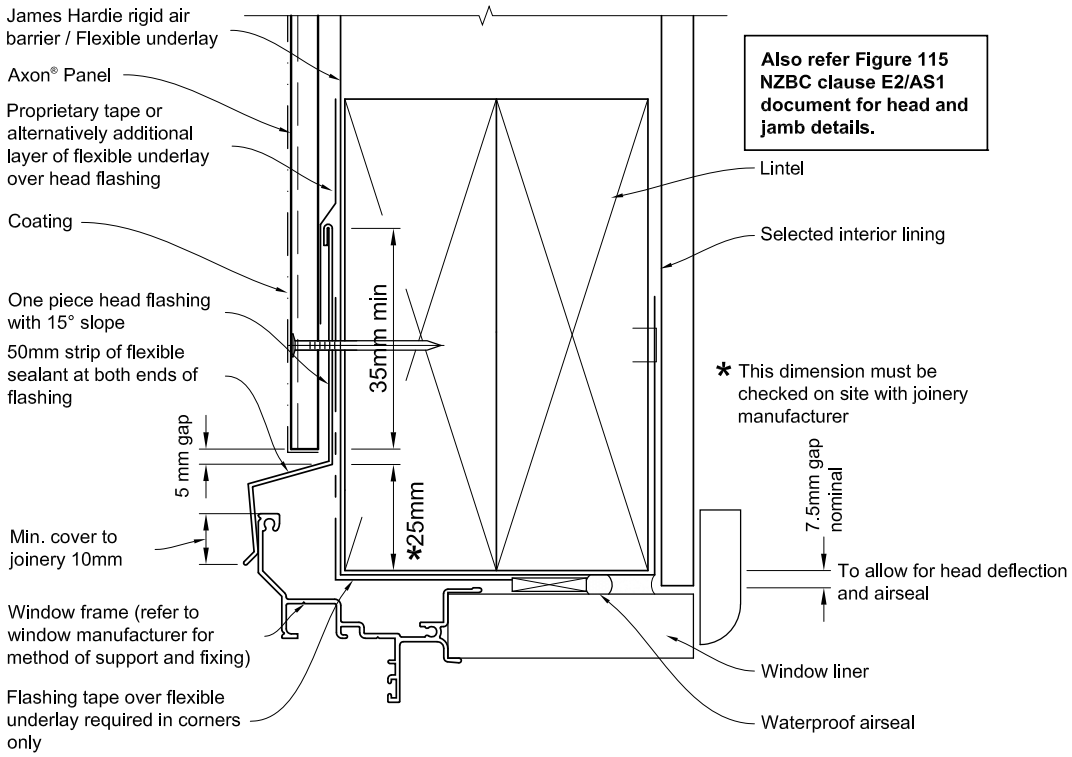
Figure 9: Window jamb



Note: When James Hardie rigid air barrier is used flashing tape to be applied to the entire window opening

Figure 10: Window head



Note: When James Hardie rigid air barrier is used flashing tape to be applied to the entire window opening

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Figure 11: Horizontal joint detail

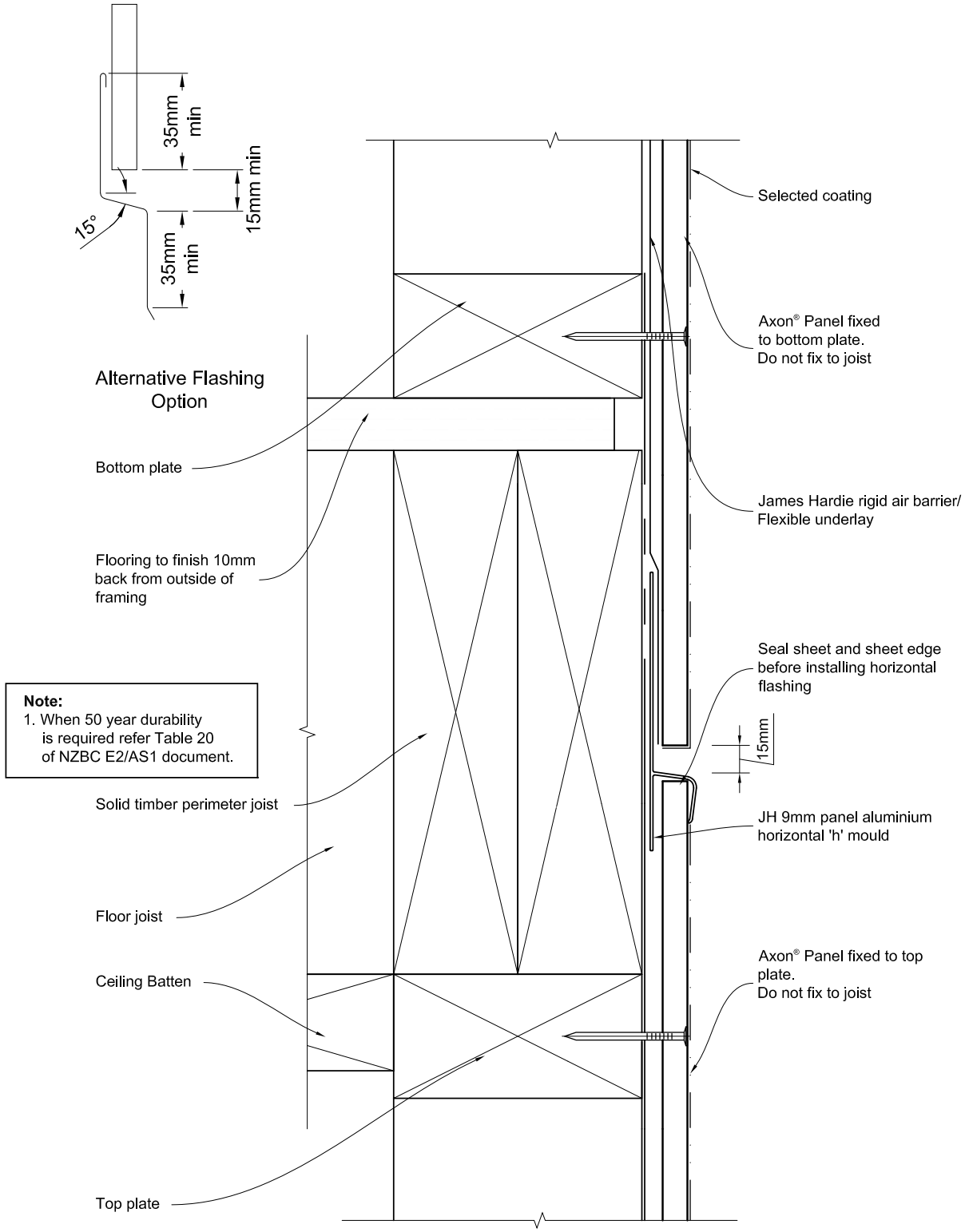

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Figure 12: Corner at 'h' mould joint detail

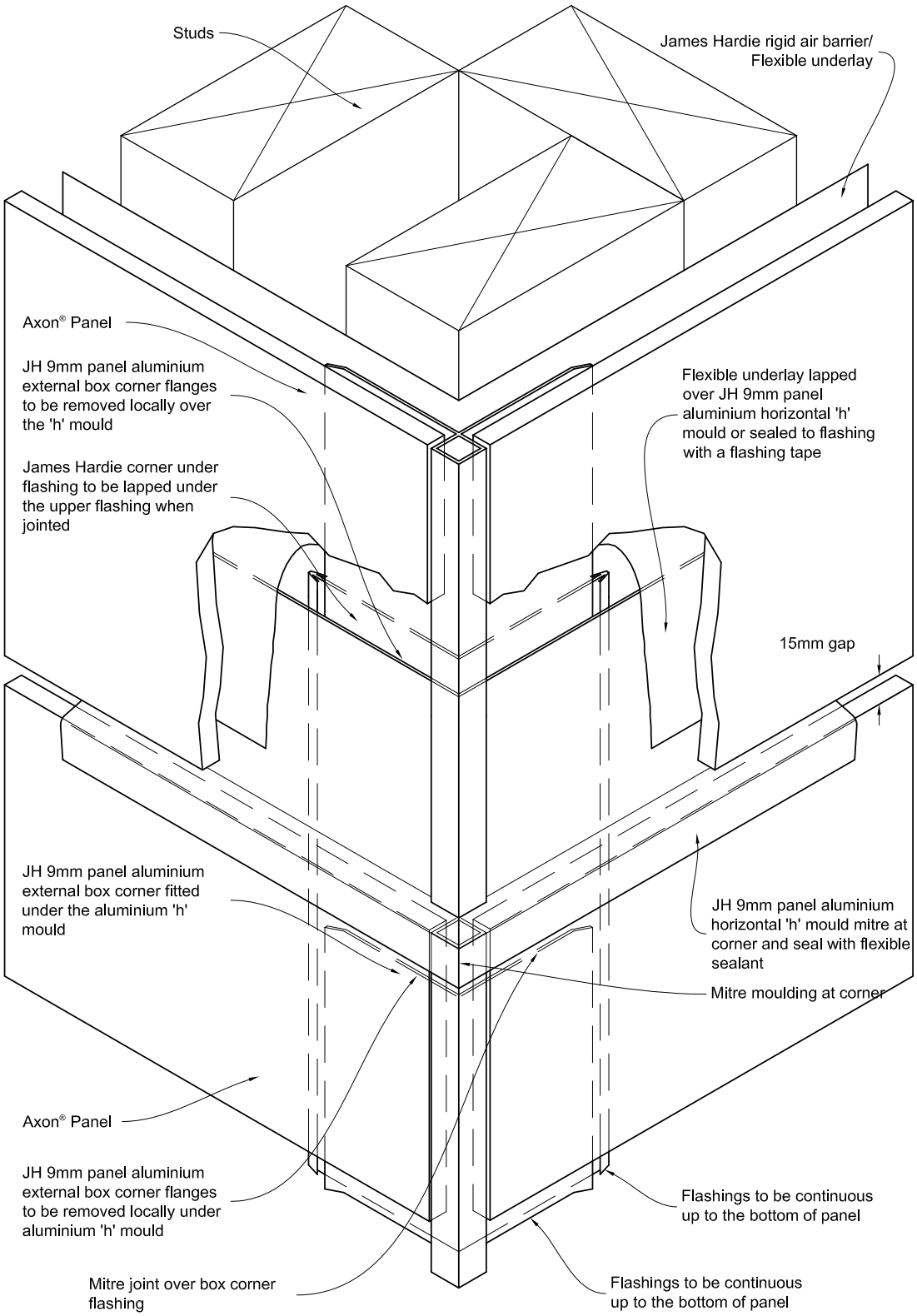

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Figure 13: Direct fixed typical panel brad nail fixing setout

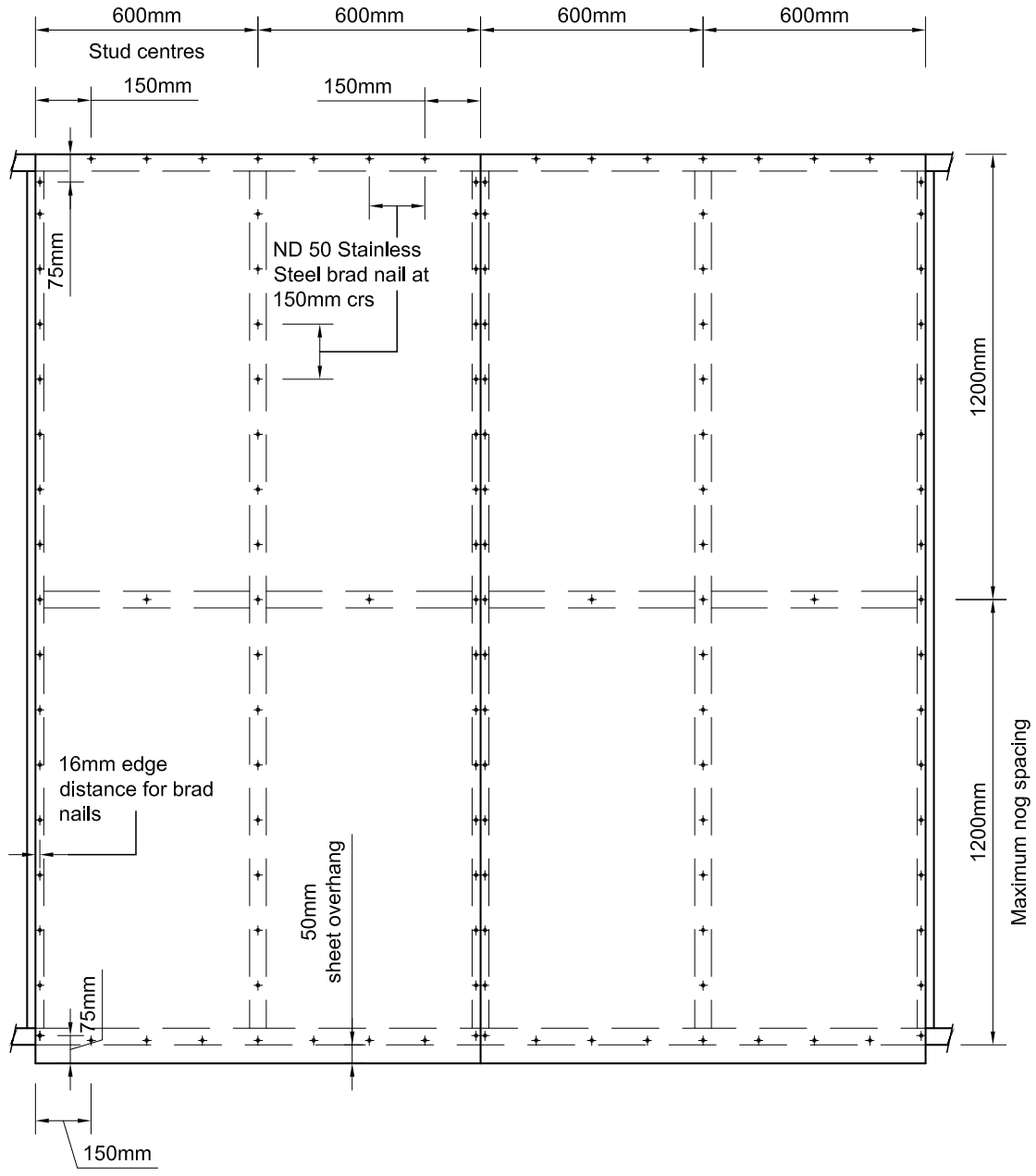

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Figure 14: Shiplap joint — brad nail

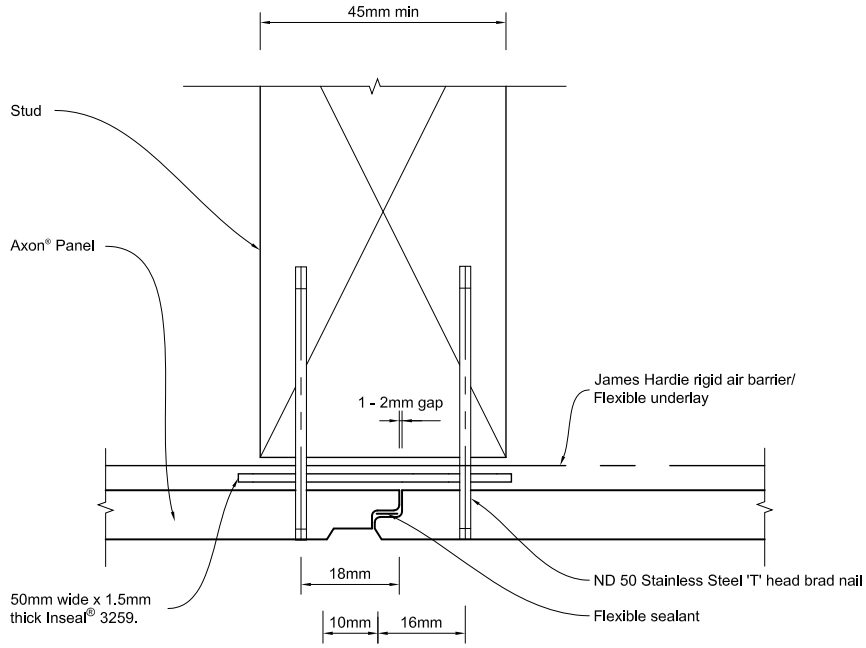
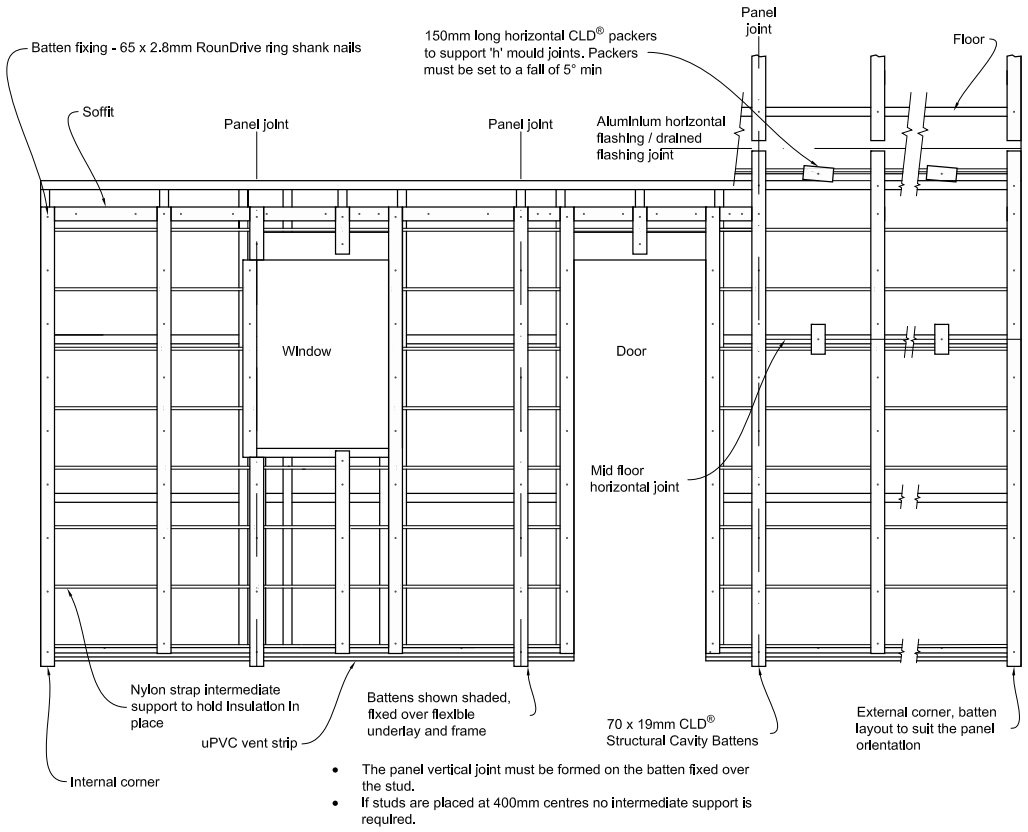


Figure 15: Framing setout



- The panel vertical joint must be formed on the batten fixed over the stud.
- If studs are placed at 400mm centres no intermediate support is required.

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Figure 16: Batten fixing setout

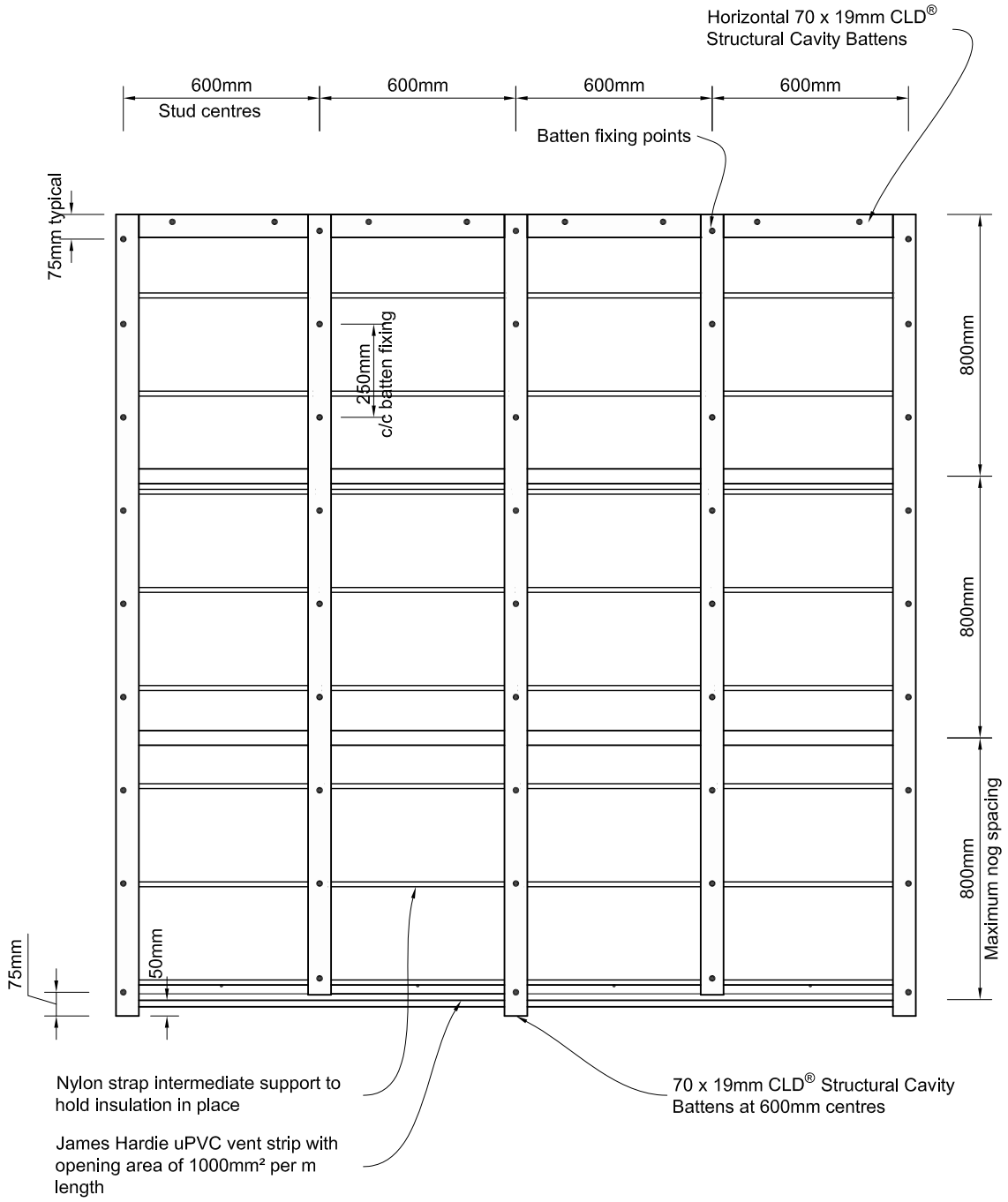

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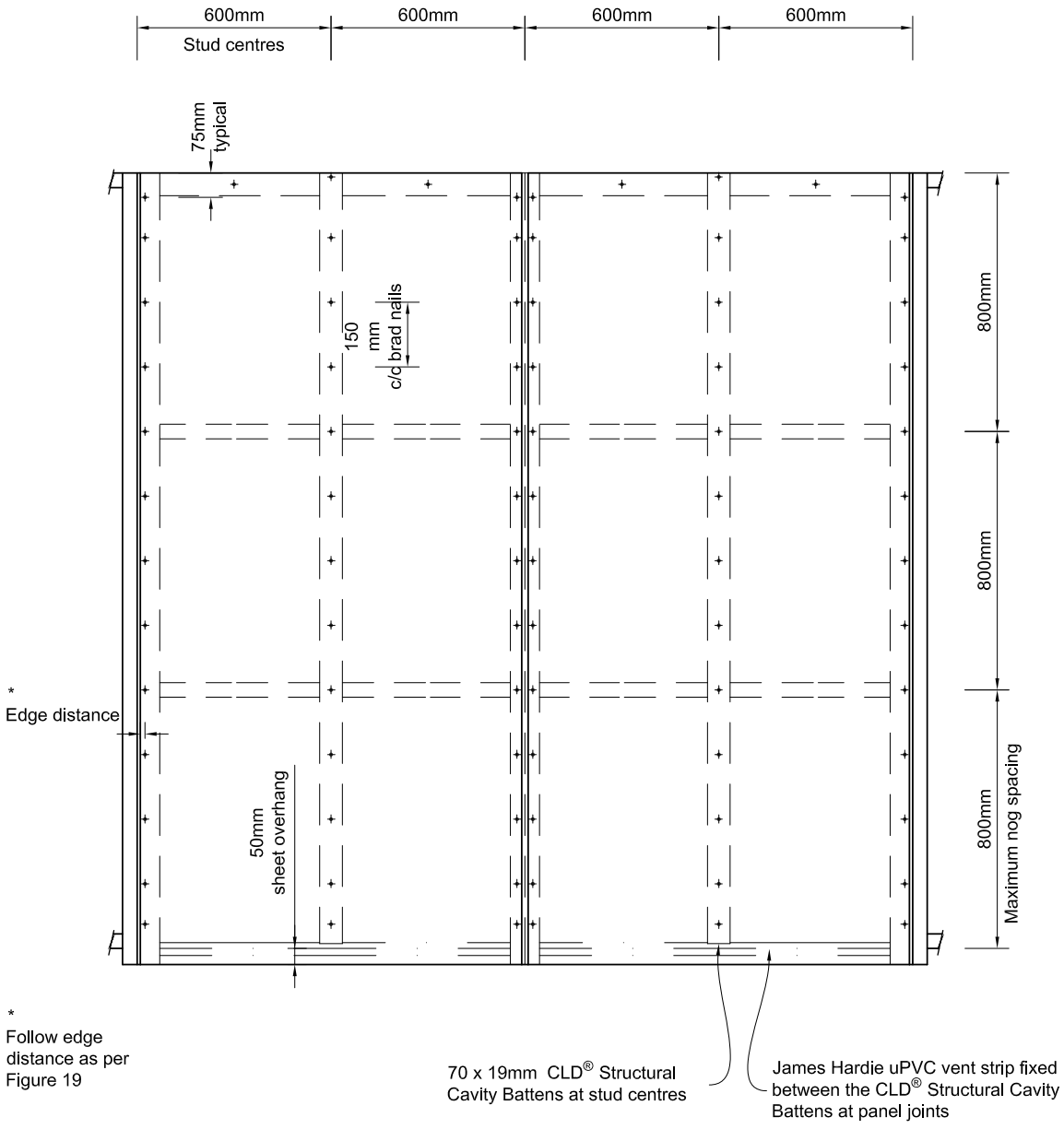
Figure 17: Sheet fixing setout



Note: When studs spaced at 400mm centres using Axon® Panel 400, the nail fixings to intermediate studs to be offset 5mm from the groove in Panel.

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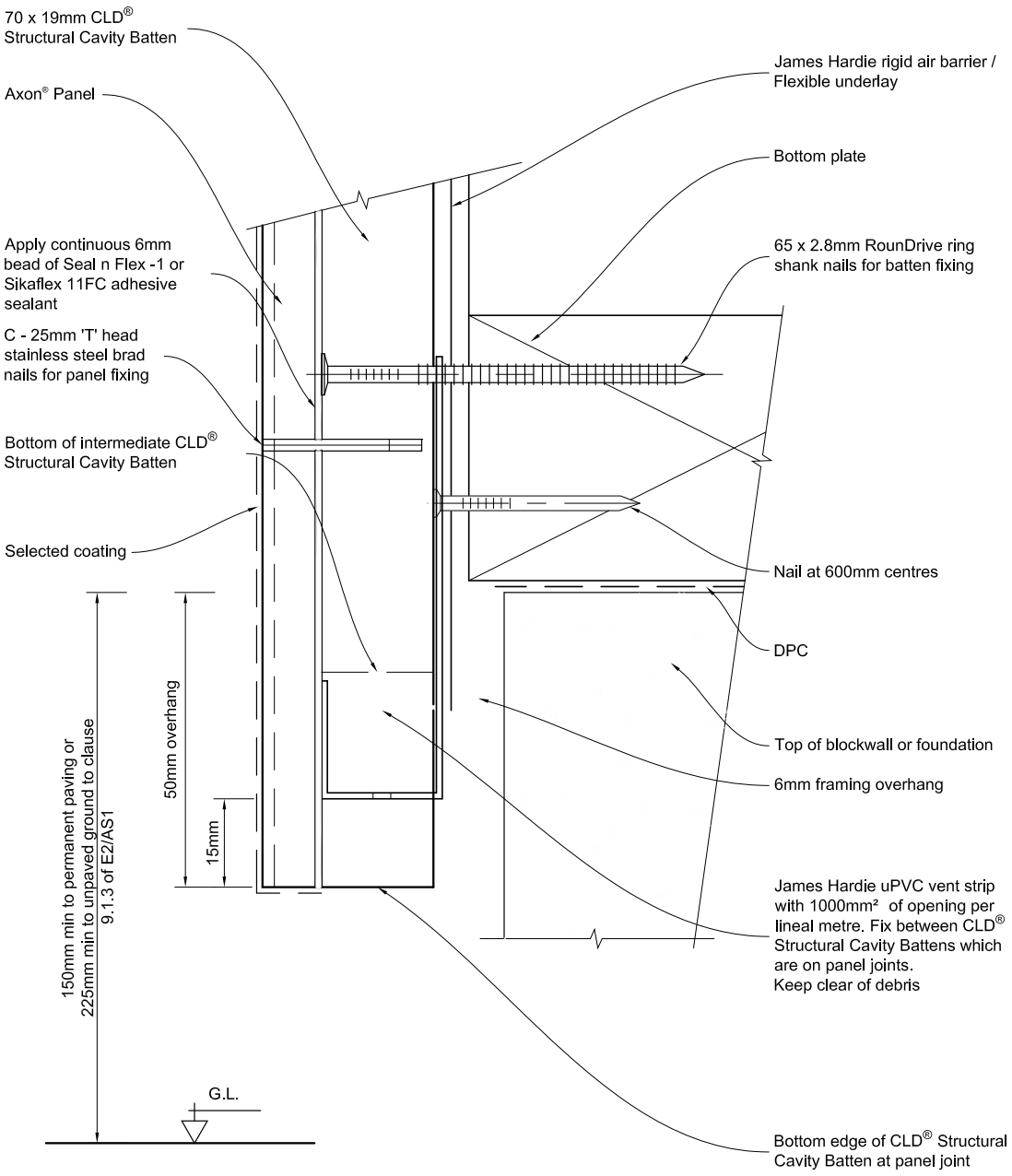
Figure 18: Foundation detail



Notes:

- Check panel extends past bottom plate as specified in Architects specification (50mm min).
- uPVC Vent strip must remain level and secure during construction. Cut and fix uPVC vent strip between CLD® Structural Cavity Battens fixed under the panel joints.
- Check vent strip is free from site debris.

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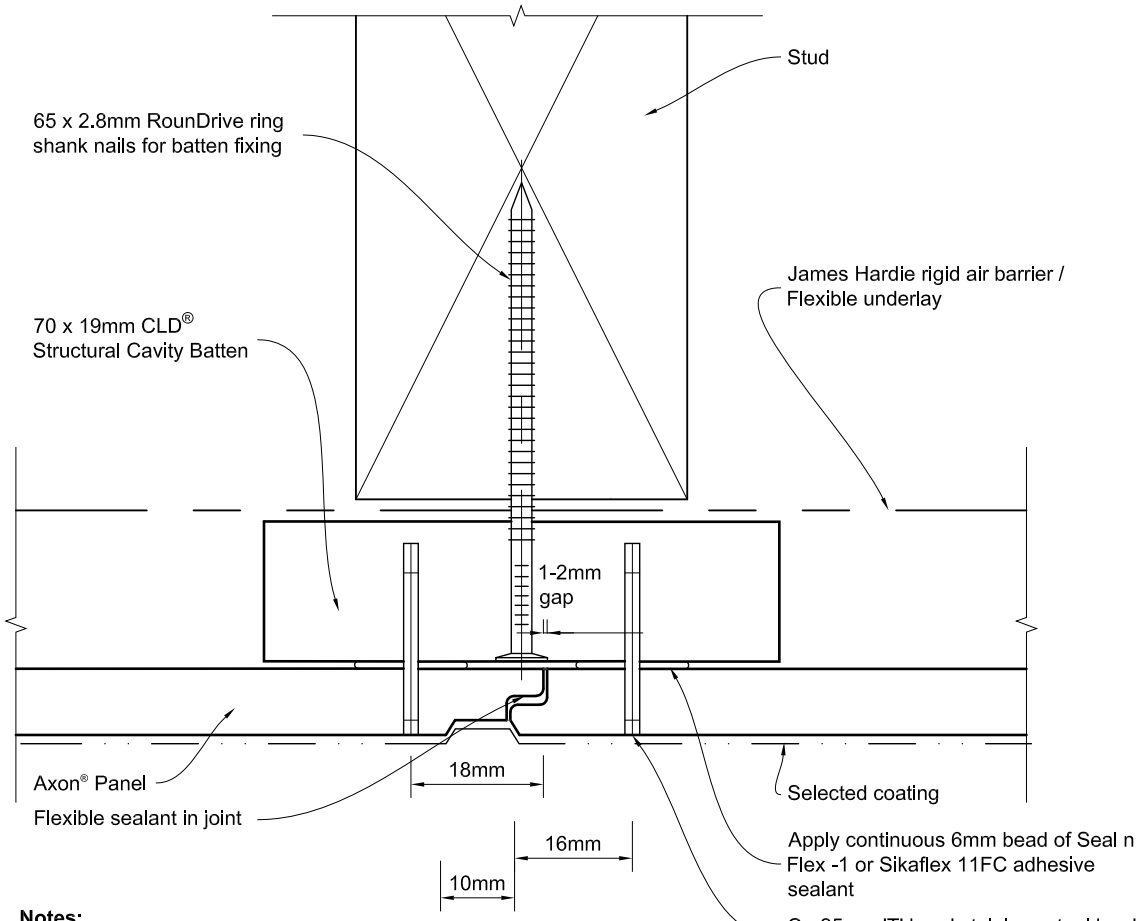
Figure 19: Vertical shiplap joint



Notes:

- Ensure that a continuous 6mm bead of adhesive sealant is applied between CLD® Structural Cavity Batten and Axon® Panel.
- Ensure that the required edge distance is maintained when fixing.
- Seal cut edges with a primer compatible with final coatings.

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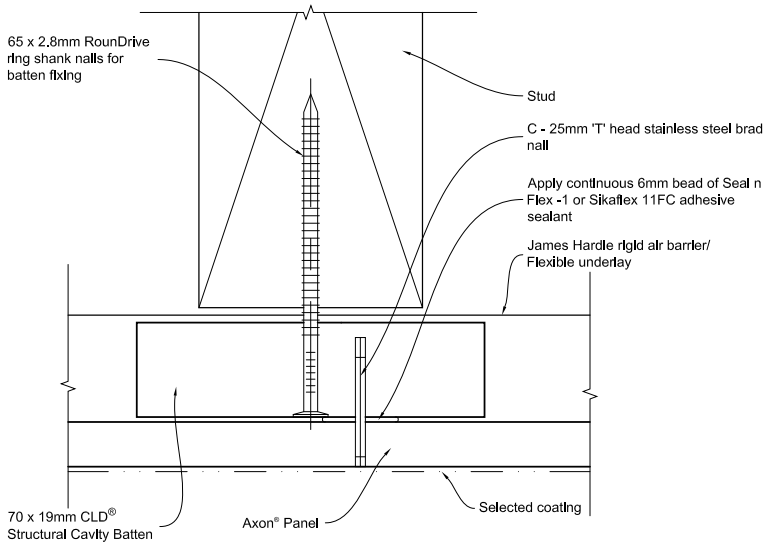
Figure 20: Intermediate stud fixing



Notes:

- Fix panel from the middle of the panel outwards.

Figure 21: Internal corner

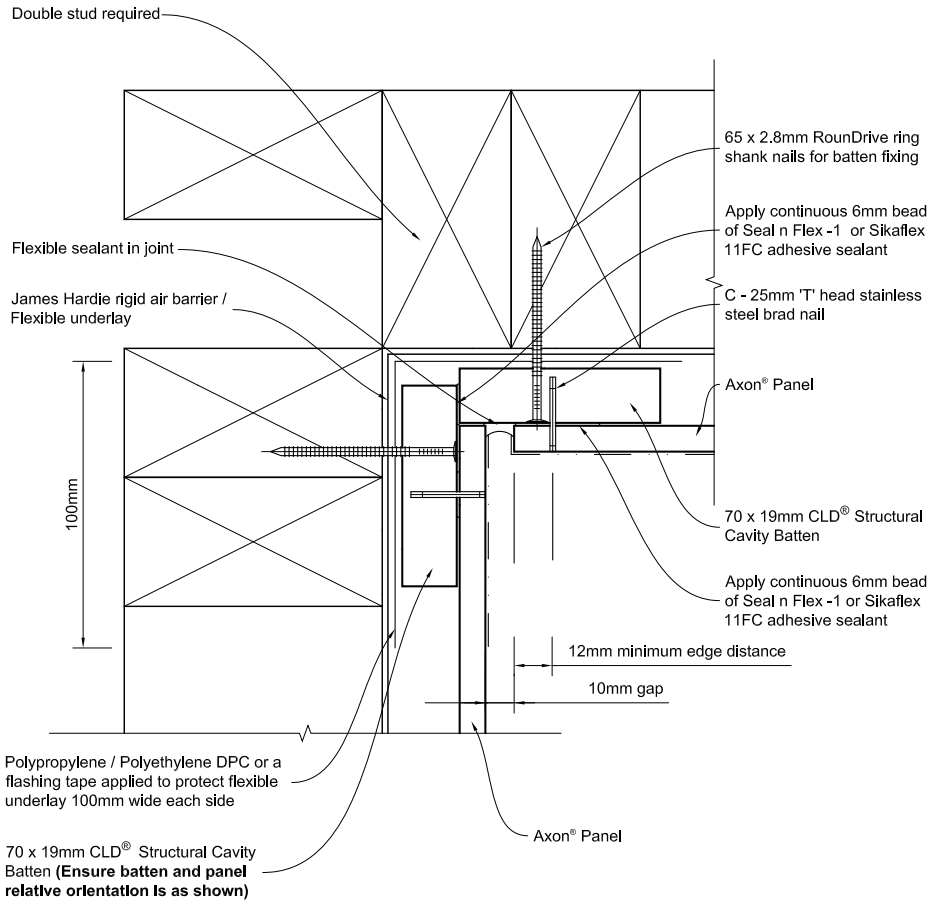


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Figure 22: External corner

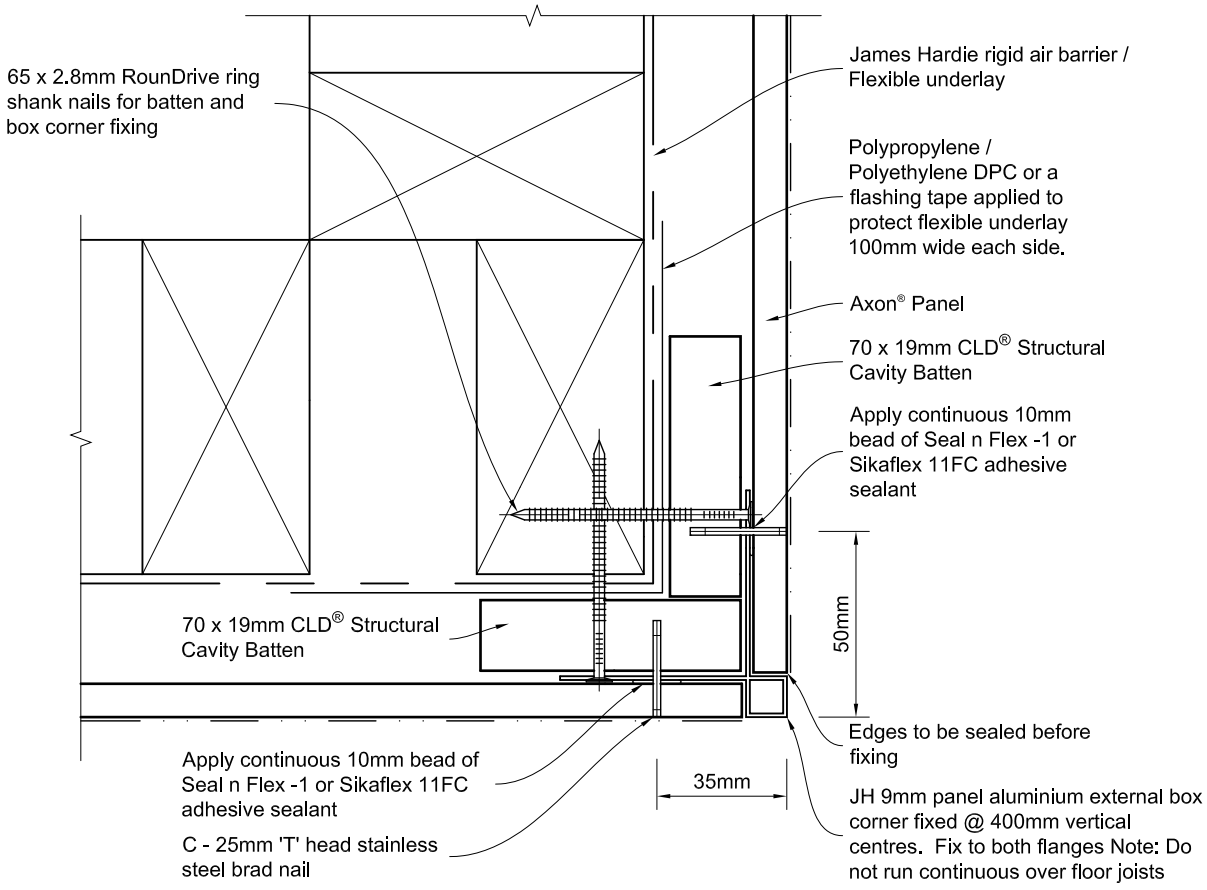

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Figure 23: Jointing of CLD Structural Cavity Batten

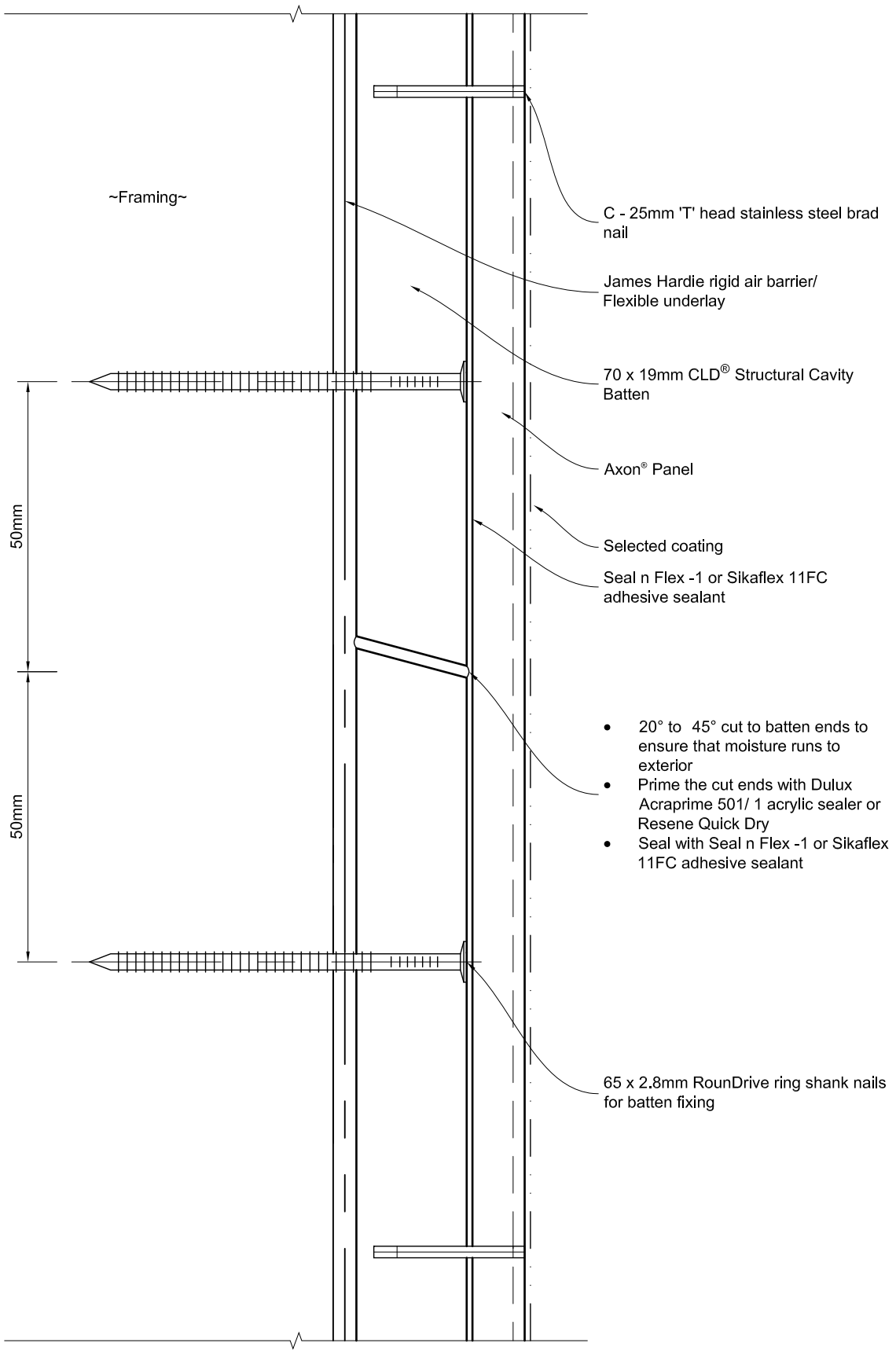

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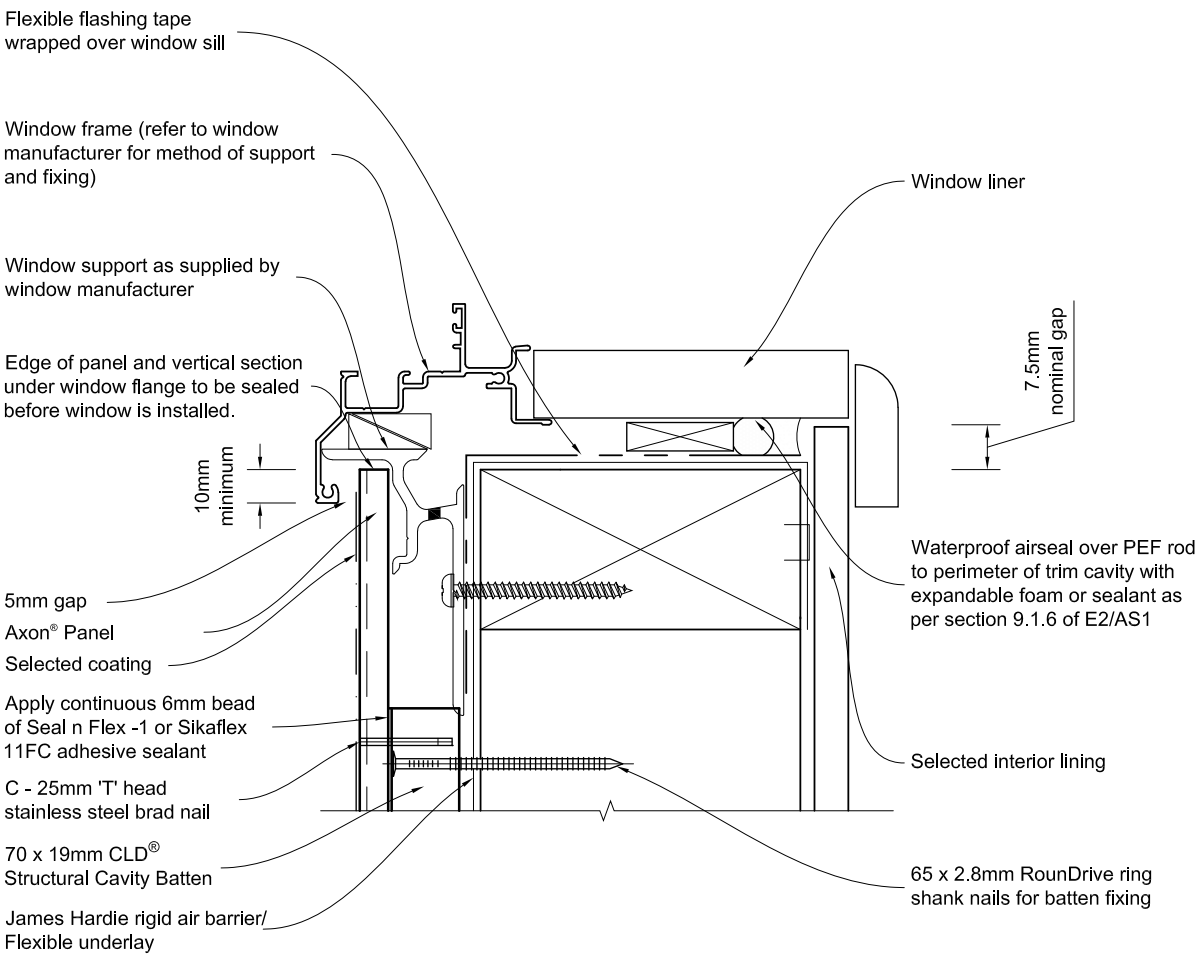
Figure 24: Window sill



General notes for materials selection

1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of NZBC E2/AS1.
2. Flexible underlay must comply with acceptable solution E2/AS.
3. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact.

Refer to the manufacturer or supplier for technical information for these materials.

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Figure 25: Window jamb

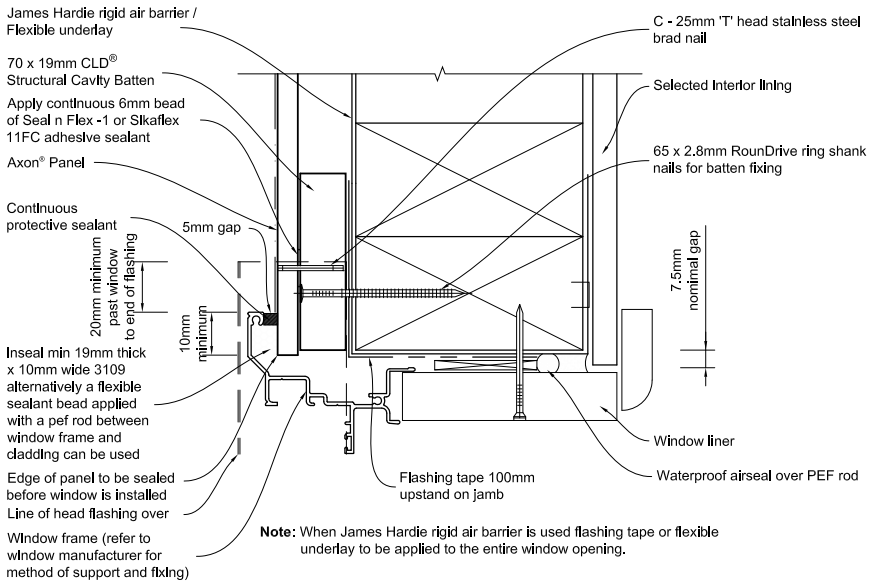

Figure 26: Window head

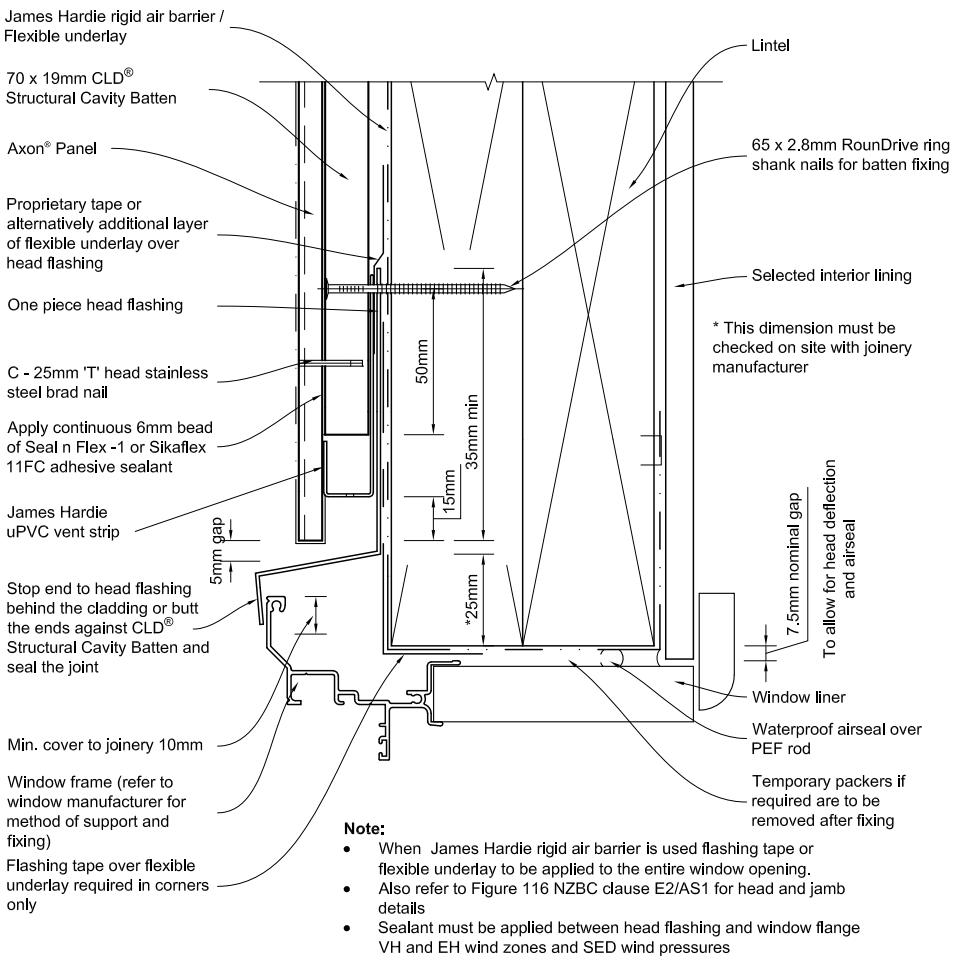

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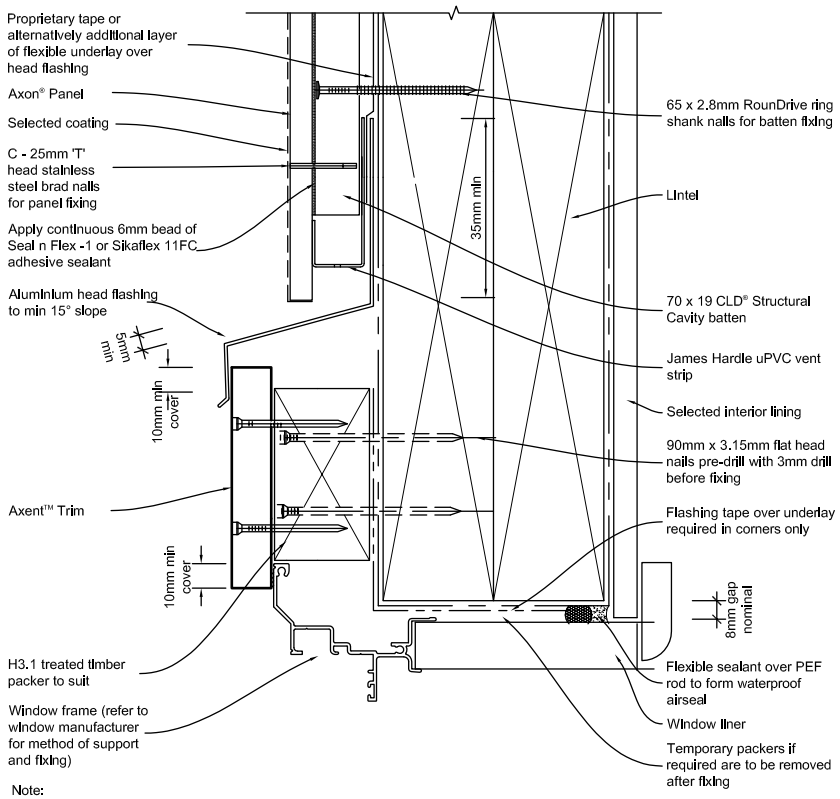
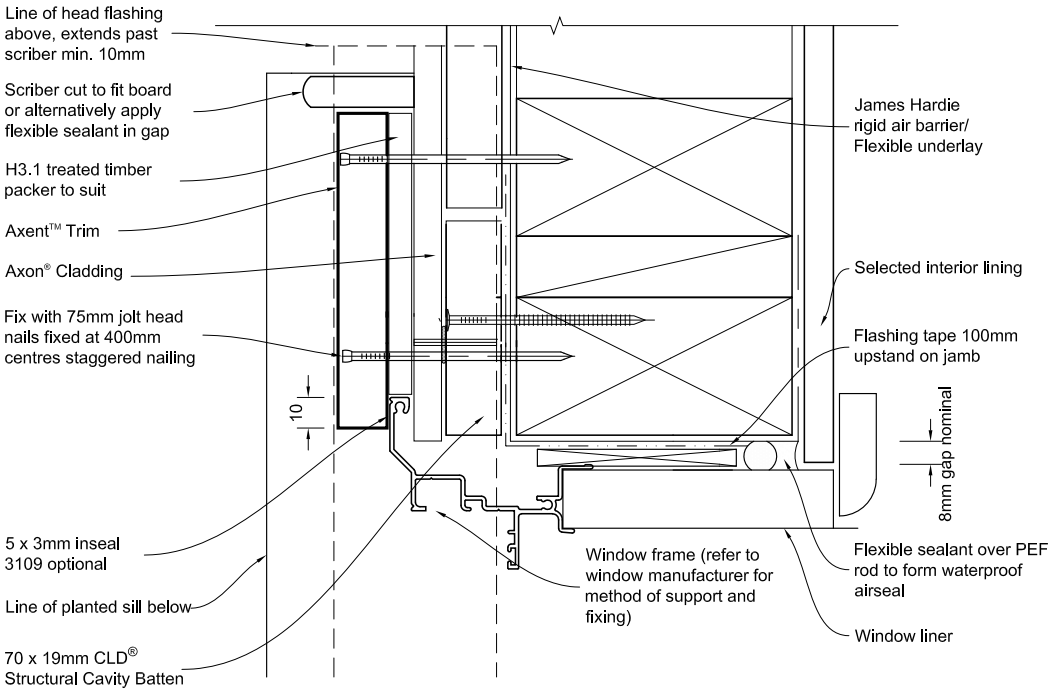
Figure 27: Window head with facings



Note:

- When James Hardie rigid air barrier is used flashing tape to be applied to the entire window opening.
- Sealant must be Installed between head flashing and Axent™ Trim and Axent™ Trim and window flange in VH and EH wind zones and SED pressures.

Figure 28: Window jamb with facings



Note: When James Hardie rigid air barrier is used flashing tape to be applied to the entire window opening.

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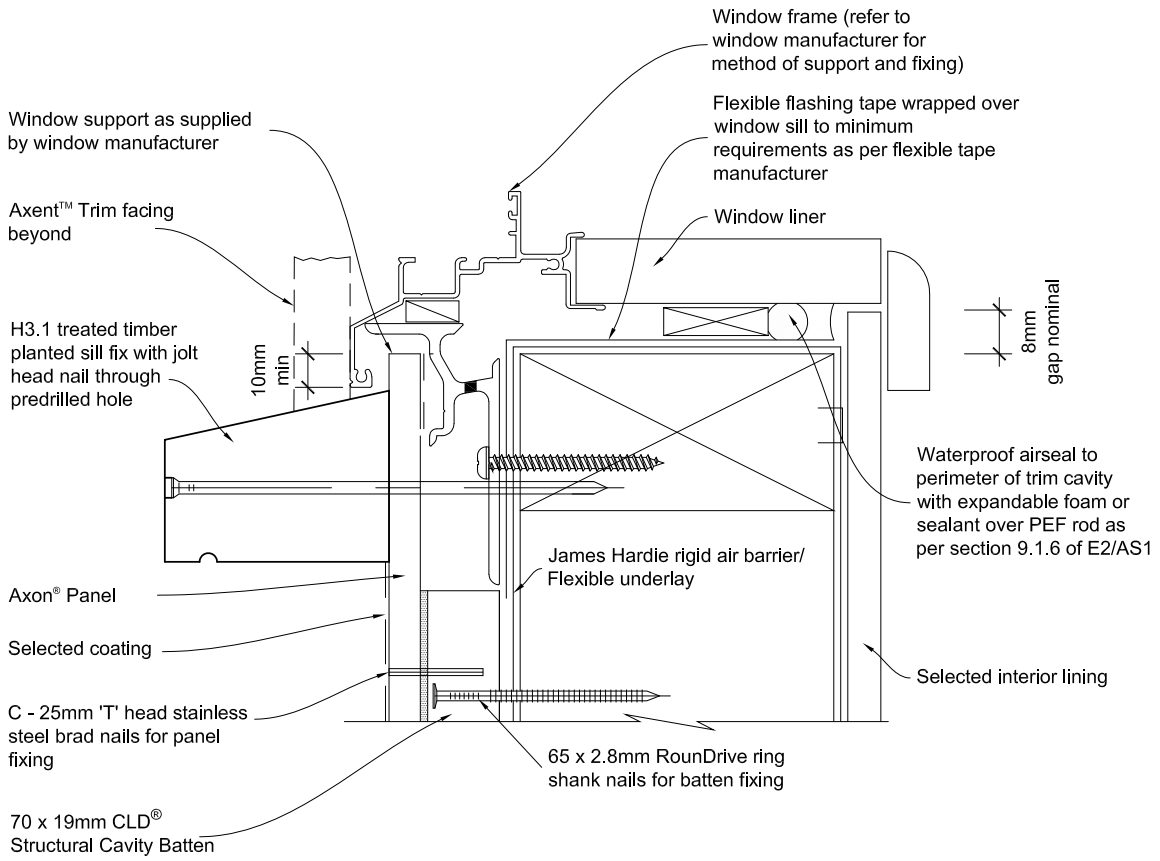
Figure 29: Window sill with planted sill



General notes for materials selection

1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and Table 20 of NZBC E2/AS1.
2. Flexible underlay must comply with acceptable solution E2/AS1.
3. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact.
4. When James Hardie rigid air barriers are used flashing tape to be applied to the entire opening.

Refer to the manufacturer or supplier for technical information for these materials.

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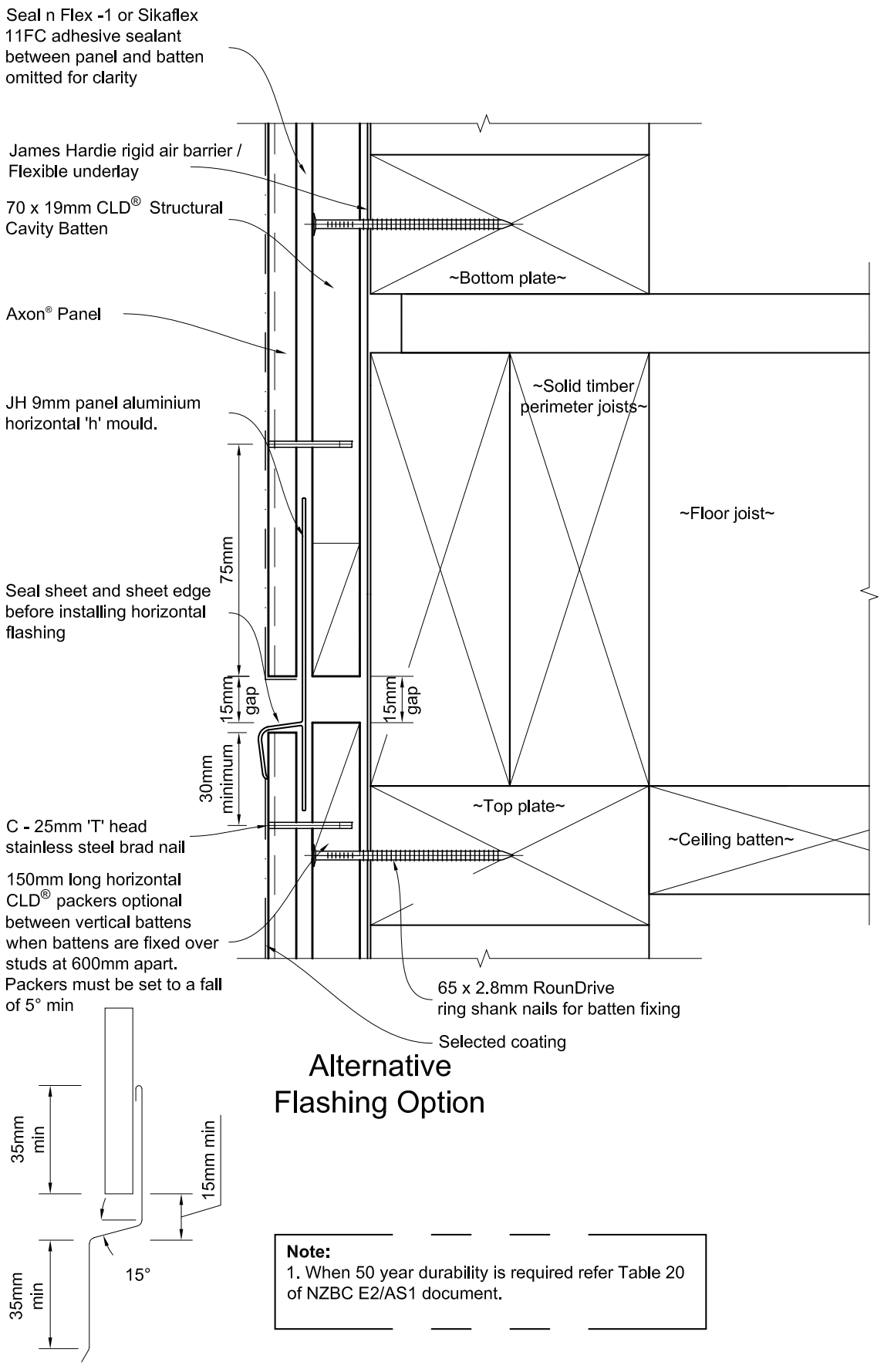
Figure 30: Horizontal joint at floor joist



Note:
1. When 50 year durability is required refer Table 20 of NZBC E2/AS1 document.

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Figure 31: Horizontal joint in tall wall

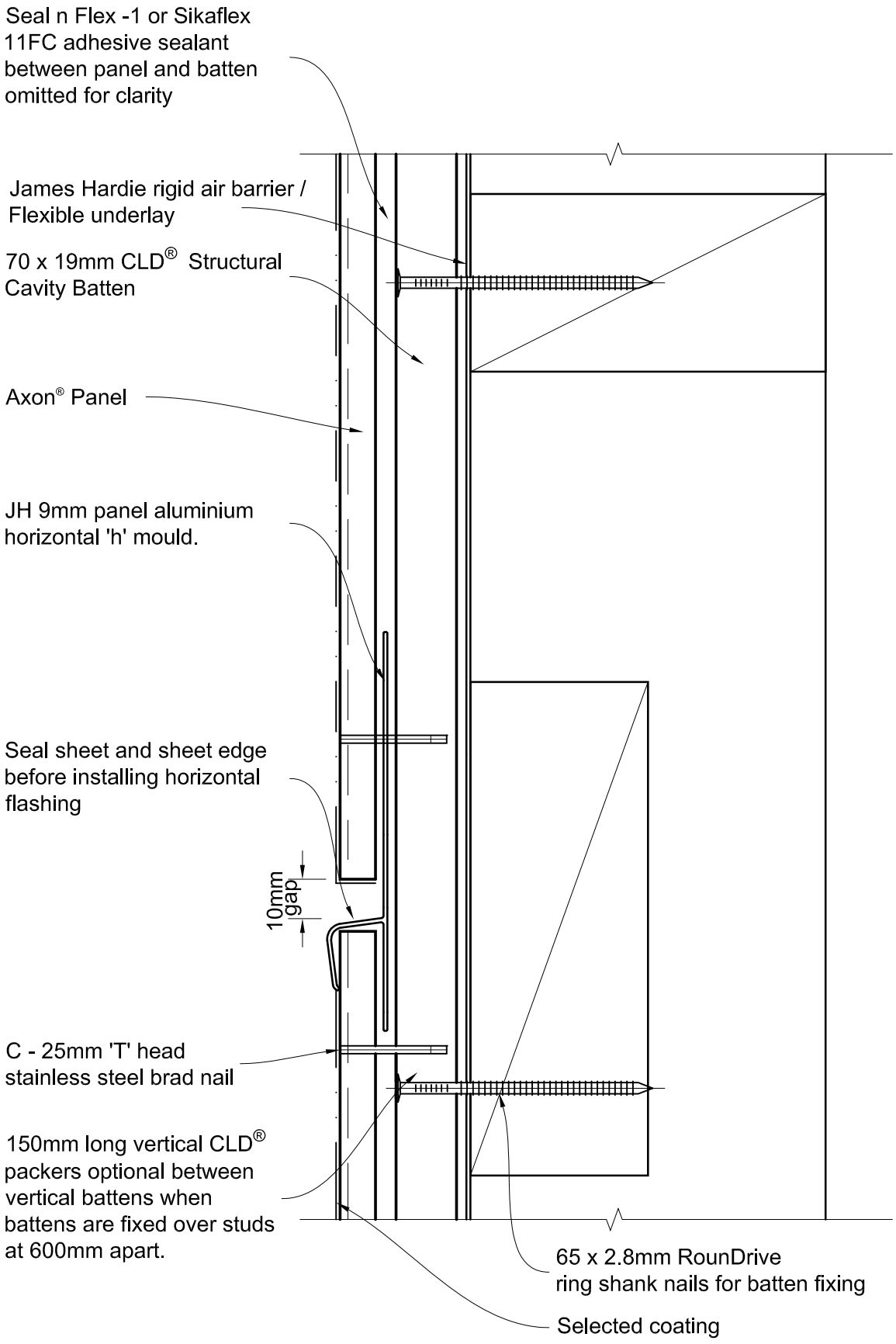

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Figure 32: Soffit detail

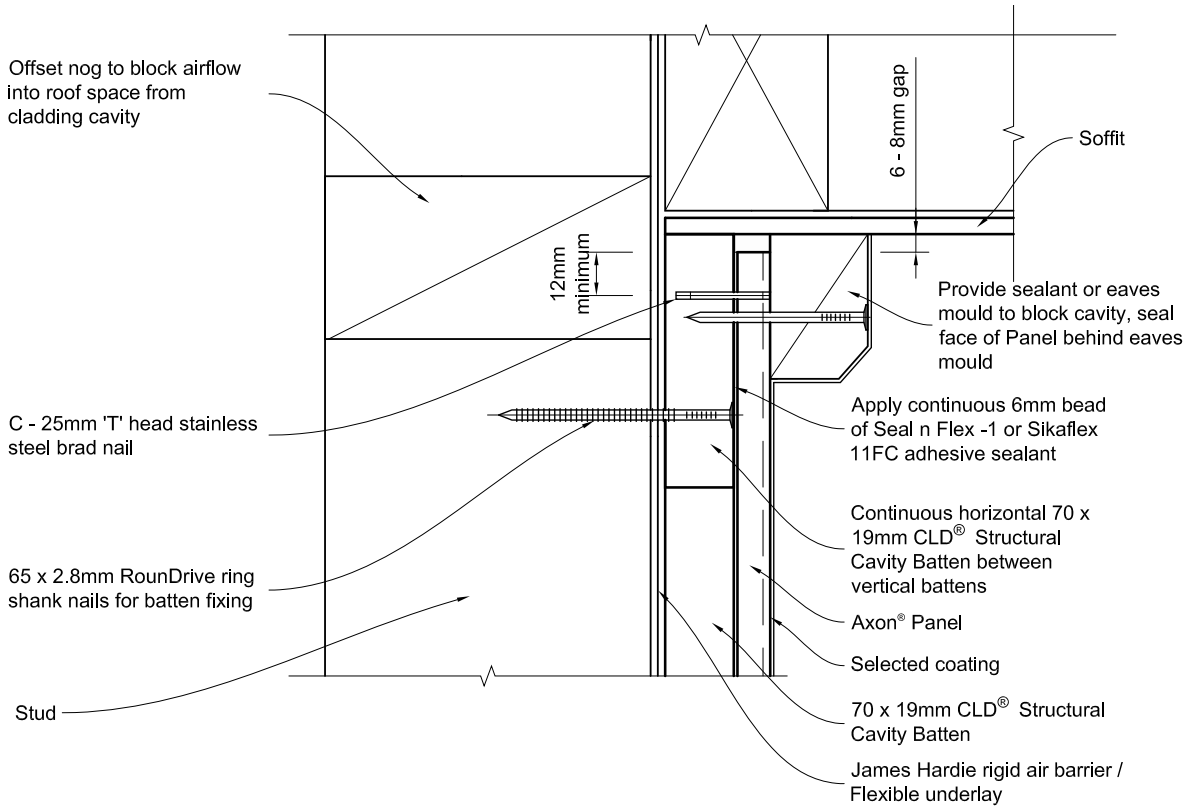

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Figure 33: External corner at 'h' mould joint detail

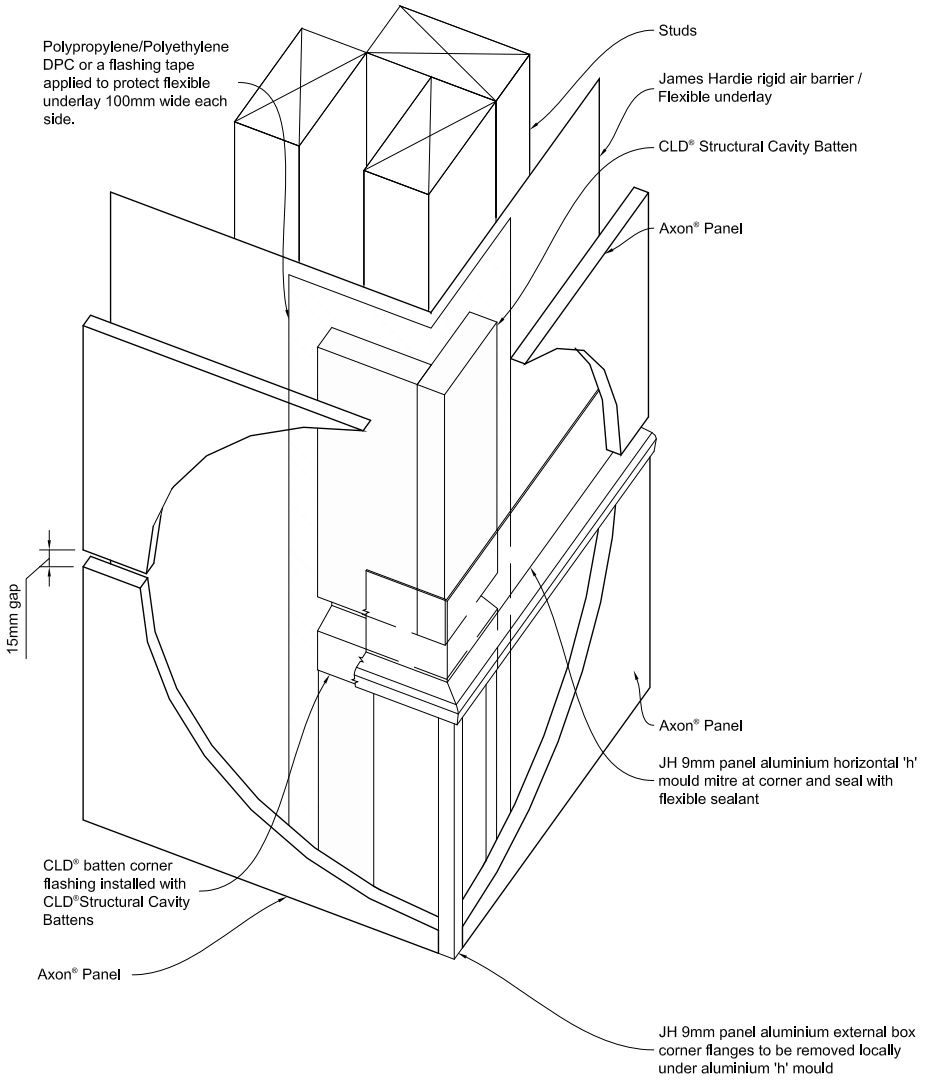

Figure 34: Cavity pipe penetration

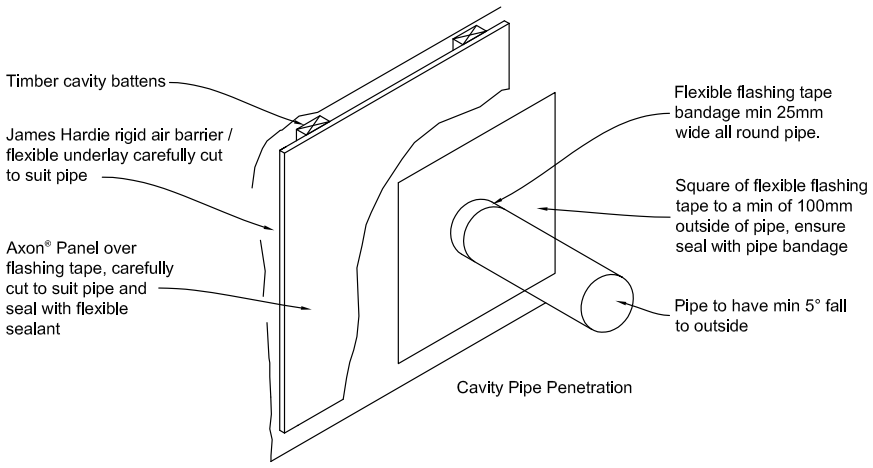

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Figure 35: Internal corner at 'h' mould joint detail

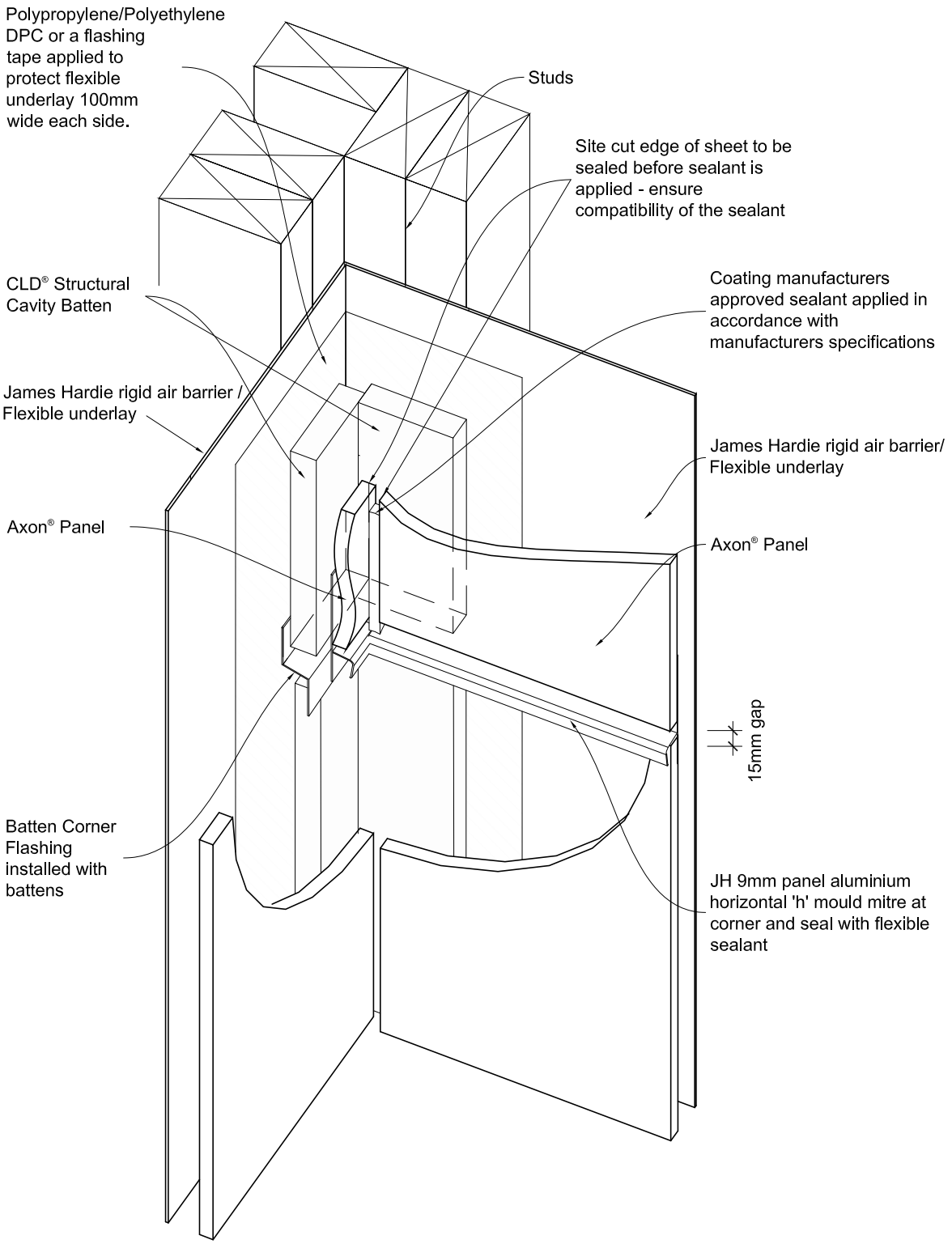

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Figure 36: Aluminium ‘h’ mould joiner

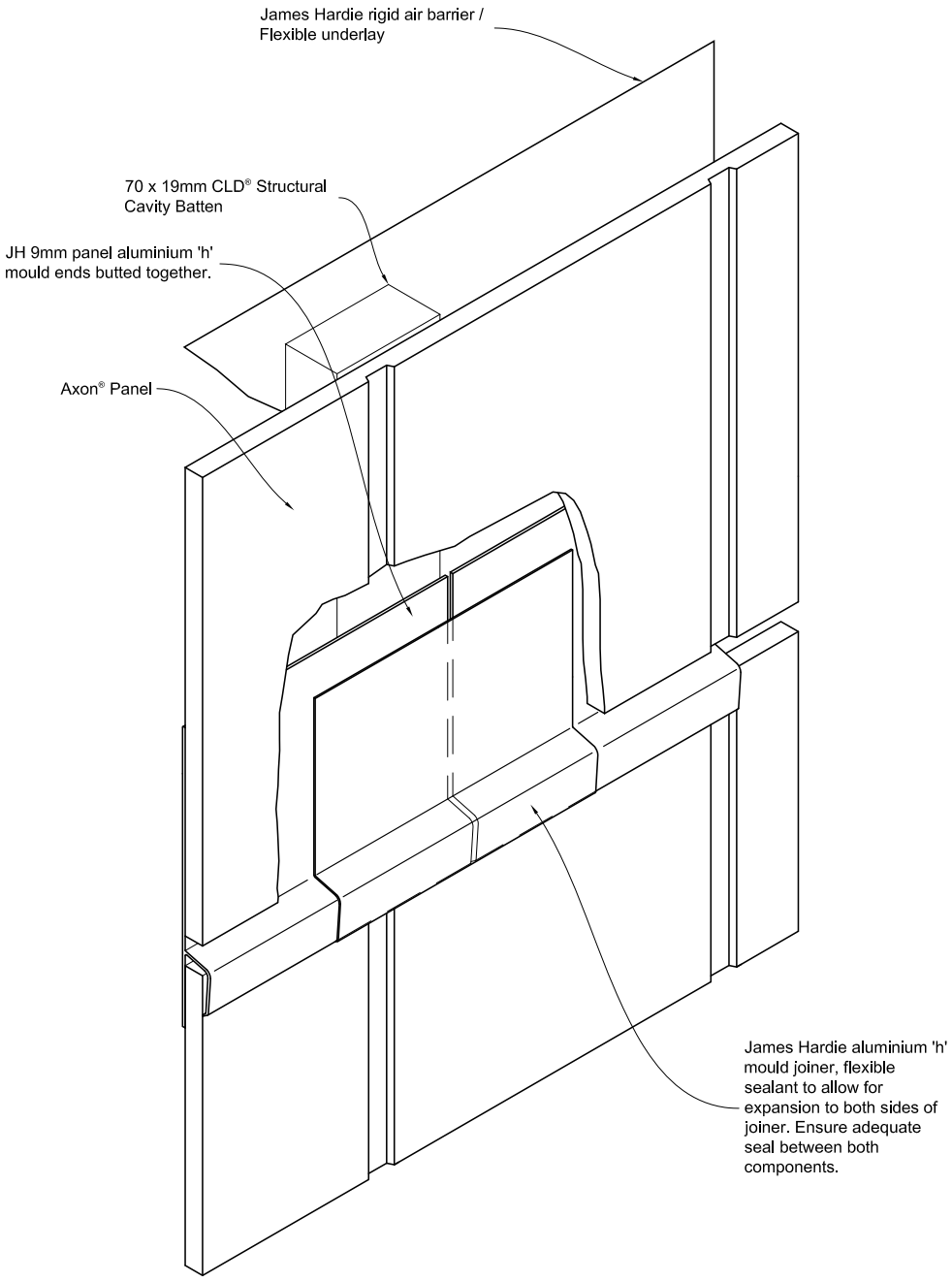

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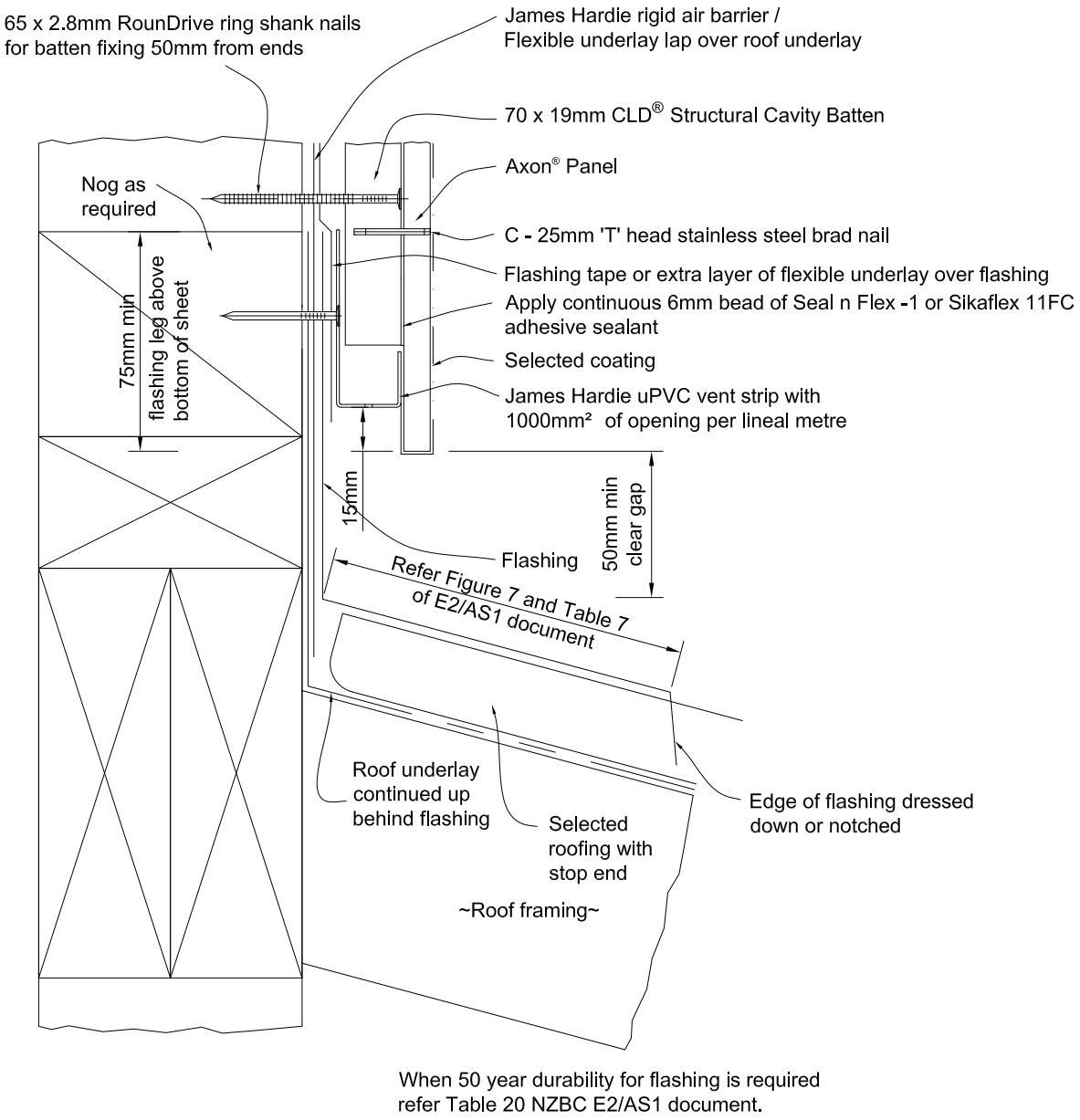
Figure 37: One piece apron flashing joint



When 50 year durability for flashing is required
refer Table 20 NZBC E2/AS1 document.

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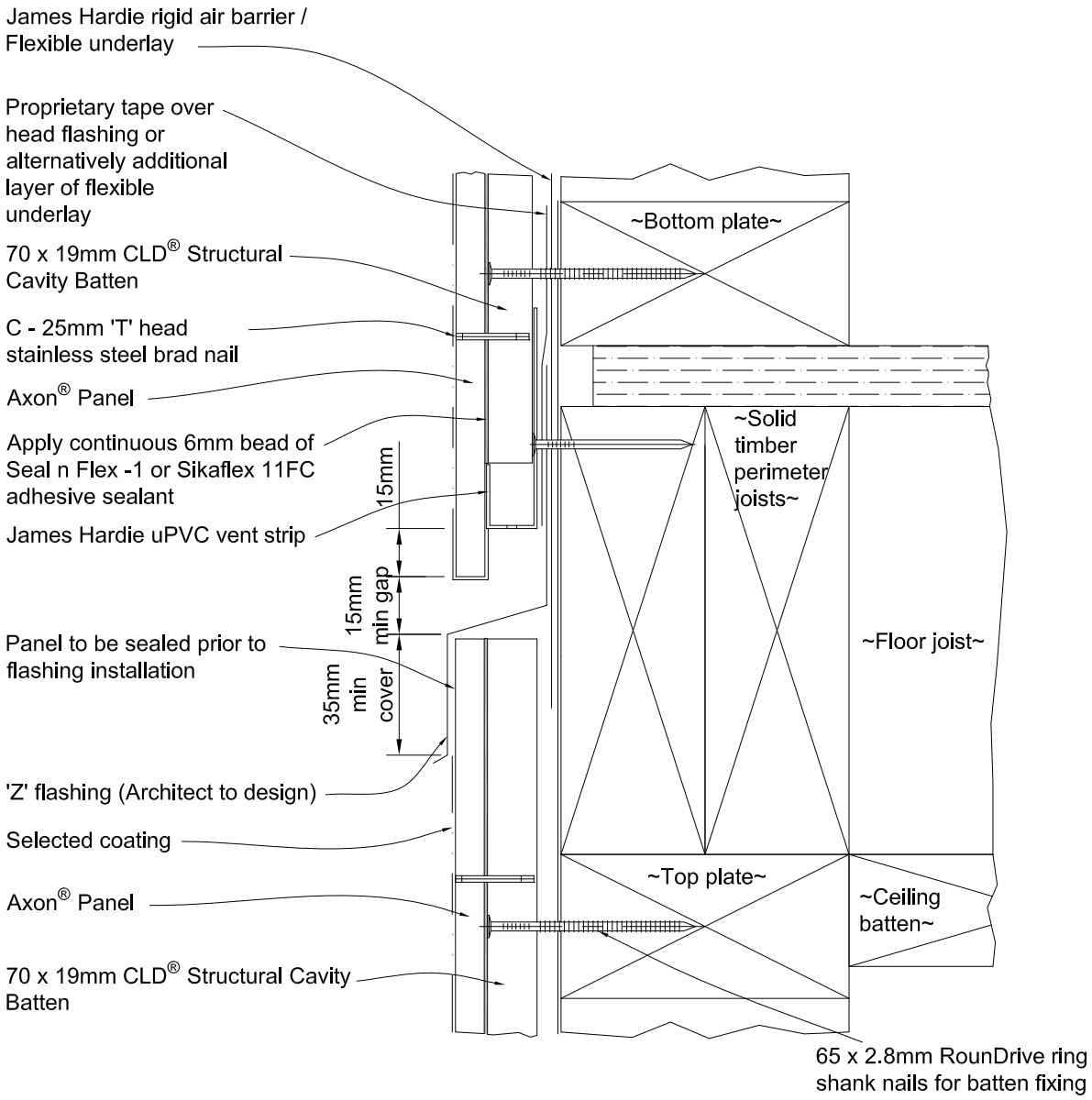
Figure 38: Drained flashing joint at floor joist



Step 1

- Check Architect's plans for the type of flashing to be used.

Step 2

- Check fixing centres and edge distances.
- If top fixings are to be hidden by the Z flashing they will need to be fixed and sealed before the Z flashing is installed.
- Cut edges need to be primed with sealer.

Step 3

- When 50 year durability is required refer Table 20 E2/AS1.

Step 4

- The flashing to be placed in the centre of the floor joists. Do not fix CLD® Structural Cavity Battens or panels into floor joists.

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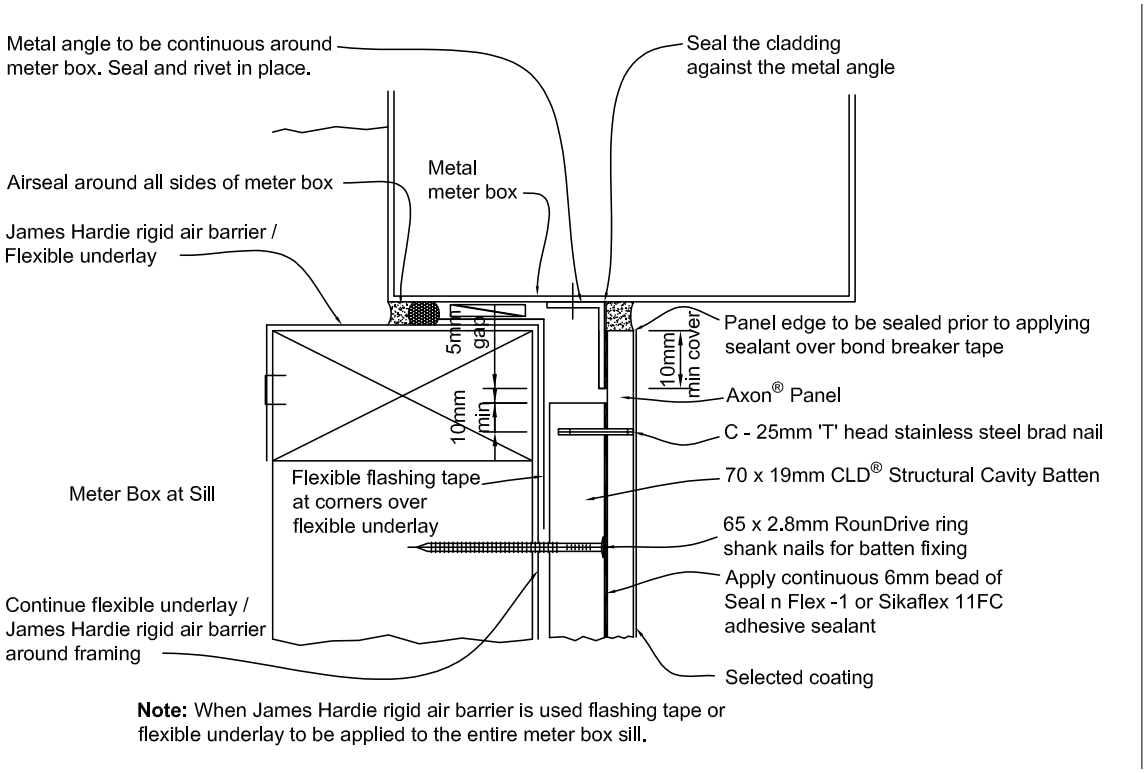
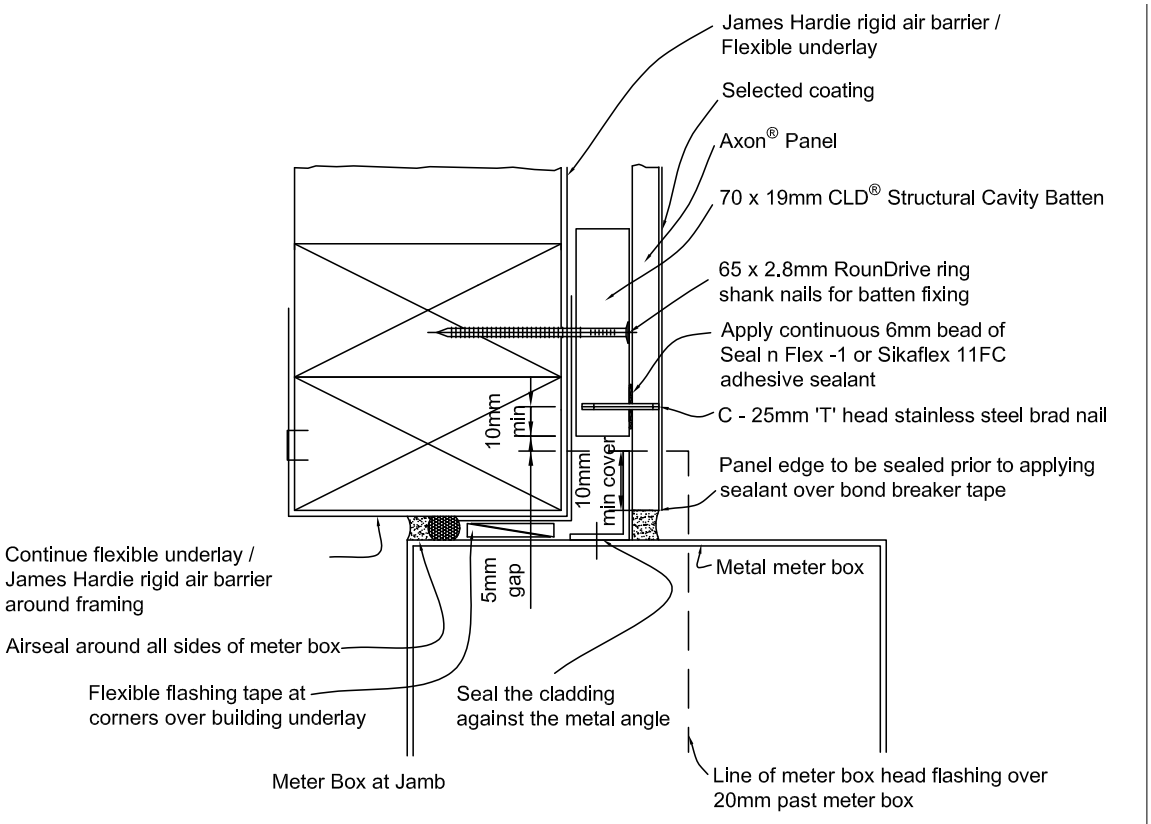
Figure 39: Meter box at sill



Note: When James Hardie rigid air barrier is used flashing tape or flexible underlay to be applied to the entire meter box sill.

Figure 40: Meter box at jamb



Note: When James Hardie rigid air barrier is used flashing tape or flexible underlay to be applied to the entire meter box jamb.

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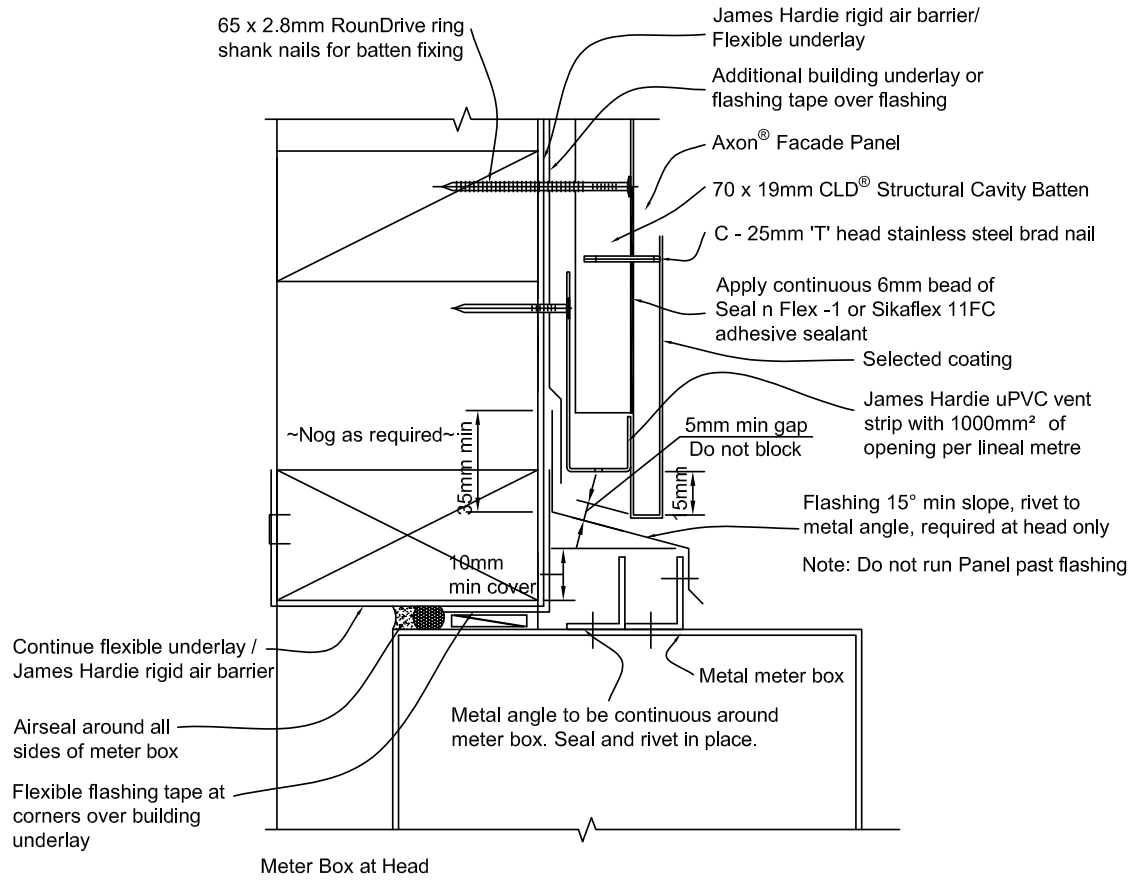
Figure 41: Meter box at head



Meter Box at Head

Note: When James Hardie rigid air barrier is used flashing tape or flexible underlay to be applied to the entire meter box head.

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Figure 42: Garage door jamb

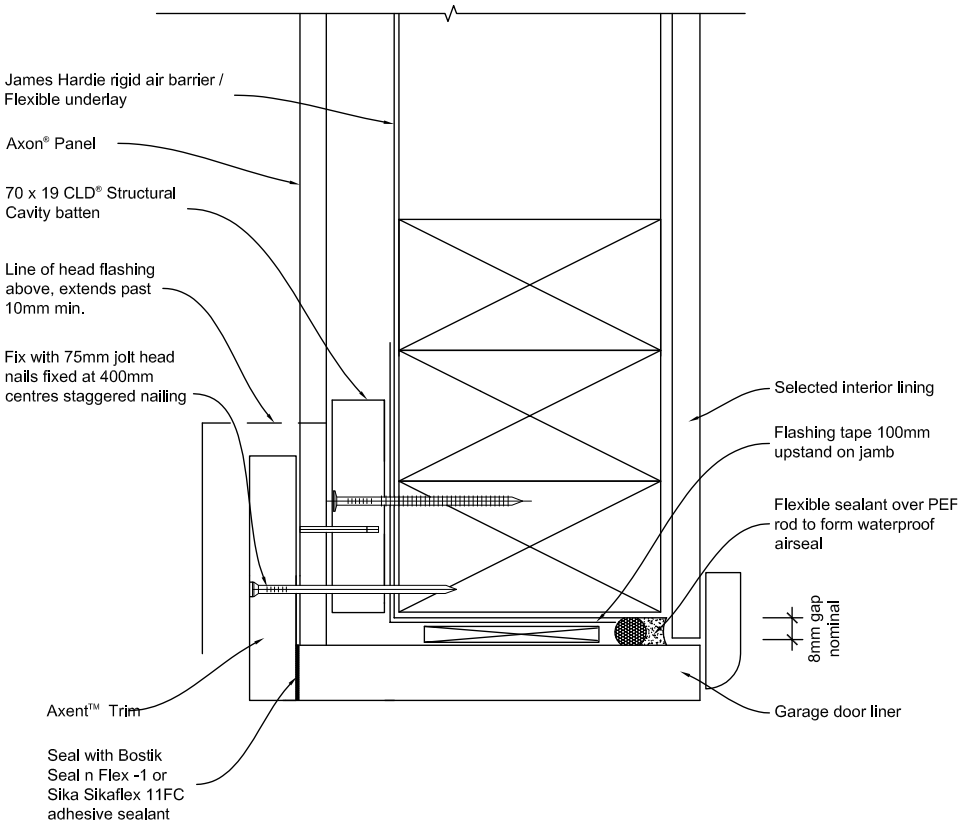
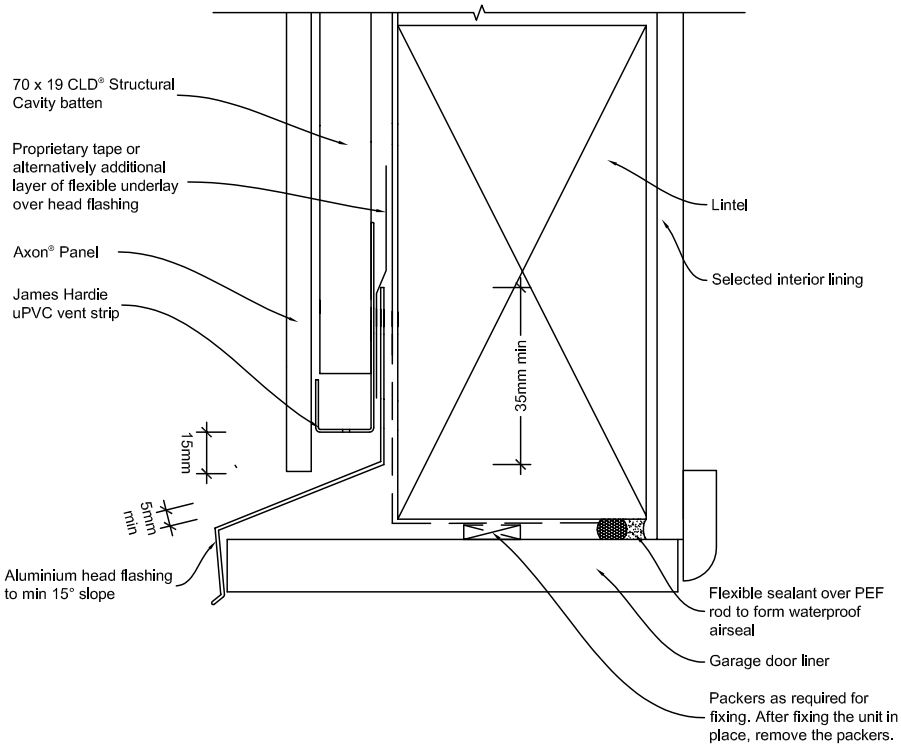


Figure 43: Garage door head



Sealant must be applied between head flashing and door liner in VH and EH wind zones and SED wind pressures.

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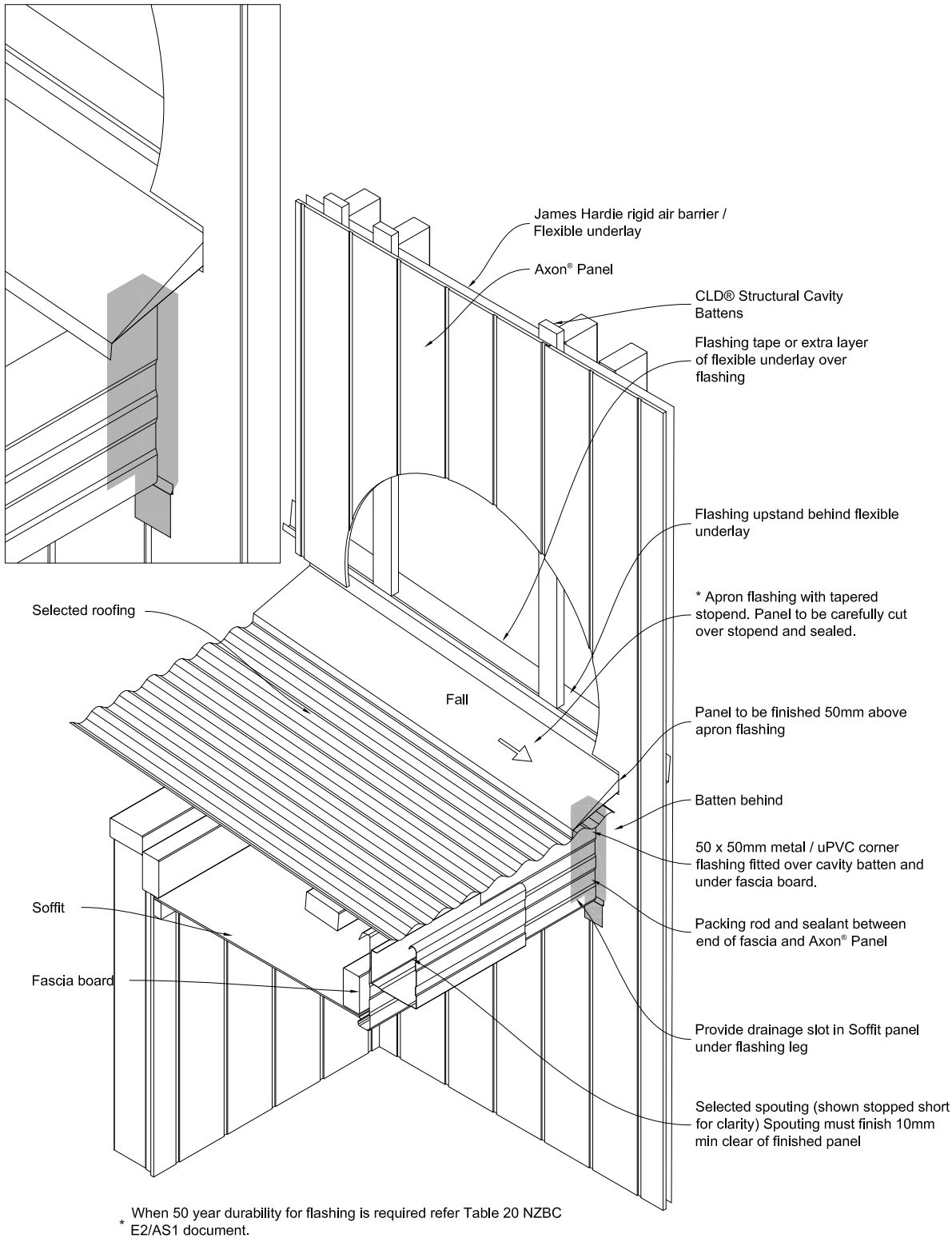
Figure 44: Junction between Axon Panel and fascia board



* When 50 year durability for flashing is required refer Table 20 NZBC E2/AS1 document.

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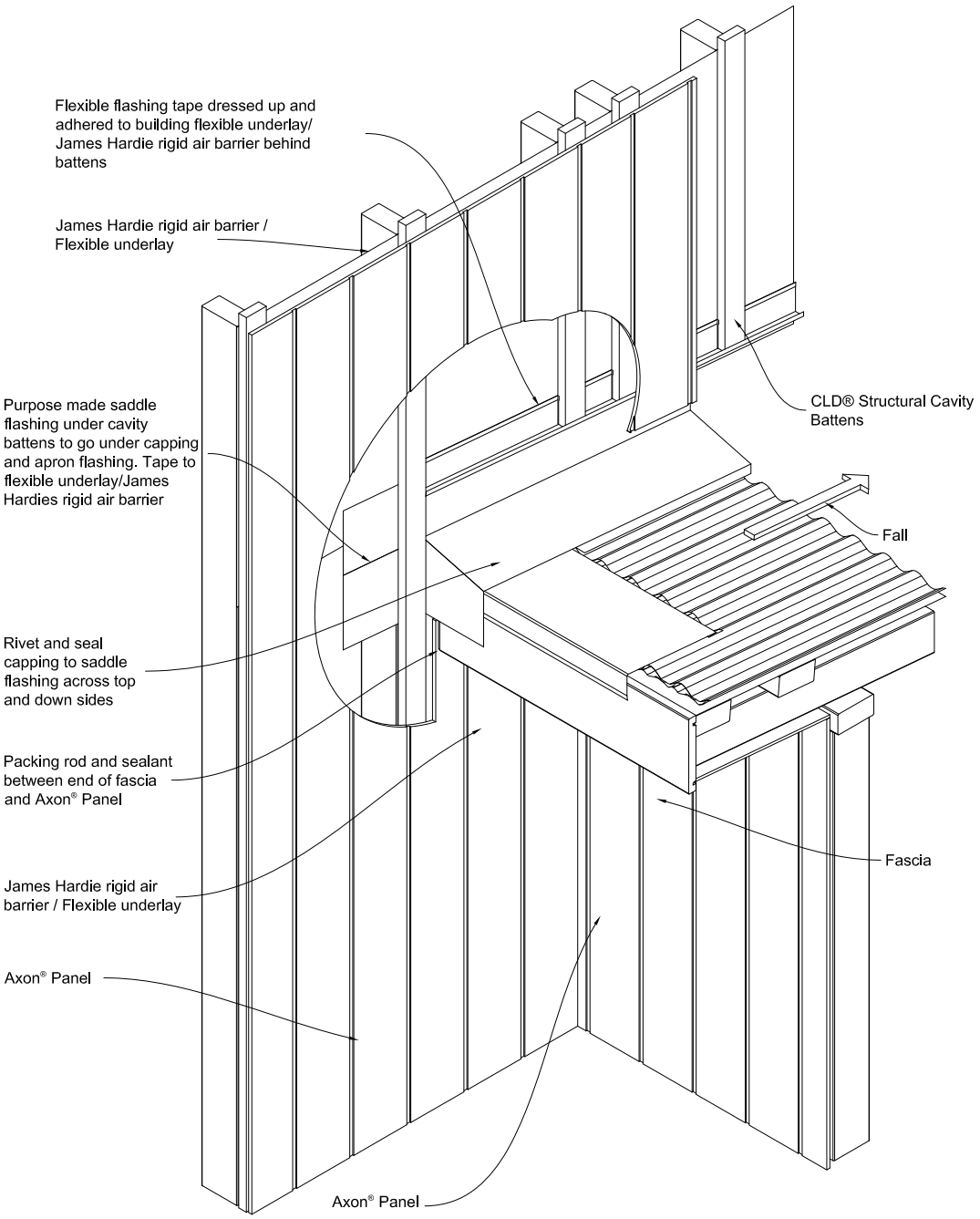
Figure 45: Enclosed roof to wall intersection



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Notes

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Product Warranty

James Hardie New Zealand Limited ("James Hardie") warrants for a period of 15 years from the date of purchase that the Axon™ Panel and CLD™ Structural Cavity Battens (the "Product"), will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, fire and damage from termite attacks to the extent set out in James Hardie's relevant published literature current at the time of installation. James Hardie warrants for a period of 15 years from the date of purchase that the accessories supplied by James Hardie will be free from defects due to defective factory workmanship or materials.

Nothing in this document shall exclude or modify any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law.

CONDITIONS OF WARRANTY:

The warranty is strictly subject to the following conditions:

a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation.

b) This warranty is not transferable.

c) The Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice.

d) The project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code ("NZBC"), regulations and standards.

e) The claimant's sole remedy for breach of warranty is (at James Hardie's option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product.

f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces).

g) All warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law.

h) If meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

Disclaimer: The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) above. James Hardie has tested/assessed the performance of the Axon™ Panel when installed in accordance with the Axon™ Panel technical specification, in accordance with the standards and verification methods required by the NZBC and those test results demonstrate the product complies with the performance criteria established by the NZBC. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design) James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards, as it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.

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James Hardie

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BRANZ Appraised
Appraisal No. 238 [2018]

PINK® BATTS® INSULATION

Appraisal No. 238 (2018)

This Appraisal replaces BRANZ Appraisal No. 238 (2012).

Amended 26 November 2018.

BRANZ Appraisals

Technical Assessments of products for building and construction.

Tasman Insulation New Zealand Ltd
PO Box 12 069
Penrose
Auckland
Tel: 09 579 2139
Fax: 09 571 3482
Freephone: 0800 746 522
Web: www.pinkbatts.co.nz

BRANZ
1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz

Product

1.1 Pink® Batts® Insulation is a range of resin bonded fibrous glasswool thermal insulating material for use in walls, ceilings and roofs of buildings. Pink® Batts® Insulation is pre-cut to suit a range of framing spacings.

Scope

2.1 Pink® Batts® Insulation has been appraised as a thermal insulation material for framed or part-framed walls, ceilings and roofs of domestic and commercial buildings.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Pink® Batts® Insulation, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years and B2.3.1 (b) 15 years. Pink® Batts® Insulation meets these requirements. See Paragraph 8.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.1. Pink® Batts® Insulation will contribute to meeting this requirement. See Paragraphs 13.1 and 13.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Pink® Batts® Insulation meets this requirement and will not present a health hazard to people.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 (a) and H1.3.2 E. Pink® Batts® Insulation will contribute to meeting these requirements. See Paragraphs 14.1 and 14.2.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Technical Specification

4.1 Pink® Batts® Insulation is a resin bonded fibrous glasswool insulation manufactured from recycled and/or virgin glass and cured urea extended phenolic resin.

4.2 Pink® Batts® Insulation is manufactured in a range of sizes to suit framing centres and cavity depths. Building Insulation Blanket (BIB) is supplied in rolls for commercial applications. Pink® Batts® Insulation is available as set out in Table 1.

Table 1: Pink® Batts® Insulation product table.

R-value	Length (mm)	Width (mm)	Nominal Thickness (mm)	Nominal Total Area (m^2)	Density (kg/m^3)
Roof - Thermal Insulation					
1.8[1]	1220	432	95	13.7	8.3
2.2[1]	1220	432	115	12.6	8.2
2.6[1]	1220	432	140	10.5	7.7
3.2[1]	1220	432	170	8.4	8.4
3.2[1]	1220	432	170	8.4	6.9
3.6[1]	1220	432	180	7.4	7.4
3.6	1220	432	180	7.4	8.8
4.0[1]	1220	432	195	6.3	8.1
5.0[1]	1220	432	220	4.2	10.0
6.0[1]	1220	432	235	3.7	13.0
6.3[1]	1220	432	250	3.2	12.3
7.0[1]	1220	432	260	2.6	15.8
Roof - Building Insulation Blanket					
1.2	12,000	1200	50	28.8	12.0
1.8	8000	1200	75	19.2	12.0
2.2	8000	1200	100	19.2	9.1
2.4	8000	1200	100	19.2	11.5
2.6	6000	1200	110	14.4	11.0
3.2	8000	1200	135	9.6	10.9
Roof - Pink® Batts® Retrofit Insulation					
2.9[1]	1220	432	150	9.5	7.7
3.3[1]	1220	432	175	8.4	7.1
Wall - Masonry Insulation					
1.0[1]	1220	580	40	21.2	14.0
1.2	1220	580	50	17.0	12.8
70 mm Wall Range - Thermal Insulation					
2.2	1140	560	70	6.4	30.0
90 mm Wall Range - Thermal Insulation					
1.8[1]	1140	560	90	16.6	9.0
2.2[1]	1140	560	90	13.4	11.6
2.4[1]	1140	560	90	10.2	14.7
2.4[1]	1140	560	90	10.2	17.4
2.6[1]	1140	560	90	9.6	19.4
2.8[1]	1140	560	90	6.4	27.1

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Table 1: Pink® Batts® Insulation product table cont.

R-value	Length (mm)	Width (mm)	Nominal Thickness (mm)	Nett Area (m²)	Density (kg/m³)
90 mm Narrow Wall Range - Thermal Insulation					
2.2[1]	1140	360	90	9.0	11.8
2.6[1]	1140	360	90	7.4	19.4
2.8[1]	1140	360	90	4.5	27.1
90 mm Steel Wall Range - Thermal Insulation					
2.2[1]	1220	610	90	15.6	11.8
2.6[1]	1220	610	90	9.7	19.4
140 mm Wall Range - Thermal Insulation					
3.2[1]	1140	560	140	9.6	9.6
3.6[1]	1140	560	140	7.0	14.0
4.0[1]	1140	560	140	5.1	19.5
140 mm Narrow Wall Range - Thermal Insulation					
3.2[1]	1140	360	140	7.0	9.6
4.0[1]	1140	360	140	4.1	19.5

[1] Pink® Batts® Insulation products that have the Environmental Choice license.

4.3 Pink® Batts® Insulation is pink in colour and is baled in polythene bags with labelling in compliance with AS/NZS 4859.1.

4.4 Pink® Batts® Retrofit Ceiling Insulation is pink in colour and is baled in teal polythene bags with labelling in compliance with AS/NZS 4859.1.

4.5 Accessories used with Pink® Batts® Insulation, which are supplied by the insulation installer, are wire netting, plastic strapping and fixings.

Handling and Storage

5.1 Pink® Batts® Insulation must be stored under cover and in dry conditions. Heavy objects must not be stacked on the bales. The bales must be stored in an orientation that avoids excessive compression of the product.

5.2 In general, insulation products are sensitive to the length of time they are stored under compression packaging. Product that does not recover to its nominal thickness may not achieve the stated R-value.

Technical Literature

6.1 Refer to the Appraisal listing on the BRANZ website for details of the current Technical Literature for Pink® Batts® Insulation. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 Pink® Batts® Insulation is intended for use as thermal insulation to meet the requirements of the NZBC. Pink® Batts® Insulation can be used to meet the minimum schedule method R-values of NZBC Verification Method H1/VM1 or NZBC Acceptable Solution H1/AS1. Greater construction R-values can be achieved where specific design is used. For construction R-values refer to the BRANZ House Insulation Guide. Product R-values and dimensions are given in Table 1.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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7.2 Pink® Batts® Insulation thermal resistance (R-value) has been determined by testing to AS/NZS 4859.1, which is an acceptable method in NZBC Acceptable Solution H1/AS1.

7.3 Pink® Batts® Insulation is designed to be friction-fitted between wall, ceiling or roof framing. They can also be laid directly on a ceiling lining, over ceiling battens or joists/truss chords. In other horizontal situations, the insulation must be adequately supported by galvanised wire netting or some other suitable durable material.

7.4 Where the insulation is installed in exterior walls, the insulation material nominal thickness must be selected to provide a snug close fit which touches all sides of the insulation cavity between the wall underlay and the interior wall lining.

7.5 Where the insulation is retrofitted in external walls without a wall underlay, and with direct-fixed claddings, the insulation must be at least 20 mm thinner than the framing to allow a gap of at least 20 mm between the insulation and the wall cladding. Horizontal straps must be stapled into the sides of the wall studs at 300 mm centres maximum as support before the insulation is installed. Refer also to NZS 4246, Section 5.4.2.

7.6 When the insulation is installed in a wall with a drained cavity, it is recommended that specific wall products with a controlled nominal thickness be used. Where the stud spacings are greater than 450 mm, an intermediate means of restraining the insulation from bulging into the cavity must be installed in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

7.7 Building Insulation Blanket is designed specifically for commercial roof and commercial wall applications. In residential applications, installation must be completed in line with NZS 4246.

7.8 To prevent moisture transfer and to provide roof ventilation, a separation of 25 mm minimum is required between the insulation and any rigid substrate or flexible roof underlay. Selecting specifically designed skillion roof insulation products with a controlled nominal thickness can assist with this requirement.

7.9 The building envelope must be constructed to ensure the insulation remains dry during installation and throughout the life of the building.

7.10 The clearance requirements for heating appliances and downlights must be met and reference made to the manufacturer's instructions and NZS 4246. See Paragraphs 10.1 - 10.3.

Durability

Serviceable Life

8.1 Where the building is maintained so that provisions of NZBC Clauses E2 and E3 are met, and where the insulation is not crushed or exposed to conditions that will diminish its thermal performance (e.g. moisture), Pink® Batts® Insulation can be expected to have a serviceable life of at least 50 years.

Maintenance

9.1 Insulation that has become damp must be removed and the cause of dampness repaired. Cavities must be clean and dry before fitting new insulation of an equivalent thermal rating. NZS 4246 gives guidance on thermal insulation maintenance due to water damage.

Prevention of Fire Occurring

10.1 Pink® Batts® Insulation is considered a non-combustible material and need not to be separated from heat sources such as fire places, heating appliances, flues and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated from fireplaces, heating appliances, flues and chimneys in accordance with the requirements of Part 7 of NZBC Acceptable Solutions C/AS1 to C/AS6 and NZBC Verification Method C/VM1.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Downlights

10.2 Recessed luminaires shall be of type and be installed in accordance with NZBC Acceptable Solution C/AS1 to C/AS6, Section 7.4.

10.3 Insulation materials must maintain a clearance of 100 mm to undefined recessed luminaires in existing buildings.

Control of Internal Fire and Smoke Spread

11.1 Pink® Batts® Insulation has been classified non-combustible when tested to AS 1530.1 and can therefore be assigned a Group Number of 1-S. Unless foamed plastics building materials are also used as part of the wall or ceiling construction, there are no internal surface finish requirements in Risk Group SH in accordance with NZBC Acceptable Solution C/AS1, Paragraph 4.2. When used in an occupied space, Pink® Batts® Insulation does not need to be enclosed in any Risk Group. Refer to NZBC Acceptable Solutions C/AS2 to C/AS6 for the specific internal surface requirements for walls or ceilings in other Risk Groups.

External Moisture

12.1 The total building envelope must be weathertight and comply with the requirements of NZBC Clause E2 to ensure that the insulation remains dry in use.

12.2 The moisture content of the construction materials at the time of installing and enclosing the insulation must meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 10.2 (a), or a lower moisture content if required by the lining manufacturer.

Internal Moisture

13.1 Buildings must provide an adequate combination of thermal resistance, ventilation and space temperature to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate. This does not apply to Communal Non-residential, Commercial, Industrial, Outbuildings or Ancillary buildings.

13.2 Roofs and walls of housing complying with the Schedule Method for Compliance with Clause H1.3.2 E will have adequate thermal resistance. Other buildings may require more thermal insulation to satisfy the requirements of NZBC Acceptable Solution E3/AS1 than that to satisfy the energy efficiency provisions alone.

Energy Efficiency

14.1 Pink® Batts® Insulation will contribute to meeting the requirements of NZBC Clause H1, Performance H1.3.1 (a) and H1.3.2 E by compliance with NZBC Verification Method H1/VM1 or NZBC Acceptable Solution H1/AS1. Refer to Paragraphs 7.1 - 7.8.

14.2 Pink® Batts® Insulation R-values have been determined by BRANZ testing to AS/NZS 4859.1 and are given in Table 1.

Installation Information

Installation Skill Level Requirements

15.1 Installation of Pink® Batts® Insulation must be completed by an installer with an understanding of insulation installation.

General

16.1 Installation of Pink® Batts® Insulation must be in accordance with the Technical Literature, Installation Instructions and this Appraisal. NZS 4246 should be used as a guide for installing insulation in residential buildings.

16.2 The product must be installed only when the building is enclosed and when the construction materials have achieved the required maximum moisture content or less.

16.3 Pink® Batts® Insulation must be released from the packaging and allowed to re-loft prior to installation. The time to loft will depend upon the length of time the product has been packaged and stored.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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BRANZ Appraised
Appraisal No. 238 [2018]

16.4 Pink® Batts® Insulation is supplied in segment and blanket form (see Table 1) to suit framing layouts. The product is able to be cut to suit wall cavities and when fitted between roof or ceiling framing. The insulation must be neatly friction-fitted between framing members so that the potential for gaps and convective heat loss is reduced. In wall cavities the insulation must be neatly friction-fitted between framing members to prevent sagging. In ceiling or roofs, the insulation may be fitted between framing members or fitted over framing members and butted tightly. The insulation must extend to the external wall top plate. The insulation must not be folded or compressed. A close even fit provides the most efficient thermal performance. Whenever possible, the insulation should be fitted beneath wiring or plumbing.

16.5 The clearance requirements for heating appliances and downlights must be followed. Refer also to NZS 4246.

Inspections

16.6 The Technical Literature, this Appraisal and NZS 4246 must be referred to during the inspection of Pink® Batts® Insulation installations.

Health and Safety

17.1 Refer to the Technical Literature and NZS 4246 for guidance on health and safety requirements such as personal protective clothing and installation hazard assessment.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

18.1 BRANZ has carried out thermal resistance testing of Pink® Batts® Insulation in accordance with AS/NZS 4859.1.

18.2 Tests have been carried out in accordance with AS 1530.1. Pink® Batts® Insulation is not deemed combustible according to the test criteria. The results have been reviewed by BRANZ technical experts.

Other Investigations

19.1 An assessment of the durability of Pink® Batts® Insulation has been made by BRANZ technical experts.

19.2 The manufacturer's Technical Literature including installation instructions have been reviewed by BRANZ and found to be satisfactory.

Quality

20.1 The manufacture of Pink® Batts® Insulation has been examined by BRANZ, including methods adopted for quality control. Details of the manufacturing processes, and quality and composition of the raw materials used were obtained and found to be satisfactory.

20.2 The range of Pink® Batts® Insulation products have been assessed for their environmental impact by the New Zealand Ecolabelling Trust and comply with the requirements of the Environmental Choice Specification, Licence No. 2504017 - Thermal (resistive type) Building Insulants. The products that have the Environmental Choice license are noted in Table 1.

20.3 Tasman Insulation New Zealand Ltd is responsible for the quality of the product supplied.

20.4 Quality of installation of the product on site is the responsibility of the installer.

20.5 Quality of maintenance of the building to ensure the insulation material remains dry is the responsibility of the building owner.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Sources of Information

- AS 1530.1: 1994 Combustibility test for materials.
- AS/NZS 4859.1: 2002 Materials for the thermal insulation of buildings.
- NZS 4246: 2016 Energy efficiency - Installing bulk thermal insulation in residential buildings.
- BRANZ Bulletin Number 525 Preventing moisture problems in timber-framed skillion roofs.
- BRANZ House Insulation Guide, Fifth Edition 2014.
- Acceptable Solution and Verification Methods for New Zealand Building Code Energy Efficiency Clause H1, Ministry of Business, Innovation and Employment, Fourth Edition, (including Amendment 3, 1 January 2017).
- Ministry of Business, Innovation and Employment record of Amendments - Acceptable Solutions, Verification Methods and Handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 05 September 2018.

This Appraisal has been amended to include the use of Pink® Batts® Insulation when retrofitting external walls without wall underlay with direct-fixed claddings.

Amendment No. 2, dated 26 November 2018.

This Appraisal has been amended to update Table 1 to include the Roof - Building Insulation Blanket product range.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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In the opinion of BRANZ, Pink® Batts® Insulation is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Tasman Insulation New Zealand Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Tasman Insulation New Zealand Ltd:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Tasman Insulation New Zealand Ltd.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Tasman Insulation New Zealand Ltd or any third party.

For BRANZ

Chelydra Percy
Chief Executive
Date of Issue:
03 August 2018

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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INSTALLATION INSTRUCTIONS

Wall

PINK® BATTS® WALL INSULATION

Installation Instructions

Correct installation with no compression, gaps or folds is critical to ensure Pink® Batts® wall insulation performance is not compromised.

Safety:

Each installation is unique, so prior to installation check for all hazards that may cause injury:

- Carry out any required repair work before starting installation
- Ensure there's adequate lighting to identify any hazards
- Treat all electrical cables as live, being careful not to cut or expose cables and wires
- Beware of other sharp objects (protruding nails, splinters etc.), pests (bees and wasps), loose boards and pipe work

Note: Seek professional advice if you are unsure how best to isolate the hazard or have a professional installer carry out the work on your behalf.

We recommend PinkFit® professional installers. PinkFit® are a nationwide network of professional installers who guarantee that their completed installation will meet the requirements of NZS 4246:2016.

For your local PinkFit® installer call **0800 746 534** or visit **pinkbatts.co.nz/installing-pink-batts/**

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Wall | PINK® BATTS® WALL INSULATION

Installation:

Any slight irritation to exposed skin caused by the fibres in glass wool, or through their inhalation, is harmless and temporary.

However for your comfort while installing, it's recommended you wear:

- Loose fitting work clothes which cover the arms and legs
- Covered shoes
- Dust mask
- Safety glasses

For safety while installing, it's recommended you use:

- Cut resistant gloves (if knife is used)

For an efficient installation, the following tools are recommended:

- Stable working platform
- Knife
- Tape measure

To ensure Pink® Batts® wall insulation performance isn't compromised, use only wall products for installing in wall applications.

- Ensure the product and all cavities are dry
- If cutting is required, cut oversize by 5 mm to ensure a good friction fit
- Ensure there are no gaps, folds or compression of the product to achieve optimal performance
- Fill gaps around windows and doors with off-cuts
- Follow the manufacturer's instructions for minimum clearances from hot inbuilt appliances. If they are unknown, refer to NZS 4246:2016
- Do not cover vents. Insulate around vents to allow unhindered ventilation
- Fit Pink® Batts® insulation tight and close around electrical cables and pipes. It's important to minimise compression, gaps and folds in the insulation. For electrical cables and small diameter pipes, partially cut insulation and place around the cables and pipes
- In new construction, it is recommended that Pink® Batts® insulation is installed once the cladding system is completely installed.

Retrofitting insulation in external walls without wall underlay/or in poor condition

a) Direct Fixed Cladding

- Use insulation that is at least 20mm thinner than the framing width - if the frame is 90mm we recommend to use **Pink® Batts® Classic R2.2 70mm** OR
- Fit inserts of Bitumac® 720 wall underlay.

b) Drained Cavity

- The insulation can be the same thickness as the frame. The use of horizontal strapping is recommended , OR
- Fit inserts of Bitumac® 720 wall underlay.

Unlined Walls in Roof Cavities

- **Pink® Batts® Wall** or **Pink® Batts® HandyPack insulation** should be secured in place by using horizontal strapping (max spacing of 300mm)

Pink® Batts® Masonry Wall Insulation

- It is recommended that an absorbent building paper or a waterproof membrane is placed between the insulation and the concrete. This is not intended to replace the DPC which must still be fixed between strapping and masonry.

CAUTION: Electrical cables and equipment installed prior 1989 may overheat and fail when partially or completely covered with bulk thermal insulation

Tip: To verify Building Code Compliance, staple a product label and installer information at an easy to find location away from any hot items such as downlights or water cylinders. An alternative is to supply the information to the building owner or authorised person.

Refer to NZS 4246:2016 for further information related to the correct installation of insulation and clearances.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

Wall | PINK® BATTS® WALL INSULATION

Product Specifications

WALL - Thermal Insulation	PRODUCT CODE	SIZE (mm)	NOMINAL STABILISED THICKNESS (mm)	NOMINAL TOTAL AREA PER BALE (m^2)	APPROX. COVERAGE PER BALE* (m^2)	ENVIRONMENTAL CHOICE
Masonry						
R1.0 Pink® Batts® Masonry R1.0	7160110	1220 x 580	40	21.2	-	✓
R1.2 Pink® Batts® Masonry R1.2	7160134	1220 x 580	50	17.0	-	
70mm Wall Range						
R2.2 Pink® Batts® Classic R2.2 70mm Wall	7160248	1140 x 560	70	6.4	7.5	
90mm Wall Range						
R1.8 Pink® Batts® Classic R1.8 Wall	7127118	1140 x 560	90	16.6	19.6	✓
R2.2 Pink® Batts® Classic R2.2 Wall	7127122	1140 x 560	90	13.4	15.8	✓
R2.2 Pink® Batts® Steel R2.2 Wall	7160214	1220 x 610	90	15.6	15.6	✓
R2.2 Pink® Batts® R2.2 Narrow Wall	7160243	1140 x 360	90	9.0	11.2	✓
R2.4 Pink® Batts® Classic R2.4 Wall	7127124	1140 x 560	90	10.2	12.1	✓
R2.6 Pink® Batts® Ultra® R2.6 Wall	7127126	1140 x 560	90	9.6	11.3	✓
R2.6 Pink® Batts® Ultra® Steel R2.6 Wall	7160215	1220 x 610	90	9.7	9.7	✓
R2.6 Pink® Batts® Ultra® R2.6 Narrow Wall	7160244	1140 x 360	90	7.4	9.2	✓
R2.8 Pink® Batts® Ultra® R2.8 Wall	7127128	1140 x 560	90	6.4	7.5	✓
R2.8 Pink® Batts® Ultra® R2.8 Narrow Wall	7160247	1140 x 360	90	4.5	5.6	✓
140mm Wall Range						
R3.2 Pink® Batts® Ultra® R3.2 140mm Wall	7127132	1140 x 560	140	9.6	11.3	✓
R3.2 Pink® Batts® Ultra® R3.2 140mm Narrow Wall	7160245	1140 x 360	140	7.0	8.6	✓
R3.6 Pink® Batts® Ultra® R3.6 140mm Wall	7127136	1140 x 560	140	7.0	8.3	✓
R4.0 Pink® Batts® Ultra® R4.0 140mm Wall	7127140	1140 x 560	140	5.1	6.0	✓
R4.0 Pink® Batts® Ultra® R4.0 140mm Narrow Wall	7160246	1140 x 360	140	4.1	5.0	✓
ROOF and WALL - Thermal Insulation						
R2.4 Pink® Batts® HandyPack R2.4^	7200158	7000 x 580	90	4.06	-	

* Coverage relates to standard structures (ie with framing allowance) therefore actual coverage may vary.
\# For full details of the Pink® Batts® Lifetime Warranty visit pinkbatts.co.nz/lifetime-warranty.
^ Product does not have the Pink® Batts® Lifetime Warranty or BRANZ Appraised Accreditation.

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Wall | PINK® BATTS® WALL INSULATION

Storage and Maintenance

Pink® Batts® insulation should be protected from damage and weather. Store under cover in clean, dry conditions. The installed product should remain dry at all times. If the product becomes wet or damp, the source of dampness (e.g. leak in building) should be repaired and any wet or damp insulation should be removed and replaced with new insulation of an equivalent R-value.

Disposal of bags

Recyclable LLDPE bags are used for packaging of Pink® Batts® insulation.

For further details download the relevant product data sheet from pinkbatts.co.nz

Accreditations/Appraisals/Certifications

BRANZ Appraised
Appraisal No. 238 [2012]

Licence No 2504017.
Thermal Building Insulants

Tasman Insulation New Zealand Ltd
Certified QMS
Telarc. Registered
Quality ISO 9001

GREENGUARD

pink batts Lifetime WARRANTY

TASMAN INSULATION NEW ZEALAND

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New Zealand

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INSTALLATION INSTRUCTIONS

Roof | PINK® BATTS® CEILING INSULATION

Installation Instructions

Correct installation with no compression, gaps or folds is critical to ensure Pink® Batts® ceiling insulation performance is not compromised.

Safety:

Each installation is unique so prior to installation check for all hazards that may cause injury:

- Carry out any required repair work before starting installation
- Ensure there's adequate lighting to identify any hazards
- Treat all electrical cables as live, being careful not to cut or expose cables and wires
- Beware of other sharp objects (protruding nails, splinters etc.), pests (bees and wasps), loose boards and pipe work
- Avoid installing during the warmest part of the day. The roof cavity temperature can increase to uncomfortable levels
- Do not stand on ceiling or ceiling battens

Note: Seek professional advice if you are unsure how best to isolate the hazard or have a professional installer carry out the work on your behalf.

We recommend PinkFit® professional installers. PinkFit® are a nationwide network of professional installers who guarantee that their completed installation will meet the requirements of NZS 4246:2016.

Call **0800 746 534** for your local PinkFit® installer

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

Roof | PINK® BATTS® CEILING INSULATION

Installation:

Any slight irritation to exposed skin caused by the fibres in glass wool, or through their inhalation, is harmless and temporary.

However for your comfort while installing, it's recommended you wear:

- Loose fitting work clothes which cover the arms and legs
- Covered shoes
- Dust mask
- Safety glasses

For safety while installing, it's recommended you use:

- Cut resistant gloves (if knife is used)
- Kneepads (for retrofitting)

For an efficient installation, the following tools are recommended:

- Stable working platform (for new build)
- Kneeling board or planks (for retrofitting)
- Knife
- Tape measure
- Install rod for tight spaces
- Head torch (for retrofitting)

For retrofitting, take into consideration:

- Using planks laid across joists to walk and work on
- Leveling and refitting any existing insulation if required with correct clearances
- Removing any damp insulation
- Starting installation at the point furthest away from the ceiling access hole

To ensure Pink® Batts® ceiling insulation performance isn't compromised, confirm the correct product and R-value is used in ceiling applications.

- Ensure the product is installed dry
- Friction fit product between framing, ensuring there are NO gaps, folds or compression of the product to achieve optimal performance
- If cutting is required, cut oversize by 5-10mm to ensure a good friction fit
- Ensure that Pink® Batts® ceiling segments are firmly butted against each other
- For retrofitting, install over timber where insulation already exists or where appropriate. Any open air pockets beside joist/truss cord ends at the roof perimeter to be blocked off with insulation off-cuts
- Fit Pink® Batts® insulation beneath electrical wiring and plumbing work. Minimise tucks
- Install to the outer edge of the top plate covering at least 50% of it while ensuring minimal overflow to the eaves
- Maintain a 25mm gap clearance between the Pink® Batts® insulation and any roofing material. If required, to maintain 25mm clearance, trim insulation or use a thinner product around the perimeter
- Insulate access hole cover and secure in place with strapping or glue
- Remove excess material

Unlined Walls in Roof Cavities

- **Pink® Batts® Wall** or **Pink® Batts® HandyPack insulation** should be secured in place by using horizontal strapping (max spacing of 300mm)

Tip: To verify Building Code Compliance, staple a product label at an easy to find location away from any hot items such as downlights or water cylinders e.g. on truss/rafter above ceiling access hole and hot water cupboard.

Note: **Pink® Batts® ceiling insulation shall not be installed in a roof space where foil has been installed as a roof underlay.**

Refer to NZS 4246:2016 for full details.

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Clearances

Follow the clearances specified by the manufacturer; if they are not known then:

Recessed Luminaire

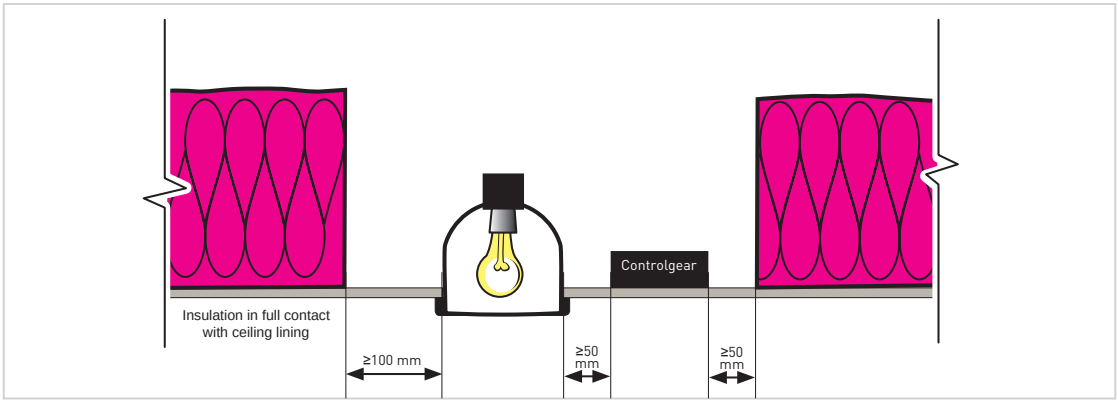
- CA rated recessed luminaires - Nil, however do not install insulation on top of the recessed luminaire
- IC rated recessed luminaires - Nil, insulation can be installed over the top of the recessed luminaire
- Unmarked - Minimum 100mm

Surface Mounted Luminaire - Minimum clearance 200mm; however it does not apply if the insulation is permanently shielded.

Controlgear

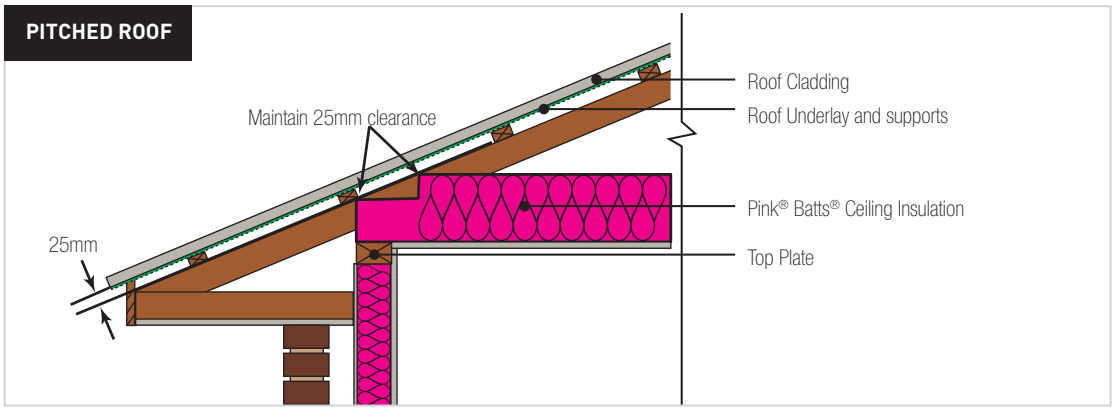
- If possible place it on top of the insulation and leave a minimum clearance of 50mm between controlgear and luminaire
- If not possible to place it on top of the insulation and leave 50mm from the insulation to the controlgear

Controlgear **shall not** sink into the insulation.



Unmarked luminaire and controlgear not placed on top of Pink® Batts® ceiling products.

- Built in appliances - Minimum 50mm
- Enclosures containing electrical equipment - Minimum 50mm
- Fan/heat/light unit - Minimum 100mm
- Ventilation systems - Minimum 50mm
- Unducted mechanical fan units - Minimum 200mm
- Unducted passive vents that remain functional - Minimum 200mm
- Metal chimney and flues - Minimum 75mm
- Brick chimney - Minimum 50mm
- Roof underlay - Minimum 25mm



Note: Pink® Batts® ceiling insulation can be installed from below when the ceiling is to be lined or replaced

*Caution: Electrical cables and equipment partially or completely surrounded with bulk thermal insulation may overheat and fail. This applies to wiring installed prior to 1989.

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Roof | PINK® BATTS® CEILING INSULATION

Product Specifications

ROOF - Thermal Insulation		PRODUCT CODE	SIZE (mm)	NOMINAL STABILISED THICKNESS (mm)	NOMINAL TOTAL AREA PER BALE (m^2)	APPROX. COVERAGE PER BALE* (m^2)	ENVIRONMENTAL CHOICE
R1.8	Pink® Batts® Classic R1.8 Ceiling	7110118	1220 x 432	95	13.7	14.4	✓
R2.2	Pink® Batts® Classic R2.2 Ceiling	7110122	1220 x 432	115	12.6	13.3	✓
R2.6	Pink® Batts® Classic R2.6 Ceiling	7110126	1220 x 432	140	10.5	11.1	✓
R3.2	Pink® Batts® Classic R3.2 Ceiling‡	7110132	1220 x 432	170	8.4	8.8	✓‡
R3.2	Pink® Batts® Skillion Roof R3.2	7110232	1220 x 432	115 max	3.7	3.9	✓
R3.6	Pink® Batts® Classic R3.6 Ceiling‡	7110136	1220 x 432	180	7.4	7.7	✓‡
R3.6	Pink® Batts® Skillion Roof R3.6	7110236	1220 x 432	165 max	6.3	6.6	✓
R4.0	Pink® Batts® Ultra® R4.0 Ceiling	7110140	1220 x 432	195	6.3	6.6	✓
R5.0	Pink® Batts® Ultra® R5.0 Ceiling	7110150	1220 x 432	220	4.2	4.4	✓
R6.0	Pink® Batts® Ultra® R6.0 Ceiling	7110160	1220 x 432	235	3.7	3.9	✓
R6.3	Pink® Batts® Ultra® R6.3 Ceiling	7110163	1220 x 432	250	3.2	3.3	✓
R7.0	Pink® Batts® Ultra® R7.0 Ceiling	7110170	1220 x 432	260	2.6	2.8	✓
ROOF - Thermal Retrofit Insulation							
R2.9	Pink® Batts® R2.9 Retrofit Ceiling	7110129	1220 x 432	150	9.5	10.0	✓
R3.3	Pink® Batts® R3.3 Retrofit Ceiling	7110133	1220 x 432	175	8.4	8.8	✓
ROOF and WALL - Thermal Insulation							
R2.4	Pink® Batts® HandyPack R2.4^	7200158	7000 x 580	90	4.06	-	

* Coverage relates to standard structures (ie with framing allowance) therefore actual coverage may vary.
‡ This product is manufactured in both New Zealand and Australia. Environmental Choice New Zealand applies to New Zealand made product only.
# For full details of the Pink® Batts® Lifetime Warranty visit pinkbatts.co.nz/lifetime-warranty.
^ Product does not have the Pink® Batts® Lifetime Warranty or BRANZ Appraised Accreditation.

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Roof | PINK® BATTS® CEILING INSULATION

Storage and Maintenance

Pink® Batts® insulation should be protected from damage and weather. Store under cover in clean dry conditions. The installed product should remain dry at all times. If the product has become wet or damp, the source of the dampness (e.g. leak in roof) should be repaired immediately and any wet or damp insulation should be removed and replaced with new product of an equivalent R-value.

Disposal of bags

Recyclable LLDPE bags are used for packaging of Pink® Batts® insulation.
For further details download the relevant product data sheet from pinkbatts.co.nz

Accreditations/Appraisals/Certifications

BRANZ Appraised
Appraisal No. 238 [2012]
Appraisal No. 632 [2012]
Appraisal No. 767 [2012]

Licence No 2504017.
Thermal Building Insulants

Tasman Insulation New Zealand Ltd
Certified QMS
Quality ISO 9001

‡ R3.6 ceiling product is manufactured in both New Zealand and Australia. Environmental Choice New Zealand applies to New Zealand made products only.

For full details of the Pink® Batts® Lifetime Warranty visit pinkbatts.co.nz

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PRODUCT CERTIFICATE

Firth Ribraft® Floor System

CERTIFICATE NO: CM70056 Rev 3
Date of issue: 26 March 2021

1 CERTIFICATE HOLDER DETAILS

Fletcher Concrete and Infrastructure Ltd
T/A Firth Industries
810 Great South Road
Penrose, Auckland 1061

Info@firth.co.nz
Ph: 0800 800 576
www.firth.co.nz

2 PRODUCT CERTIFICATION BODY

Bureau Veritas Australia Pty Ltd
3/435 Williamstown Road
Port Melbourne VIC 3207
Australia

Ph: 1800 855 190
www.bureauveritas.com.au
Bureau Veritas Australia Pty Ltd

The complaints process for this certificate can be found here:
www.bureauveritas.com.au/your-feedback

KEY INFORMATION

3 SUMMARY OF DESCRIPTION OF BUILDING METHOD OR PRODUCT

The Firth RibRaft® Floor System comprises of polystyrene pods, steel reinforcing rods, plastic spacers and Firth RibRaft® concrete.

Continuation of description can be found in item 9. Supporting Information about Description of Building Product or Method.
Matters that should be taken into account in the use or application of the building method or product can be found in item 6. Conditions and Limitations of Use.

4 SUMMARY OF INTENDED USE OF BUILDING METHOD OR PRODUCT

The Firth RibRaft® Floor System is a method of concrete floor construction, suitable for all slab-on-ground concrete floors for domestic or residential buildings that fall within the scope of NZS 3604:2011 Timber framed buildings.

Continuation of intended use can be found in item 8. Supporting Information about Intended use of Building Product or Method.

5 BUILDING CODE PROVISIONS

The performance clauses of the New Zealand Building Code that are relevant to the intended use and with which the building method or product complies or contributes to (where used as part of a system).

B1 Structure: B1.3.1, B1.3.2, B1.3.3 (a, b, f, g, h, q, m), B1.3.4
B2 Durability: B2.3.1(a), B2.3.2(a)
E2 External Moisture: E2.3.3, E2.3.7
F2 Hazardous Building Materials: F2.3.1
H1 Energy Efficiency: H1.3.1 (contributes to), H1.3.2E (contributes to)

How the building method or product complies or contributes can be found in item 12. Basis for Certification. Any qualifications on the extent of that compliance can be found in item 6. Conditions and limitations of use.

This certificate is issued by an independent certification body accredited by JAS-ANZ, the product certification accreditation body appointed by the Chief Executive of the Ministry of Business, Innovation and Employment under the Building Act 2004.
The Ministry does not in any way warrant, guarantee, or represent that the building method or product that is the subject of this certificate conforms with the New Zealand Building Code, nor accept any liability arising out of the use of the building method or product.
The Ministry disclaims to the extent permitted by law, all liability (including negligence) for claims of losses, expenses, damages, and costs arising as a result of the use of the building method(s) or product(s) referred to in this certificate.

This certificate may only be reproduced in its entirety. It is advised to check that this certificate is currently valid and not withdrawn or suspended by referring to the Register of Product Certificates on the Building Performance website http://www.building.govt.nz.

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PRODUCT CERTIFICATE

Firth Ribraft® Floor System

6 CONDITIONS AND LIMITATIONS OF USE

1. The Firth RibRaft® Floor System shall only be used in buildings which fall within the scope of NZS 3604:2011 – Timber-framed buildings, located:
   a) Where the Seismic Hazard Factor Z (defined in NZ 1170.5:2004) is less than or equal to 0.45 (refer to Figure 6 of the Firth RibRaft® Technical Manual January 2020)
   b) in any wind zones up to and including Extra High
   c) in areas with snow loads up to 2.0 kPa
   d) in all exposure zones (except microclimates)
   e) and where the ground Ultimate Bearing Capacity exceeds the value specified in Table 2 for the types of construction in Table 1 of the Firth RibRaft® Technical Manual January 2020.
2. The Firth RibRaft® Floor System shall be designed and installed in accordance with the Firth RibRaft® Technical Manual January 2020.

NOTE: Together, items 3, 4, 5 and 6 define scope of use.

7 HEALTH AND SAFETY INFORMATION

The compliance with any manufacturer's installation instructions, maintenance, OH & S statements, MSDS's and other Health and Safety declarations will provide the necessary Health and Safety Information pertaining to the product.

8 SIGNATURES

Sam Guindi
Product Certification Manager

For and on behalf of
Bureau Veritas Australia Pty Ltd

Dene Cook
Divisional Technical Manager

For and on behalf of
Firth Industries

This certificate is issued by an independent certification body accredited by JAS-ANZ, the product certification accreditation body appointed by the Chief Executive of the Ministry of Business, Innovation and Employment under the Building Act 2004.
The Ministry does not in any way warrant, guarantee, or represent that the building method or product that is the subject of this certificate conforms with the New Zealand Building Code, nor accept any liability arising out of the use of the building method or product.
The Ministry disclaims to the extent permitted by law, all liability (including negligence) for claims of losses, expenses, damages, and costs arising as a result of the use of the building method(s) or product(s) referred to in this certificate.

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PRODUCT CERTIFICATE

Firth Ribraft® Floor System

SCHEDULE: INFORMATION THAT SUPPORTS KEY INFORMATION

9 SUPPORTING INFORMATION ABOUT DESCRIPTION

The system consists of the following components:

- RibRaft® Polystyrene Pod 1100mm x 1100mm x 220mm. 300mm thick pods are also available for deeper edge beams and internal ribs.
- Firth Pod and Reinforcement spacer (300mm and 100mm)
- Firth Reinforcement chair
- Reinforcement Grade 500E
- Mesh reinforcement
- Firth RibRaft® Concrete 20MPa or 25 MPa
- Sand Blinding
- DPM (250 micron polyethylene sheet)

10 SUPPORTING INFORMATION ABOUT INTENDED USE

Further details regarding the use of the product can be found in Firth RibRaft® Technical Manual, January 2020.

11 SUPPORTING INFORMATION ABOUT CONDITIONS AND LIMITATIONS OF USE

N/A

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The Ministry does not in any way warrant, guarantee, or represent that the building method or product that is the subject of this certificate conforms with the New Zealand Building Code, nor accept any liability arising out of the use of the building method or product.
The Ministry disclaims to the extent permitted by law, all liability (including negligence) for claims of losses, expenses, damages, and costs arising as a result of the use of the building method(s) or product(s) referred to in this certificate.

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PRODUCT CERTIFICATE

Firth Ribraft® Floor System

12 BASIS FOR CERTIFICATION

B1 Structure - By analysis and comparison with Acceptable Solution B1/VM1
B2 Durability – By analysis and comparison with Acceptable Solution B2/AS1 and Verification Method B2/VM1
E2 External moisture – By analysis and comparison with Acceptable Solution E2/AS1
H1 Energy efficiency - By analysis and comparison with Acceptable Solution H1/AS1
F2 Hazardous building materials - By comparison with performance Clause F2.3.1

13 SUPPORTING DOCUMENTATION FOR CERTIFICATION

1. Acceptable Solutions and Verification Methods for New Zealand Building Code Clause B1 Structure 1st Edition (Amendment 19), 28 November 2019
2. Acceptable Solutions and Verification Methods For New Zealand Building Code Clause B2 Durability (Amendment 12), 28 November 2019
3. Acceptable Solutions and Verification Methods For New Zealand Building Code Clause E2 External moisture 3rd edition (Amendment 9), 27 June 2019
4. Structural assessment by Holmes Consulting Firth Ribraft Concrete Floor System, May 2012
5. OPUS Report "Compliance of Firth of Ribraft System with NZBC Clause B2 Durability", 24 May 2010
6. eCubed Building Workshop Report on R value of Ribraft Concrete Floor System, 17 September 2010
7. Firth RibRaft® Technical Manual, January 2020
8. NZS 3604:2011 Timber framed buildings
9. NZS 4214:2006 Methods of determining the total thermal resistance of parts of buildings

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The Ministry does not in any way warrant, guarantee, or represent that the building method or product that is the subject of this certificate conforms with the New Zealand Building Code, nor accept any liability arising out of the use of the building method or product.
The Ministry disclaims to the extent permitted by law, all liability (including negligence) for claims of losses, expenses, damages, and costs arising as a result of the use of the building method(s) or product(s) referred to in this certificate.

This certificate may only be reproduced in its entirety. It is advised to check that this certificate is currently valid and not withdrawn or suspended by referring to the Register of Product Certificates on the Building Performance website http://www.building.govt.nz.

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PRODUCT CERTIFICATE

Firth Ribraft® Floor System

14 CONDITIONS RELATING TO NOTIFICATION

(a) the certificate holder notifies the product certification body (Bureau Veritas) in writing of any intended change to any of the following particulars:
(i) the name, address, or contact details of the certificate holder:
(ii) any address of a location where a certified product is produced or manufactured:

(b) the certificate holder notifies the product certification body (Bureau Veritas) in writing of any intended change, modification, or alteration to any of the following:
(i) the certified building method or product:
(ii) the method of its production or manufacture:
(iii) the product quality plan prepared in respect of the certified building method or product:
(iv) the application or installation instructions for the certified building method or product:
(v) any documentation relating to the use and maintenance of the certified building method or product:

(c) if the certificate holder has any reason to suspect that the certified building method or product does not comply with the Building Code, the certificate holder notifies the product certification body (Bureau Veritas) in writing of the reason for that suspicion:

(d) if the certificate holder or the product certification body (Bureau Veritas) finds that a certified building method or product that has been released on the market does not comply with the Building Code, the certificate holder discloses that fact in disclosure statements published in a form that is acceptable to the product certification body and to the chief executive:

(e) if the certificate is suspended or revoked, the certificate holder—
(i) notifies all customers to whom the building method or product is regularly supplied; and
(ii) immediately ceases using the certificate, the mark of conformity, and any reference to the number of the certificate.

This certificate is issued by an independent certification body accredited by JAS-ANZ, the product certification accreditation body appointed by the Chief Executive of the Ministry of Business, Innovation and Employment under the Building Act 2004.
The Ministry does not in any way warrant, guarantee, or represent that the building method or product that is the subject of this certificate conforms with the New Zealand Building Code, nor accept any liability arising out of the use of the building method or product.
The Ministry disclaims to the extent permitted by law, all liability (including negligence) for claims of losses, expenses, damages, and costs arising as a result of the use of the building method(s) or product(s) referred to in this certificate.

This certificate may only be reproduced in its entirety. It is advised to check that this certificate is currently valid and not withdrawn or suspended by referring to the Register of Product Certificates on the Building Performance website http://www.building.govt.nz.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

Rinnai

INFINITY A-Series
Product technical statement

A product technical statement is a way to show how a product or system is fit for purpose for use in New Zealand and to demonstrate compliance with the New Zealand Building Code (Building Code Amendment Act 2013).

Product description
Designed and made in Japan, the Rinnai INFINITY A-Series are gas condensing continuous flow water heaters with inbuilt frost protection. They have electronic ignition and require electricity to operate.

The temperature dip switch setting is factory preset to 55 °C. Model selection is based on the application.

A16

Scope of use
Suitable for mains and medium pressure residential applications only. They are designed to be externally mounted on an outside wall and located as close as practicable to the most frequently used hot water outlets to reduce the delay for hot water delivery.

They are not suitable as a spa or swimming pool heater, for hydronic applications, or for commercial applications. They are also not suitable as a gas boost for solar installations as the temperature cannot be set high enough.

A20

Hard or acidic water will need to be treated to use this product.

Available for connection to natural gas or LPG, this must be specified at the time of purchase.

Flue terminations must comply with the flue terminal locations shown in AS/NZS 5601.1.

A24

Design guidelines
Specification and installation must be in accordance with Rinnai installation requirements and with the Building Code.

Rinnai specify that installation must be in compliance with AS/NZS 5601.1:2013, AS/NZS 3000:2007, and AS/NZS 3500.

A26

Quality assurance
- ISO 9001 Certified System
- ISO 14001 Certified System

ISO 9001

Rinnai.co.nz
0800 746 624

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

Rinnai

INFINITY A-Series
Product technical statement

Compliance with the NZ Building Code

If specified, installed and maintained in accordance with all Rinnai requirements the INFINITY A-Series will comply with the below provisions of the NZ Building Code. AS/NZS 5601.1 is an acceptable solution within the NZBC for gas installations as per NZBC G11/AS1 9.0.1.

CODE CLAUSE	EVIDENCE OF COMPLIANCE
B1 Structure	
B1.3.1 B1.3.2 B1.3.3 (a,b,c,h,m)	Certified to AS/NZS 5263.1.2:2016 / AS/NZS 4552, a series of standards for safety, performance and energy efficiency in gas fired water heaters for hot water supply and/or central heating.
B2 Durability	
B.2.3.1 (c)	Durability testing and in-service history
C2 Prevention of fire occurring	
C2.2 and C2.3	Certification of continuous flow gas water heaters to AS/NZS 5263.1.2:2016 / AS/NZS 4552
E2 External moisture	
E2.3.2	Achieved by following E2/AS1
G4 Ventilation	
G4.3.3 (f,i)	Achieved as long as the building complies with G4/AS1
G9 Electricity	
G9.3.1 (a,b,c,d,f), G9.3.3	G9/AS1 as required by Rinnai installation guidance
G10 Piped services	
G10.3.2, G10.3.3, G10.3.4, G10.3.5, G10.3.6	G10/AS1 (NZS 5422 Natural Gas) and (NZS 5435 LPG)
G11 Gas as an energy source	
G11.3.1, G11.3.2, G11.3.3, G11.3.4	G11/AS1 (AS/NZS 5601.1) as required by Rinnai installation guidance
H1 Energy efficiency provisions	
H1.3.4	Certification of continuous flow gas water heaters to AS/NZS 4552.2* (Minimum energy performance standards for gas water heaters)

* Some provisions of the AS/NZS 5263.1.2:2016 apply to Australia only (e.g. thermal efficiency), which is why we have noted the equivalent AS/NZS 4552 standard.

Additional evidence to support the above statements - Energy Safety Supplier Declaration of Compliance:

- INFINITY A16: 1825920179
- INFINITY A20: 1825820179
- INFINITY A24 1825720179
- INFINITY A26: 1825620179

Seismic restraint: Rinnai has prepared a seismic restraint calculation using NZS 4219. This can be accessed from the A-Series product page (technical tab) on the Rinnai website.

Special conditions: Installation requirements

Full appliance information can be found at www.rinnai.co.nz.

Limitation: To be installed in accordance with all Rinnai installation requirements and by a licensed gasfitter/plumber, and electrician. Upon completion of the installation, a final inspection and test to demonstrate that the gas appliance has been installed in accordance with Rinnai's instructions and in accordance with Gas (safety and measurement) Regulations 2013 is required by the installer. The gasfitter is to issue a certificate of compliance.

Special conditions - maintenance requirements

For reliable operation Rinnai INFINITY units, in residential applications, should be serviced every two years. Installation, servicing and repair shall be carried out only by authorised personnel.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

BRANZ Appraised
Appraisal No. 846 [2019]

SUPER-STICK FLEXIBLE FLASHING TAPE

Appraisal No. 846 (2019)

This Appraisal replaces BRANZ Appraisal No. 846 (2013).

BRANZ Appraisals

Technical Assessments of products for building and construction.

Marshall Innovations Limited
PO Box 9411
Greerton
Tauranga
Tel: 07 543 0948
Fax: 07 541 1029
Web: www.mwnz.com

BRANZ
1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz

Product

1.1 SUPER-STICK is a flexible flashing tape used around framed joinery openings as a secondary weather resistant barrier.

1.2 SUPER-STICK is installed into and around the framed joinery opening over the building wrap and exposed frame to cover both the face and edge of the opening framing. SUPER-STICK is also used at joinery heads to seal flashing upstands to the building wrap.

Scope

2.1 SUPER-STICK has been appraised as a flexible flashing system for use around window and door joinery openings for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- with wall cladding systems complying with NZBC Acceptable Solution E2/AS1 or a valid BRANZ Appraisal that specifies a flexible flashing tape system; and,
- with wall underlays compatible with the flexible flashing tape; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

2.2 SUPER-STICK has also been appraised as a flexible flashing system for use around window and door joinery openings for steel framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, with regards to building height and floor plan area; and,
- constructed with steel framing complying with the NZBC; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- with wall cladding systems covered by a valid BRANZ Appraisal that specifies a flexible flashing system; and,
- with wall underlays compatible with the flashing tape and steel frame; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

Note: Marshall Innovations Ltd offer SUPER-STICK as a jointing and flashing tape for use with rigid air barrier systems that do not require a flexible wall underlay, but this aspect is outside the scope of this Appraisal. Contact the rigid air barrier system proprietor for system details including recommended jointing and flashing tapes.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

BRANZ Appraised
Appraisal No. 846 [2019]

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, SUPER-STICK, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years and B2.3.2. SUPER-STICK meets these requirements. See Paragraphs 8.1 and 8.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. SUPER-STICK contributes to meeting this requirement. See Paragraphs 7.1 - 7.4 and 11.1.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. SUPER-STICK meets this requirement and will not present a health hazard to people.

Technical Specification

4.1 SUPER-STICK is a multi-layered silver polyester faced, copolymer, self-adhesive tape. The tape is supplied in rolls of 75 mm x 22.86 m, 150 mm x 22.86 m and 200 mm x 22.86 m.

Handling and Storage

5.1 Handling and storage of all materials supplied by Marshall Innovations Ltd, whether on or off site, is under the control of the installer. Rolls must be stored under cover, in clean, dry conditions away from direct exposure to sunlight.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for SUPER-STICK. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 SUPER-STICK meets the requirements of AC148: 2001 which is an alternative solution to the version of AC148 referenced by NZBC Acceptable Solution E2/AS1, Paragraph 9.1.5 (b). The installation method for SUPER-STICK is an alternative solution to the installation method shown within NZBC Acceptable Solution E2/AS1, Figure 72A and 72B.

7.2 The use of flexible flashing tape systems around window and door joinery openings is critical to assist the overall weathertightness performance of window and door joinery installations.

7.3 SUPER-STICK is suitable for use over flexible wall underlays compatible with the flashing tape in NZS 3604 Wind Zones up to and including Extra High. In the Extra High Wind Zone, the flexible underlay must be installed over a rigid underlay complying with NZBC Acceptable Solution E2/AS1, Table 23.

7.4 SUPER-STICK is designed to prevent air leakage and water penetration around window and door openings at framing junctions (e.g. at the sill trimmer and opening stud junction), and to keep any water that gets past the cladding, or through the joinery, from direct contact with the framing timber.

7.5 SUPER-STICK is not designed to overcome poor detailing and workmanship of the window or door joinery installation. The system must not be considered in isolation, but be considered as part of the wall cladding system. SUPER-STICK flashing tape is designed to be used in conjunction with air seals and joinery flashing systems, not as a substitute.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

7.6 When SUPER-STICK is used in conjunction with LOSP [light organic solvent preservative] treated timber, the solvent from the timber treatment must be allowed to evaporate [generally at least one week] prior to the installation of the system.

Durability

8.1 Assessment of durability to meet the NZBC is based on difficulty of access and replacement, and the ability to detect failure of SUPER-STICK both during normal use and maintenance of the building.

Serviceable Life

8.2 Provided it is not exposed to the weather or ultra-violet light for a total of more than 90 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, SUPER-STICK is expected to have a serviceable life equal to that of the cladding. The maximum exposure period may however be limited by the requirements of the substrate supplier.

Maintenance

9.1 No maintenance is required for SUPER-STICK. Regular checks, at least annually, must be made of the junctions between the joinery and wall cladding to ensure that they are maintained weathertight and that the primary means of weather resistance for the junction e.g. flashing, sealant, etc continues to perform its function, to ensure that water will not penetrate the cladding.

Prevention of Fire Occurring

10.1 Separation or protection must be provided to SUPER-STICK from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

11.1 Where a cladding manufacturer specifies the use of generic flashing tapes around window and door joinery openings at framing junctions as part of their system, or they specify the use of flexible flashing tapes that comply with NZBC E2/AS1, Paragraph 9.1.5 (b), SUPER-STICK may be used.

Installation Information

Installation Skill Level Requirements

12.1 Installation must always be carried out in accordance with the SUPER-STICK Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.

General

13.1 The selected building wrap must be installed in accordance with the manufacturer's instructions, and must completely cover the joinery opening. The wrap is then cut on a 45° angle away from each corner of the opening so the flaps can be folded into the opening and secured to the interior face of the timber framing.

13.2 Before SUPER-STICK is applied, the substrate surfaces must be clean, dry and free from any surface contaminants such as dust and grease that may cause loss of adhesion.

13.3 A 75 mm wide x 150 mm long sealing tape 'butterfly' must be installed at 45° across the corner of the jamb/sill junction overlapping the corner by 3 mm to create a seal at the corner junction. A length of SUPER-STICK is then cut to the length of the sill plus 300 mm. The tape is installed flush with the interior face of the opening and is applied along the entire length of the sill and 150 mm up each jamb. The overhanging tape is cut at the corner of the opening to allow the tape to be folded onto the face of the building wrap and "butterfly" installed across the corner. Cut another length of SUPER-STICK the exact length of the sill and overlay onto the already installed Tape to ensure nail sealability requirements are met.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

BRANZ Appraised
Appraisal No. 846 [2019]

13.4 A 300 mm length of SUPER-STICK must be installed 150 mm down the jamb and 150 mm along the lintel at each of the top corners of the window or door joinery opening. A 75 mm wide x 150 mm long sealing tape 'butterfly' must be installed at 45° across the corner of the head/jamb junction overlapping the corner by 3 mm to create a seal at the corner junction.

13.5 SUPER-STICK must not be stretched. When joining two sections of tape, the overlap must be 100 mm minimum.

13.6 If SUPER-STICK is exposed to the weather or UV light for more than 90 days, it must be replaced with new material.

Installation Temperature

13.7 SUPER-STICK must not be installed where temperatures are less than -5°C *[Note: Marshall Innovations Ltd approve the installation of SUPER-STICK down to -20°C. This has not been addressed by this Appraisal and is outside its scope.]*

Inspections

13.8 The Technical Literature must be referred to during the inspection of SUPER-STICK installations.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

14.1 Testing of SUPER-STICK has been completed by BRANZ to the requirements of ICC Evaluation Service Acceptance Criteria for Flashing Materials AC148. The adhesion of SUPER-STICK to black bituminous Kraft building paper complying with the requirements of NZBC Acceptable Solution E2/AS1, Table 23 and selected other synthetic wall underlays have been tested and found to be satisfactory.

Other Investigations

15.1 An assessment was made of the durability of SUPER-STICK by BRANZ technical experts.

15.2 Site inspections were carried out by BRANZ to examine the practicability of installation.

15.3 The Technical Literature has been reviewed by BRANZ and found to be satisfactory.

Quality

16.1 The manufacture of SUPER-STICK has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ undertakes an ongoing review of product quality on an inwards goods basis.

16.2 The quality of supply to the market is the responsibility of Marshall Innovations Ltd.

16.3 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and building wraps in accordance with the instructions of the designer.

16.4 The quality of installation, handling and storage on site is the responsibility of the installer in accordance with the instructions of Marshall Innovations Ltd.

Sources of Information

- ICC Evaluation Service, Inc, AC148 Acceptable Criteria for Flexible Flashing Materials, July 2001.
- NZS 3604: 2011 Timber-framed buildings.
- Acceptable Solutions and Verification Methods for New Zealand Building Code External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 [Amendment 8, 30 November 2018].
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

BRANZ

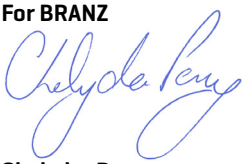
In the opinion of BRANZ, SUPER-STICK is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Marshall Innovations Limited, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Marshall Innovations Limited:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Marshall Innovations Limited.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Marshall Innovations Limited or any third party.

For BRANZ



Chelydra Percy
Chief Executive

Date of Issue:
7 June 2019

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

BRANZ Appraised
Appraisal No. 548 [2019]

TEKTON® BUILDING WRAP

Appraisal No. 548 (2019)

This Appraisal replaces BRANZ Appraisal No. 548 (2013)

BRANZ Appraisals

Technical Assessments of products for building and construction.

Marshall Innovations Limited
PO Box 9411
Greerton
Tauranga
Tel: 07 543 0948
Fax: 07 541 1029
Web: www.mwnz.com

BRANZ
1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz

Product

1.1 Tekton® Building Wrap is a synthetic breather-type flexible wall underlay and air barrier for use under direct and non-direct fixed wall cladding on timber and steel framed buildings. The product is manufactured of a coated spun-bonded polypropylene.

Scope

2.1 Tekton® Building Wrap has been appraised for use as a flexible wall underlay on timber framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- with absorbent wall claddings directly fixed to framing; and,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
- with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
- situated in NZS 3604 Wind Zones up to, and including Very High.

2.2 Tekton® Building Wrap has been appraised for use as a flexible wall underlay on steel framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
- with masonry veneer subject to specific design; and,
- situated in NZS 3604 Wind Zones up to, and including Very High.

2.3 Tekton® Building Wrap has been appraised for use as a flexible wall underlay over rigid wall underlays on timber and steel framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
- with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1 for timber framed buildings or specific design for steel framed buildings; and,
- situated in NZS 3604 Wind Zones up to and including Extra High.

2.4 Tekton® Building Wrap has also been appraised for use on buildings subject to specific weathertightness design. Building designers are responsible for the building design and for the incorporation of Tekton® Building Wrap into their design in accordance with the declared properties and the instructions of Marshall Innovations Limited.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Tekton® Building Wrap, if used, designed, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet, or contribute to meeting the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (a), not less than 50 years, B2.3.1 (b), 15 years and B2.3.2. Tekton® Building Wrap meets these requirements. See Paragraphs 9.1 and 9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the cladding system, Tekton® Building Wrap will contribute to meeting this requirement. See Paragraphs 12.1 – 12.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Tekton® Building Wrap meets this requirement and will not present a health hazard to people.

Technical Specification

4.1 Tekton® Building Wrap is a 100 g/m^2 light grey sheet polypropylene membrane material approximately 0.6 mm thick.

4.2 The product is supplied in rolls 1.370 m x 37 m and 2.743 m x 37 m. The product is printed with the Tekton® logo repeated along the length of the roll. The rolls are wrapped with an instruction sticker.

Accessories

4.3 Accessories used with Tekton® Building Wrap which are supplied by the installer are:

- Fixings – staples, clouts, screws or proprietary wrap fixings, or other temporary fixings to attach the wall wrap to the framing.
- Wall underlay support – polypropylene strap, 75 mm galvanised mesh or galvanised wire, or vertical cavity battens where required to support the wall wrap in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

Handling and Storage

5.1 Handling and storage of the product, whether on or off site, is under the control of the installer. The rolls must be protected from damage and weather. They must be stored on end, under cover, in clean, dry conditions and must not be crushed.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Tekton® Building Wrap. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Timber and Steel Framing

7.1 Studs must be provided at maximum 600 mm centres. Dwangs must be fitted flush between the studs at maximum 1200 mm centres.

General

7.2 Tekton® Building Wrap is intended for use as an alternative to conventional building papers which are fixed over timber and steel framed walls in order to limit the entry of wind into building cavities, and to act as a secondary barrier to wind-driven rain.

7.3 The material also provides a degree of temporary weather protection during early construction. However, the product will not make the building weathertight and some wetting of the underlying structure is always possible before the building is closed in. Hence, the building must be closed-in and made weatherproof before moisture sensitive materials such as wall or ceiling linings and insulation materials are installed.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

7.4 Tekton® Building Wrap must not be exposed to the weather or ultra violet light for a total of more than 60 days before being covered by the wall cladding.

7.5 Tekton® Building Wrap is suitable for use under wall claddings as a wall underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23, except that it must not be used with non-absorbent wall claddings such as vinyl or metal based sidings or weatherboards in direct fixed installations. Tekton® is suitable for use under cavity based wall claddings as a non-absorbent synthetic wall underlay as called up in NZS 2295, Table 2.4 on steel framed buildings. Refer to Table 1.

7.6 Tekton® Building Wrap is also suitable for use as an air barrier to walls that are not lined, such as attic spaces at gable ends, as called up in NZBC Acceptable Solution E2/AS1, Paragraph 9.1.4 (c). Refer to Table 1.

Table 1: NZBC E2/AS1 Table 23 Requirements

NZBC E2/AS1 Table 23 Wall Wrap Properties	Property Performance Requirement	Actual Property Performance
Absorbency	≥ 100 g/m^2	Classified as non-absorbent (see paragraph 7.5)
Vapour Resistance	≤ 7 MN s/g	Pass
Water Resistance	≥ 20 mm	Pass
pH of Extract	≥ 5.5 and ≤ 8	9.78 *(Note 1)*
Shrinkage	≤ 0.5%	Pass
Mechanical	Edge tear and tensile strength	**Edge tear:** Machine direction = 228 N Cross direction = 186 N **Tensile strength:** Machine direction = 4.4 kN/m Cross direction = 3.9 kN/m
Air Barrier	Air resistance: ≥ 0.1 MN s/m^3	Pass

Note 1: Further testing of Tekton® Building Wrap was completed to determine the effect of the high pH level on the wall underlay and materials it is likely to come into contact with during its serviceable life. The testing confirmed that the high pH had no adverse effects on the wall underlay performance, or the performance of other materials.

7.7 In cavity installations where the cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens to prevent the wall underlay bulging into the cavity space when bulk insulation is installed in the wall frame cavity in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

Stucco Plaster

7.8 Tekton® Building Wrap is suitable for use as a non-rigid backing material for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.5.1. The wall underlay must be supported with 75 mm galvanised mesh or plastic tape or wire at 150 mm centres run across the cavity battens to limit deflection to a maximum of 5 mm.

7.9 Tekton® Building Wrap may also be used as a slip layer over rigid backings for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.3.1 (b).

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Structure

8.1 Tekton® Building Wrap is suitable for use in all Wind Zones of NZS 3604 up to, and including, Very High when used as a flexible building underlay, and all Wind Zones of NZS 3604 up to, and including, Extra High when used as an overlay for rigid building underlays.

Durability

9.1 Tekton® Building Wrap meets code compliance with NZBC Clause B2.3.1 (a), not less than 50 years for building wraps used where the cladding durability requirement or expected serviceable life is not less than 50 years, and code compliance with NZBC Clause B2.3.1 (b), 15 years for building wraps used where the cladding durability requirement is 15 years.

Serviceable Life

9.2 Provided it is not exposed to the weather or ultra-violet light for a total of more than 60 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, Tekton® Building Wrap is expected to have a serviceable life equal to that of the cladding.

Control of Internal Fire and Smoke Spread

10.1 Tekton® Building Wrap has an AS 1530 Part 2 flammability index of not greater than 5 and therefore meets the requirements of NZBC Acceptable Solutions C/AS2 to C/AS6, Paragraph 4.17.8 b), for the surface finish requirements of suspended flexible fabric used as an underlay to exterior cladding that is exposed to view in occupied spaces. It may therefore be used with no restrictions in all buildings.

Prevention of Fire Occurring

11.1 Separation or protection must be provided to Tekton® Building Wrap from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

12.1 Tekton® Building Wrap must be used behind claddings that meet the requirements of the NZBC, e.g. such as those covered by NZBC Acceptable Solution E2/AS1, or claddings covered by a valid BRANZ Appraisal.

12.2 Tekton® Building Wrap, when installed in accordance with the Technical Literature and this Appraisal, will assist in the total cladding systems compliance with NZBC Clause E2.

12.3 When used as an air barrier, particular care must be taken to ensure an air tight barrier is achieved, and weather sealing at all openings and penetrations through the cladding meets the requirements of the NZBC.

Installation Information

Installation Skill Level Requirements

13.1 Installation must always be carried out in accordance with the Tekton® Building Wrap Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant Licence Class.

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Wrap Installation

14.1 Tekton® Building Wrap must be fixed to all framing members at maximum 300 mm centres with hot-dip galvanised, large-head clouts 20 mm long, zinc plated 6-8 mm staples, self-drilling screws, or proprietary wrap fixings. The membrane must be pulled taut over the framing before fixing.

14.2 Tekton® Building Wrap must be run horizontally and must extend from the upper-side of the top plate to the under-side of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs. Horizontal laps must be no less than 75 mm wide, with the direction of the lap ensuring that water is shed to the outer face of the membrane. End laps must be made over framing and be no less than 150 mm wide.

14.3 The wall underlay should be run over openings and these left covered until windows and doors are ready to be installed. Openings are formed in the membrane by cutting on a 45 degree diagonal from each corner of the penetration. The flaps of the cut membrane must be folded inside the opening and stapled to the penetration framing. Excess wall underlay may be cut off flush with the internal face of the wall frame.

14.4 Tekton® Building Wrap can be added as a second layer over head flashings in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.3.

14.5 When fixing the product in windy conditions, care must be taken due to the large sail area created by wide roll widths.

14.6 Any damaged areas of Tekton® Building Wrap, such as tears, holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping, or by taping small tears.

Inspections

14.7 The Technical Literature must be referred to during the inspection of Tekton® Building Wrap installations.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

15.1 The following tests have been carried out on Tekton® Building Wrap by Scion: Folding strength of paper in accordance with AS/NZS 1301.423; edge tear resistance and tensile strength in accordance with AS/NZS 4200.1 and air resistance in accordance with BS 6538-3.

15.2 The following tests have been carried out on Tekton® Building Wrap by BRANZ: Absorbency in accordance with AS/NZS 4201.6, Vapour transmission in accordance with ASTM E 96B, Shrinkage in accordance with AS/NZS 4201.3, Water barrier in accordance with AS/NZS 4201.4 and pH of extract in accordance with AS/NZS 1301.421. A range of these tests were completed before and after Tekton® Building Wrap was exposed to ultra-violet light.

15.3 The Flammability Index of Tekton® Building Wrap has been evaluated in accordance with AS 1530.2.

Other Investigations

16.1 A durability opinion was given by BRANZ technical experts.

16.2 Site inspections were carried out by BRANZ to assess methods used for the installation of Tekton® Building Wrap, and to examine completed installations.

16.3 The marketer's Technical Literature, including installation instructions, have been examined by BRANZ and found to be satisfactory.

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Quality

17.1 The manufacture of Tekton® Building Wrap has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ has taken note of product certification by ICC-ES and CCMC covering quality aspects associated with the product.

17.2 The quality of supply to the market is the responsibility of Marshall Innovations Limited.

17.3 Building designers are responsible for the design of the building, and for the incorporation of the wall wrap into their design in accordance with the instructions of Marshall Innovations Limited.

17.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Marshall Innovations Limited.

Sources of Information

- AS 1530.2 – 1993 Test for flammability of materials.
- AS/NZS 1301.421s: 1998 Determination of the pH value of aqueous extracts of paper, board and pulp – cold extraction method.
- AS/NZS 4200.1: 1994 Pliable building membranes and underlays – materials.
- AS/NZS 4201.1: 1994 Pliable building membranes and underlays – Methods of test – Resistance to dry delamination.
- AS/NZS 4201.2: 1994 Pliable building membranes and underlays – Methods of test – Resistance to wet delamination.
- AS/NZS 4201.3: 1994 Pliable building membranes and underlays – Methods of test – Shrinkage.
- AS/NZS 4201.4: 1994 Pliable building membranes and underlays – Methods of test – Resistance to water penetration.
- AS/NZS 4201.6: 1994 Pliable building membranes and underlays – Methods of test – Surface water absorbency.
- BS 6538.3: 1987 Method for determination of air permeance using the Garley apparatus.
- NZS 2295: 2006 Pliable, Permeable Building Underlays.
- NZS 3604: 2011 Timber-framed buildings.
- Acceptable Solutions and Verification Methods for New Zealand Building Code External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 (Amendment 8, 30 November 2018).
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

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BRANZ

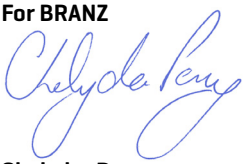
In the opinion of BRANZ, Tekton® Building Wrap is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Marshall Innovations Limited, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Marshall Innovations Limited:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Marshall Innovations Limited.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Marshall Innovations Limited or any third party.

For BRANZ



Chelydra Percy
Chief Executive

Date of Issue:
14 June 2019

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Seismic force calculation
(as per NZS 4219:2009)

Rinnai

Product: Rinnai **INFINITY A-series** gas continuous flow water heaters

Earthquake load demand as per section 3.4		
EQ load demand	F	23.409
F=C x W (equation 3.1) Appliance weight[1]	W	17 .00
Building placement factor[2]	CH	1
Zone factor[3]	Z	0.6
Performance factor	CP	0.85
Risk factor[4]	Rc	1
Lateral force coefficient 2.7 x CH x Z x CP x Rc (equation 3)	C	1.377

[1] Assumes 15 kg max for A26, other A-series models weigh less
[2] Assumes appliance is located at ground floor level
[3] Assumes worst case zone factor based on table NZS 4219 Table 3
[4] Assumes building importance of 4 and component value of P5 based on NZS 4219:2009 Table 2 and Table 1 calculated as per NZS 4219:2009 3.4.3 Table 5

Relative seismic displacement as per section 3.5		
Height between fixing points[1]	Hz	0.571
Component displacement 0.025 x Rc x Hz (equation 3.3)	D	0.001428

[1] Assumes 571 mm on a A-series unit between top and bottom bracket hole centroids

Combined action on component
kg - 273.9906
kn - 2.685108 (safety factor 1.936607)

Rinnai A-series CFWH mounting brackets and hardware has been tested for shear force by SGS in test reports INZ 61025-01 and 61025-02

- Shear force of mounting bracket 5.2 kN
- Shear force of M5 screw 10.0 kN

Fixing suggestions

- Timber fixing: as per NZS 4219:2009 Table 9, 8 mm diameter coach screw inserted into grain side dry radiata pine timber
- Steel fixing: as per NZS 4219:2009 Table 10, M8 bolt
- Masonry drill in fixing: 8 mm (M6) Ramset dynabolt as per Ramset Technical Resource 31.1

Please note: The calculation only pertains to the appliance and not the associated pipework.

JOHN SWARBRICK
Technical and Compliance Manager (01-18)

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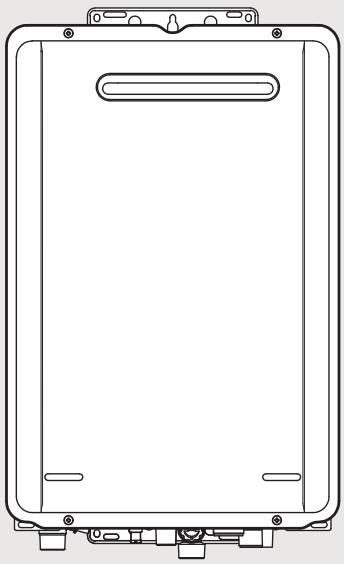
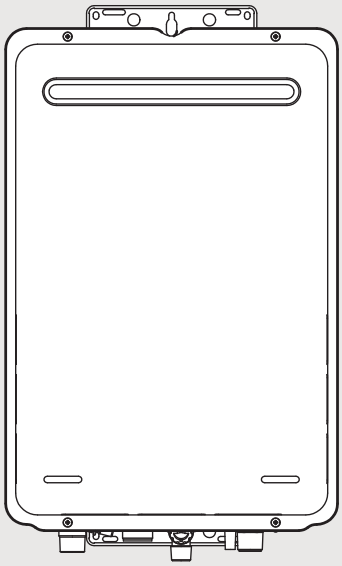
Suitable for the following Rinnai INFINITY models:

- A16 (REU-A1620WG-ZK)
- A20 (REU-A2024WG-ZK)
- A24 (REU-A2426WG-ZK)
- A26 (REU-A2626WG-ZK)
- EF26 (REU-E2626W-ZK)





INFINITY EF26 and A-Series continuous flow water heaters

Installation guide

Rinnai

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Important

This appliance must be installed in accordance with:
- Manufacturer's installation instructions
- Current AS/NZS 3000, AS/NZS 3500, AS/NZS 5601.1 and G12/AS1

For use with Natural Gas or Universal LPG as indicated on the appliance.

Not suitable as a spa or swimming pool heater.
Not suitable for hydronic applications.
Not suitable for commercial or solar applications.
Not suitable for locations greater than 1000 m above sea level.

Appliance must be installed, commissioned and serviced by an authorised person, being in New Zealand a licensed gasfitter.

Warning
Improper installation, adjustment, alteration, service and maintenance can cause property damage, personal injury or loss of life.

For more information about buying, using, and servicing of Rinnai appliances call: 0800 RINNAI (0800 746 624).

Rinnai New Zealand Limited
105 Pavilion Drive, Mangere, Auckland
PO Box 53177, Auckland Airport, Auckland 2150

Phone: (09) 257-3800
Fax: (09) 257-3899
Email: info@rinnai.co.nz
Web: rinnai.co.nz
youtube.com/rinnainz
facebook.com/rinnainz

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EF26 controller communication cables.....19

Before installation

Unpack the appliance and check for damage. DO NOT install any damaged items.

Check all components and that the correct gas type has been supplied.

Get an overview of the steps required before starting the installation. Failure to follow these instructions could cause a malfunction of the appliance. This could result in serious injury and property damage.

These instructions apply only to the continuous flow water heater models listed on the front of this guide.

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Specification

Designed and made in Japan, the Rinnai INFINITY EF26 and A-Series are continuous flow gas hot water heaters with inbuilt frost protection. The EF26 is a condensing model. They have electronic ignition and require electricity to operate. They are factory preset to 55 °C (maximum set temperature is 65 °C).

Scope of use

Suitable for **residential** applications only. They are designed to be externally mounted on an outside wall and located as close as practicable to the most frequently used hot water outlet(s), to reduce the delay for hot water delivery.

They are not suitable as a spa or swimming pool heater, and for hydronic heating. They are also not suitable as a gas boost for solar installations as the temperature cannot be set high enough.

Hard or acidic water will need to be treated to use this product.

Specification summary

	A16 REU-A1620WG-ZK	**A20** REU-A2024WG-ZK	**A24** REU-A2426WG-ZK	**A26** REU-A2626WG-ZK	**EF26** REU-E2626W-ZK
Thermal efficiency	80.5%	80.5%	81%	80.5%	91.5%
Hot water capacity	1.5-20 L/min	1.5-24 L/min	1.5-26 L/min	1.5-26 L/min	1.5-26 L/min
Hot water capacity at a 25° rise	16 L/min 960 L/h	20 L/min 1200 L/h	24 L/min 1440 L/h	26 L/min 1560 L/h	26 L/min 1560 L/h
Input	16.3-124 MJ/h	19.9-156 MJ/h	16.3-184 MJ/h	16.3-199 MJ/h	16.3-175 MJ/h
Output	27.8 kW	34.9 kW	42.0 kW	44.5 kW	44.5 kW
Weight	13 kg	14 kg	15 kg	15 kg	18 kg
Water, nominal operating pressure	120-1000 kPa	160-1000 kPa	200-1000 kPa	200-1000 kPa	220-1000 kPa
Ingress protection	IPX4	IPX4	IPX4	IPX4	IPX5
Power consumption: - Normal - Standby - Frost protection	 47 W 2 W 68 W	 58 W 2 W 68 W	 56 W 2 W 68 W	 65 W 2 W 68 W	 63 W 2 W 92 W

Safety devices

- Flame failure
- Boil-dry protection
- Overheat protection (OHS)
- Fusible link
- Pressure relief valve
- Combustion fan rpm check

Line pressures

- NG 1.13-3.0 kPa
- LPG 2.75-3.0 kPa

The maximum line pressure is 3.5 kPa, with the maximum standing pressure under abnormal intermittent conditions 5.0 kPa. In the case of commercial metering (i.e. 35-37 kPa coming in), there may be a requirement to regulate the incoming line pressure down.

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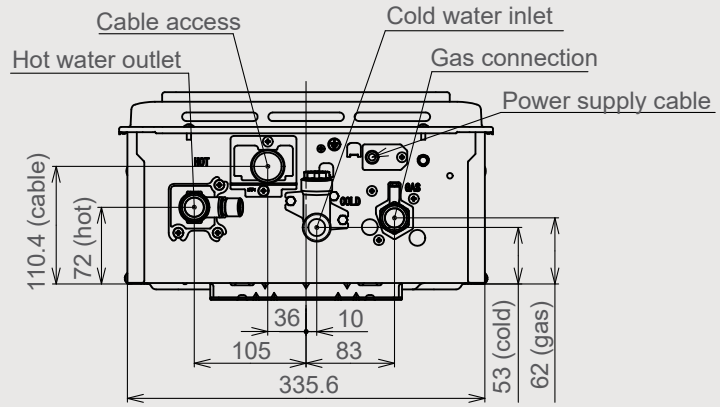
Connections and fittings

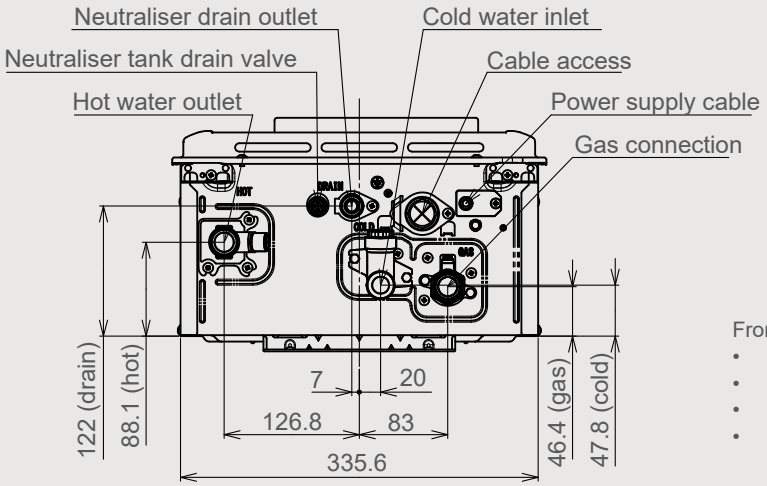
A-Series



From bottom of unit:

- Hot 41 mm (A16 39 mm)
- Cable 29 mm
- Gas 40 mm
- Cold 50 mm

EF26



From bottom of unit:

- Hot 41 mm
- Cable 26 mm
- Gas 38 mm
- Cold 50 mm

		Hot	Cold	Gas	Condensate
A16 external	REU-A1620WG-ZK	R½ (15 mm)	R½ (15 mm)	R¾ (20 mm)	N/A
A20 external	REU-A2024WG-ZK	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	N/A
A24 external	REU-A2426WG-ZK	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	N/A
A26 external	REU-A2626WG-ZK	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	N/A
EF26 external	REU-E2626W-ZK	R¾ (20 mm)	R¾ (20 mm)	R¾ (20 mm)	R½ (15 mm)

Service connection points

An approved full flow isolation valve and disconnection union MUST BE fitted to the cold water inlet. A non-return valve is not required unless stipulated by local regulations.

Isolation valves MUST NOT be fitted directly the appliance.

It may be necessary to fit a temperature limiting device for delivery to areas used primarily for the purposes of personal hygiene, refer page on ‘Water delivery temperature’ for more information.

Purge gas and cold water supply lines to remove air and swarf before final connection. Swarf in the gas or water supplies may cause damage, a common problem, which is not covered by warranty.

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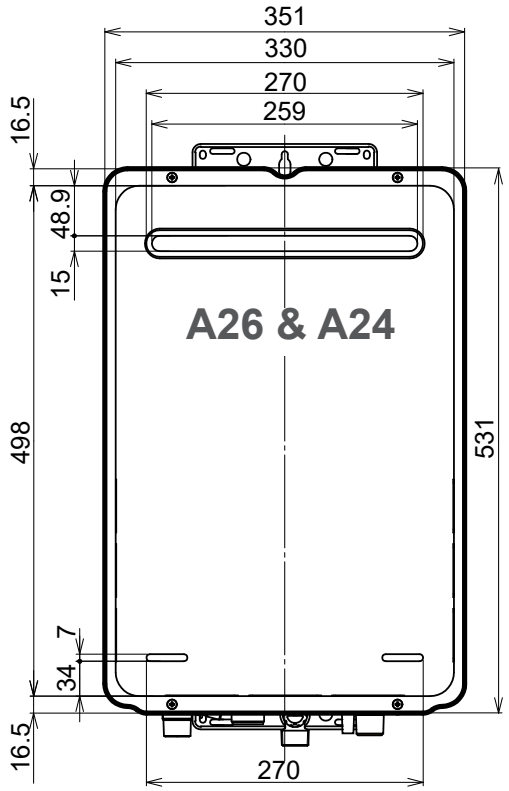
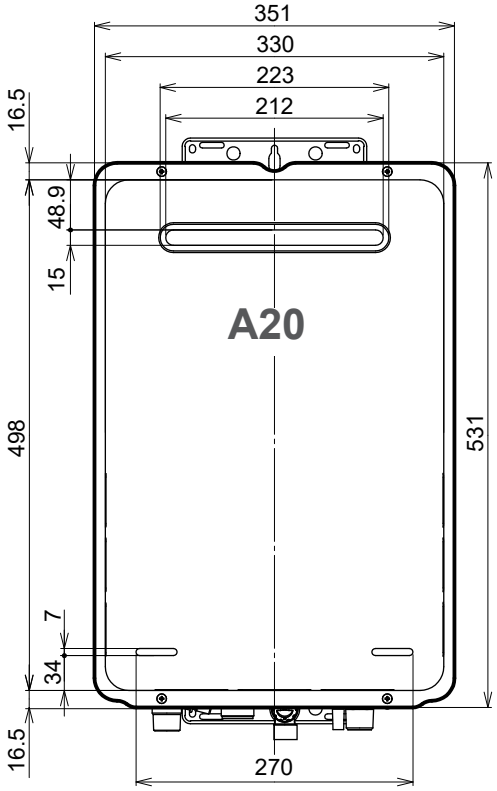
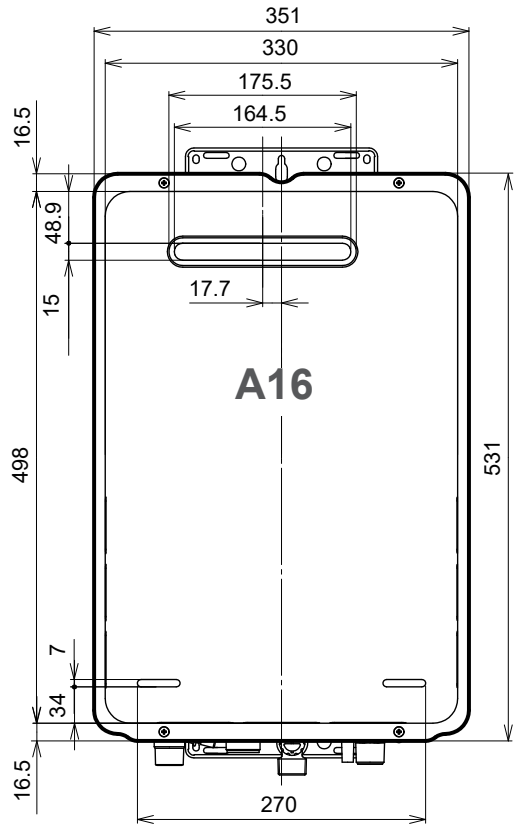
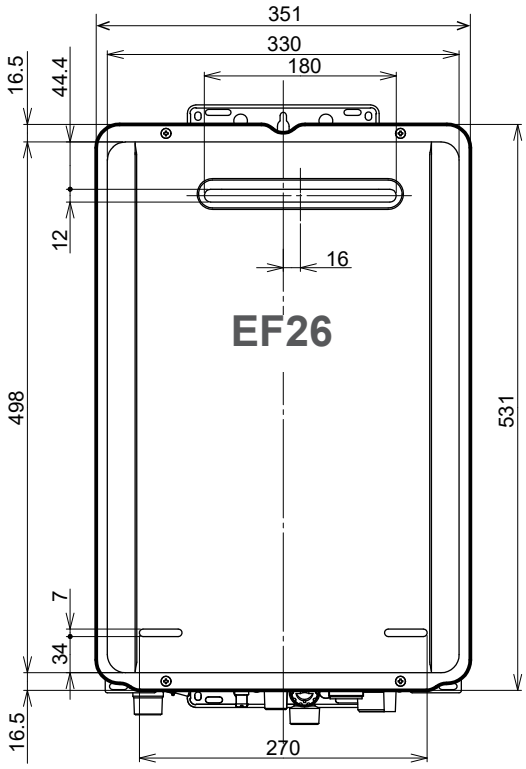
Dimensions (mm)









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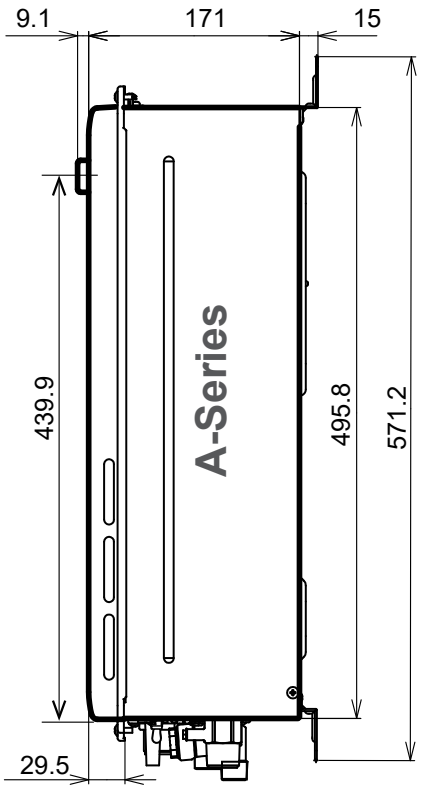

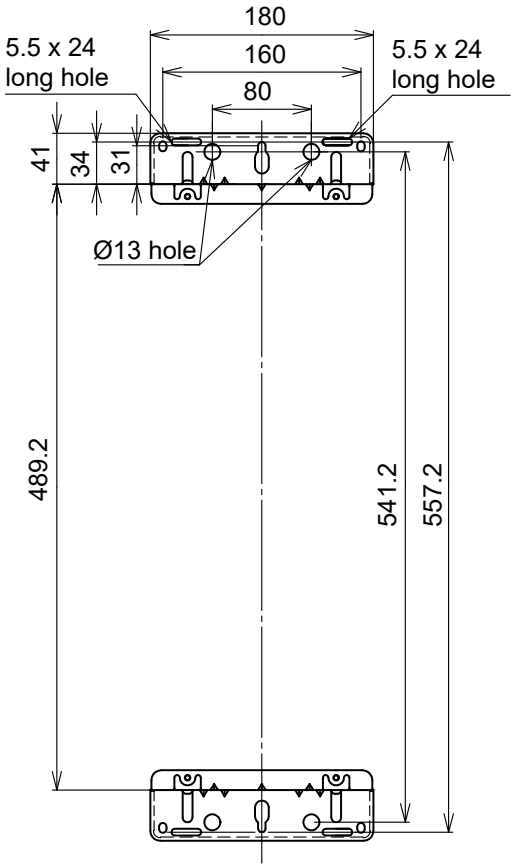

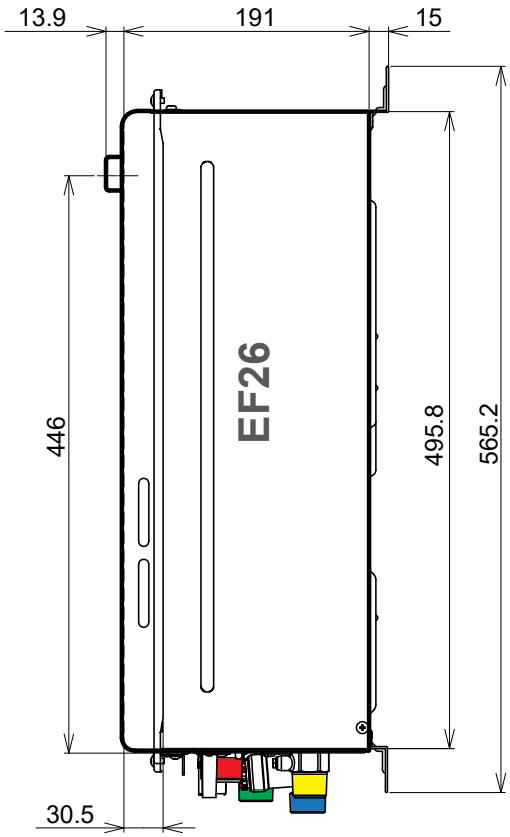

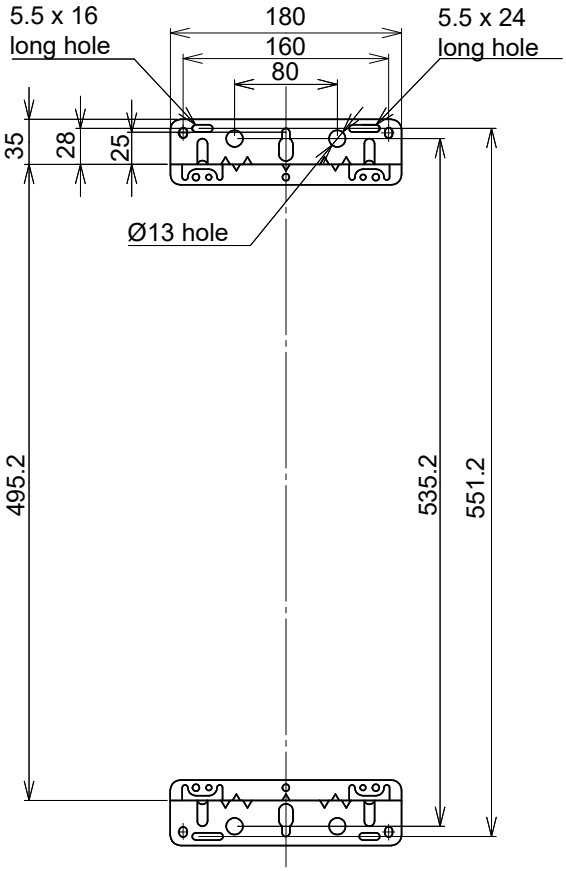

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Appliance location

This appliance is designed for outdoor installations only. It MUST BE located above ground in open air with natural ventilation, without stagnant areas, where gas leakage and products of combustion can be rapidly dispersed by wind and natural convection.

This appliance MUST BE placed as close as possible to the most frequently used hot water outlet(s) to minimise the delay for hot water delivery[1]. For installations where the distance between the water heater and outlets is considerable, a flow and return system can be used to minimise the waiting time for hot water delivery. Alternatively multiple appliances can be strategically placed to serve outlets with minimal delay.

An AC 230 V, 10 A earthed power point must be provided adjacent[2] to the appliance. This power point must be weatherproof. It must be clear of the gas and water connections to the appliance and also the flue exhaust and water pressure relief valve. The power cord of the appliance is 1.5 m long.

All appliances MUST BE installed to ensure access can be gained without hazard or undue difficulty for maintenance and servicing. Sufficient clearances shall allow access and removal of all serviceable components. Appliances should not be mounted more than 2.5 m above the ground or floor level unless the customer can arrange permanent and safe access, or can provide another means of safe access.

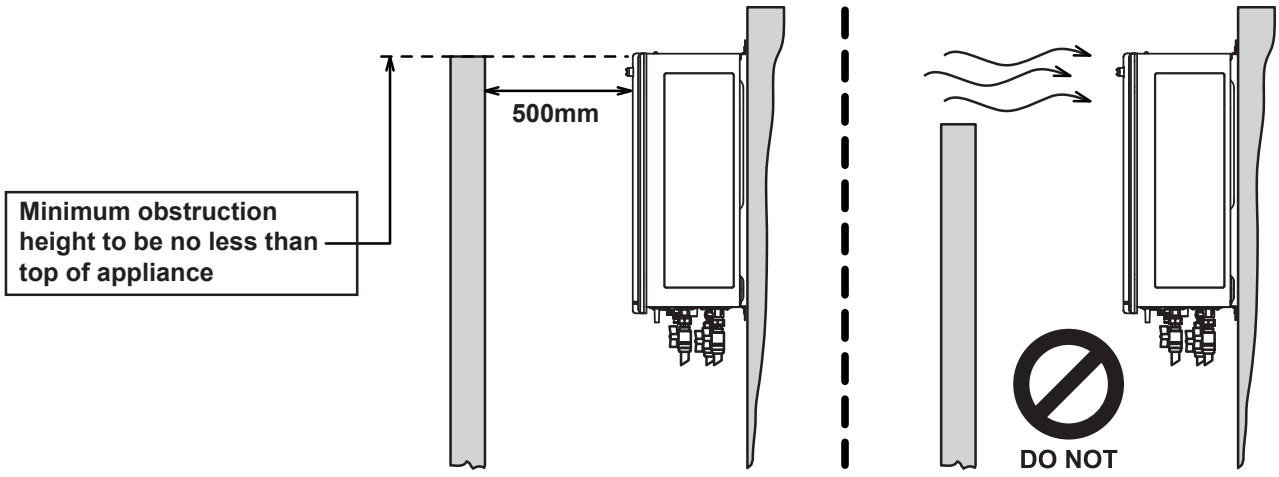
The appliance MUST BE mounted on a vertical structure with the water and gas connections on the underside pointing downwards.

Location of the flue terminal MUST BE in accordance with Section 6 and Figure 6.2 of AS/NZ 5601.

The E26 / A-Series are suitable for installations up to 1000 m above sea level. They are not suitable for alpine areas.

Horizontal obstructions

AS/NZS 5601 states a minimum horizontal clearance of 500 mm between a building structure and obstruction facing the terminal. At 500 mm the obstruction needs to be the full height of the unit, as shown below, and not a partial obstruction. A partial obstruction of less than 1 m could result in wind pushing the flue gases back into the flue terminal.



IMPORTANT

There **MUST** be **NO** partial obstructions to the appliance front cover or any other part of the appliance casing. This will avoid the appliance from failing to operate under windy conditions.

[1] Rinnai recommend a maximum pipe run of 10 m.
[2] Power point can be within the pipe cover if a pipe cover is installed—must comply with AS/NZS Wiring rules

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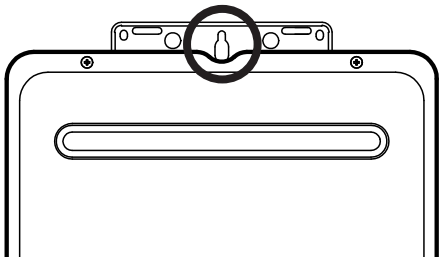
General installation information

Securing the Rinnai INFINITY

The wall structure on which units are mounted MUST BE capable of supporting the weight of the appliance and associated pipe work.

Ensure that suitable fixing screws or bolts are used to secure the unit to the wall, in accordance with AS/NZS 5601 section 6. Wooden plugs shall not be used.

The top bracket has a keyhole slot so that the appliance can be positioned by hanging it on one screw. Once in position the appliance can be secured with appropriate fixings.



The appliance can be mounted directly against the wall or structure. There is no need to use non-combustible sheeting or leave an air gap between the appliance back panel and the wall or structure to meet the temperature hazard requirements of AS/NZS 5601.

Pipe sizing

If the gas pipe sizing is insufficient the appliance won't perform properly. Gas pipe sizing must consider the gas input into this appliance as well as other gas appliances in the premises. The gas meter and regulator must be specified for this gas rate.

An approved sizing chart such as the one in AS/NZS 5601 should be used. Refer specification for gas consumption details.

Water pipe sizing and layout should be performed in accordance with AS/NZS 3500. All hot water pipe work should be insulated to optimise performance and energy efficiency.

Water supply

The appliance is intended to be permanently connected to the water mains.

Refer specification for operational water pressure limitations. Approved pressure limiting valves may be required if the maximum rated water supply pressures are exceeded. To achieve the rated flow, the minimum water supply pressures must be met.

The water heaters will operate at lower pressures but will not achieve the rated flow. Contact Rinnai for gravity fed or low pressure installations.

Water chemistry and impurity limits are detailed in the operation guide within the warranty section. Most metropolitan water supplies fall within these requirements.

If you are unsure about the water quality contact your water authority. If sludge or foreign matter is present in the water supply, a suitable filter or strainer is required in the water supply to the water heater to prevent unwarranted damage and loss of performance.

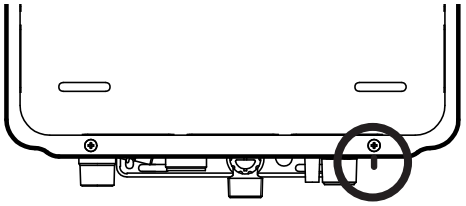
Frost protection

Frost protection operates automatically, as long as the appliance is connected to the electrical power supply, by activating when the temperature inside the unit drops below 3.5 °C[1], and turns off once the temperature inside the unit reaches 7 °C[1].

[1] Approximate temperatures

Frost protection thermistor

The EF26 and A-Series models have an external thermistor to control frost protection. It is a small black indicator located on the bottom right hand side of the unit, directly underneath the cover screw (circled below). The frost protection thermistor needs to be exposed to the outside air to correctly function—do not insulate the frost protection circuit will not work correctly.



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Water delivery temperature

Requirements of AS/NZS 3500 MUST BE considered regarding the temperature limitations of hot water supplied to areas used primarily for personal hygiene. The temperature of these areas may be limited to 55 °C or less.

If the appliance is to deliver water primarily for the purposes of personal hygiene in an early childhood centre, school, nursing home or similar facility as defined in AS/NZS 3500.4, a Temperature Limiting Device (TLD), such as a tempering valve may be required, even if the appliance is set to 55 °C or less. For these types of applications contact Rinnai.

Requirements for Rinnai INFINITY units installed without controllers

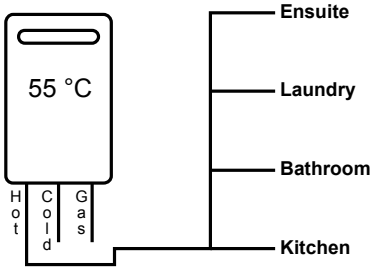

Diagram 1 - 55 °C Appliance

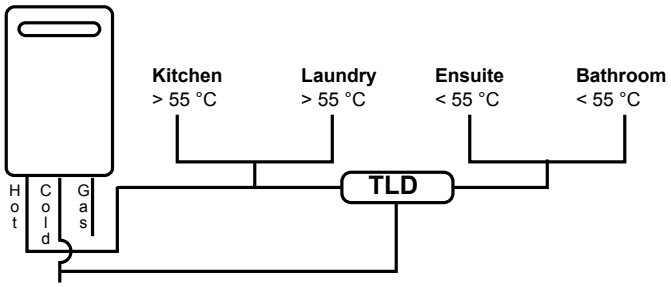

Diagram 2 - Not a 55 °C Appliance
(TLD = Temperature Limiting Device)

When the Rinnai INFINITY is set to deliver water at a temperature higher than 55 °C, it will be necessary to fit a Temperature Limiting Device for delivery to areas used for the purposes of personal hygiene.

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Controller installation

The maximum number of controllers that can be fitted is **four**, refer water controller configurations section below.

General information

Other manufacturers water controllers are NOT compatible with Rinnai water heaters. Water controllers MUST NOT be used with any solar boost water heater. Rinnai water controllers bought in from other countries are not compatible with Rinnai appliances sold in New Zealand.

Water controllers and transceivers (for those with wireless controllers) DO NOT contain serviceable parts and must only be serviced by an authorised person.

Master controller

Only one master controller can be designated as a 'master' water controller. This water controller is normally used in the kitchen. The remaining controllers are 'sub-controllers' and are for use in bathrooms, toilets, and laundries. The temperature limit for all sub-controllers is 50 °C, this is a safety feature, to reduce the risk of burns in these areas. A master controller MUST NOT be installed in a bathroom.

Water controller configurations

- A maximum of four Compact controllers (MC-601) can be fitted.
- Only one master controller can be installed. This can be a Kitchen Deluxe[1] (MC-100V), or any other Compact controller (MC-601).

  [1] When a Kitchen Deluxe controller is fitted, it will always function as a master controller, this is the default setting and cannot be changed.

- In addition to a master controller, up to three additional controllers can be fitted

Controller location

- Do not install water controllers near a heat source, such as a cook top, stove or oven. Heat steam, smoke, and hot oil may cause damage.
- Do not install water controllers outdoors unless protection from water/dust ingress and sunlight are provided.
- Do not install water controllers in direct sunlight.
- Do not install water controllers against a metal wall unless the wall is earthed in accordance with AS/NZS 3000.
- Water controllers must not be installed where chemicals such as benzene, alcohol, turpentine, hydrogen sulphide, ammonia, chlorine or other similar chemicals are in use.

The water controller is water resistant, however excessive exposure to water may result in damage. Durability is improved when positioned OUTSIDE the shower recess.

- Avoid direct exposure to water or steam as these may cause the controller to malfunction.
- Water controllers must be installed in shaded and clean locations. They should be fitted out of reach of children (suggested height 1.5 m from the floor), and installed at least 400 mm above the highest part of a sink, basin or bath.

When cleaning your water controller use only a damp cloth and mild detergent.

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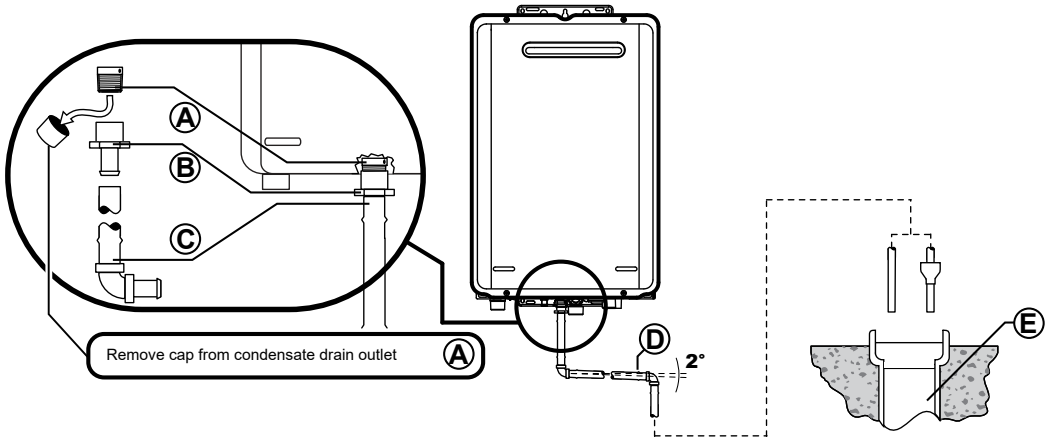
EF26 condensate neutraliser tank and drain

The Rinnai INFINITY EF26 water heater generates condensate continuously at a rate of up to 5 litres per hour as a by-product of a highly efficient gas burner. This condensate has been neutralised by having an inbuilt condensate neutraliser kit.

Important considerations for the neutraliser drain pipe
The content of AS/NZS 3500 ‘ Temperature / Pressure Relief and Expansion Control Valve Drain Lines’ has been used as a guide in preparing the information below.



A. Water heater drain outlet connection, R½” (15 mm) BSP male. Condensate / neutraliser drain outlet connection, ½” (15 mm) BSP male nylon.

N.B: The black plastic shipping cap MUST BE removed from the condensate / neutraliser drain outlet prior to water heater operation.

B. PE R½” BSP (15 mm) female to barbed irrigation system connector (13-19 mm) or equivalent plastic fitting[1].

C. Drain pipe and fittings to match B.

D. Continuous fall of at least 2° from water heater to discharge point. Lengths and bends in accordance with the table below.

Lengths and changes of direction				
Max. length (m)	9	8	7	6
Max. changes of direction greater than 45°	3	4	5	6

E. Suitable points of discharge are deemed to be drains, sewers or pits. DO NOT discharge onto electrical connections, earth stakes, copper pipes, concrete paths or into a pond.

Installation
The drain line MUST NOT discharge onto electrical connections, earth stakes, copper pipes, concrete paths or into a pond.

The point of discharge from each drain line shall be located so that the release of condensate / neutraliser does not cause a nuisance, is readily discernible and incurs no risk of damage to the building.

There shall be no tap, valve or other restrictions in any line.

Each line shall fall continuously from the valve to the approved point of discharge.

Drain lines shall not discharge into a storage water heater safe tray.

The end of the condensate line shall be:

- Not lower than 200 mm or higher than 300 mm above an unpaved surface; or
- Not lower than 75 mm, or higher than 300 mm above a gravel pit not less than 100 mm in diameter in a paved surface.
- Where discharging over a tundish or gully trap, drain lines shall have an air gap of a size at least twice the diameter of the drain line.

[1] Non-PE plastics will fail over time due to contact with the acidic condensate. Damage caused by installation of non-PE plastics will not be covered by warranty.

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Interconnection of condensate drain lines
Condensate / neutraliser drain lines from multiple water heaters may be joined together provided they conform with the requirements detailed on the previous page.

Common stack discharge
Where individual water heaters are installed in a multi-storey building, the condensate / neutraliser drain lines may discharge into a common stack, subject to the following:

- The discharge from the common stack is to a tundish, having a discharge line, that is not less than the size of the common stack, directly connected to a fixture trap, and installed in connection with any adjacent soil or waste stack.
- The discharge point of the common stack is such that any discharge is readily visible and will not cause any nuisance.
- The common stack is vented by extending the pipe upwards, above the roof level.

Tundish drain lines
The drain line from any tundish shall not be less than DN 20 or less than one size larger than that of the largest drain line discharging into a tundish. Tundish drain lines shall comply with the requirements detailed on the previous page.

Areas subject to freezing
In areas where water pipes are prone to freezing, the drain pipe from any valve shall be insulated and not exceed 300 mm in length. It shall discharge into a tundish through an air gap of not less than 75 mm and not more than 150 mm measured from the outlet of the drain pipe to the rim of the tundish.

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Commissioning

AS/NZS 5601.1, clauses 2.6.8 and 6.11.2, states that every part of a gas installation shall be commissioned prior to initial use. It is the installer's responsibility to ensure all current AS/NZS 5601 requirements are met. The URL's provided are links to short videos on how key steps are performed.

WARNING The appliance operation must be tested after installation. Ensure the building occupants do not have access to the hot water outlets during this procedure.

Please note
The Rinnai INFINITY EF26 and A-Series come with a factory preset outlet temperature of 55 °C. The high and low gas operating pressures are also factory preset. Under normal conditions the operating pressures do not require adjustment during installation. Make adjustments ONLY if the unit is not operating correctly and all other possible causes for incorrect operation have been eliminated.

Inlet supply pressure to the appliance MUST BE checked and set within the operating parameters of the appliance in all instances.

If the appliance can not be adjusted to perform correctly call 0800 RINNAI (0800 746 624) for assistance.

Commissioning steps

1	**Flush water pipes and gas line**	Before final connection of the water heater , flush the gas, hot and cold water supply lines. Swarf in the gas or water supplies may cause damage, a common problem, which is not covered by warranty.
2	**Connect the gas line**	
3	**Purge the gas line of air**	
4	**Final connection test**	
5	**Check supply pressure**	Operate ALL other gas appliances at their maximum rate. With all gas appliances on maximum the supply pressure must read between 1.13-3.0 kPa on Natural gas and on LPG 2.75-3.0 kPa. If the pressure is lower, the gas supply is inadequate and the appliance will not operated to specification. It is the installer's responsibility to check the gas meter, service regulator and pipe work for correct operation and sizing, and rectify as required.
6	**PCB settings checked**	Refer sideways flue diverter information on the next page and the PCB interface layout and functions page. PCB settings checked if the factory default temperature has been changed. Dip switch settings checked if a sideways flue diverter is fitted. Short video: http://rinnai.co.nz/007
7	**Operate and test for gas leaks**	Replace the appliance front cover otherwise the unit won't operate correctly, and operate and test for gas leaks using an electronic leak detector.
8	**Operational test**	Confirm the water flow and hot water delivery temperature using a thermometer. If water controllers are fitted, it is necessary to test their operation through the complete range of functions, refer separate instructions provided with the water controllers.

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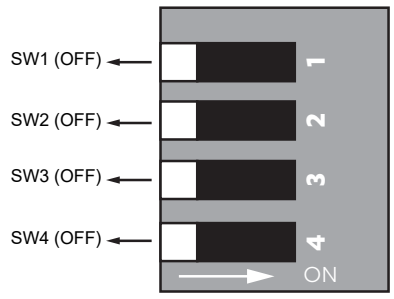
9	**Check cold water inlet filter**	Inspect and clean the water inlet filter. This may need to be repeated to ensure the filter remains clear, especially on new installations. Short video: http://rinnai.co.nz/006 If you feel the customer is capable of doing this check it would be beneficial to show them how to inspect and clean the water filter as well.
10	**Customer handover**	After testing is completed, explain to the customer the function and operation of the water heater and water controllers (if fitted). Also talk to them about: • The gas, power, and water connections • How frost protection works • Procedure for draining the water heater • Where to find the data plate • Maintenance and servicing If the customer is not there try and contact them by phone to discuss these important points. Ensure the installer details section is completed in the operation guide, the commissioning checklist has been completed and signed, and that the guide and checklist are left with the customer.

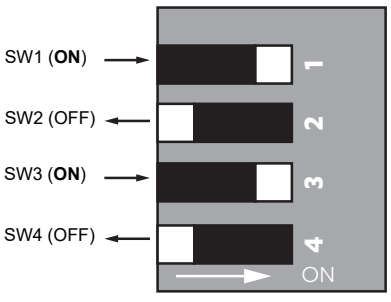
Sideways flue diverter dip switch changes

When delivered ex-factory, by default SW1, SW2, SW3, and SW4 of the DipSW are set to the OFF position.

If a sideways flue diverter is installed onto the water heater, SW1 and SW3 of the DipSW must be set to the ON position.



Default dip switch settings as they are ex-factory.



Dip switch settings required for a sideways flue diverter installation.

The dip switch change for a sideways flue diverter is required to increase the combustion fan speed, which helps overcome the friction losses from having a sideways flue diverter installed on the water heater.

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PCB interface and dip switch settings

The PCB interface and dip switch settings must only be changed by a licensed gasfitter. They have been provided as there may be a requirement to change the temperature of the water delivered from the water heater of change the dip switch settings if fitting a sideways flue diverter.

WARNING Care must be taken when changing the temperature or dip switch settings as they can be easily switched or bumped into the wrong position. Fully check the operation of the water heater before leaving including the temperature of the water delivered.

The cover of the water heater will need to be removed to carry out this operation. As this will expose live mains voltage wiring **please disconnect the power supply before removing the front cover.**

We wish to draw your attention to the requirements of the New Zealand Building Code and compliance document G12. This requires that water delivered to sanitary fixtures be no more than 55 °C. Increasing the water heater set temperature will require that you protect all sanitary fixtures to which the appliance is plumbed with suitable tempering valves or something similar.

Rinnai will accept no liability for issues arising out of the use of this information.

If you have any doubts about the performance of the water heater, please contact Rinnai by phoning 0800 RINNAI (0800 746 624).

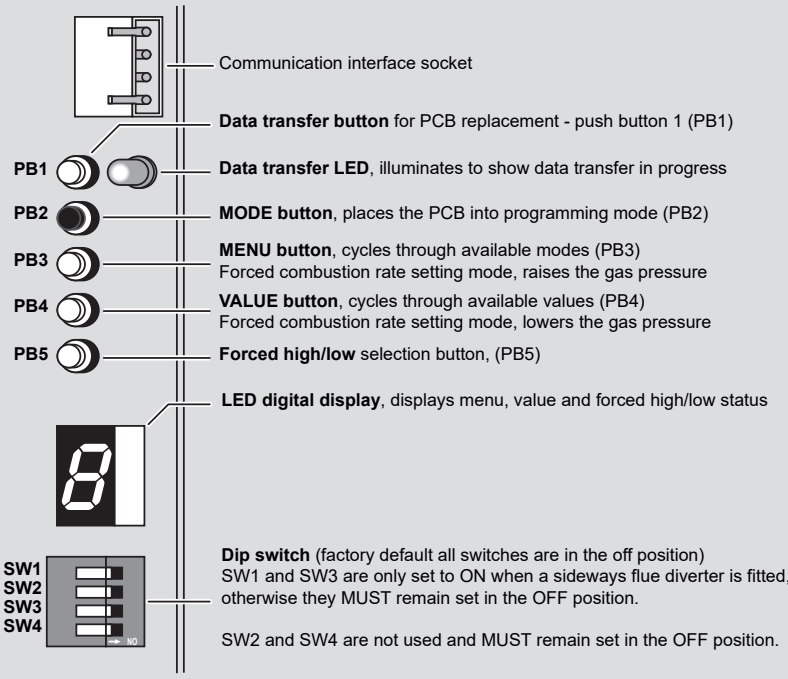
The following information details settings for the Rinnai INFINITY EF26 and A-Series models only. They are not applicable for other models.

Basic operation of the PCB interface

- To place the PCB into programming mode press PB2 until the LED digital display shows 1, noting that the current set value will be displayed shortly afterwards.
- To alter a value press PB4, each press of the button will select the next available value.
- To change to another menu, press PB3, each press of the button will select the next available menu.
- To exit the programming mode and save the selected settings press PB2 until the LED display goes blank.

Note:

- If no buttons are pressed the PCB will automatically exit programming mode after 10 mins.
- Exiting programming mode sets the value last viewed as the current value.



EF26 error code 92

Neutraliser alert will flash when the total calorific value reaches 255 GJ, approximately 16 years of residential use. Water heater can still work, but the condensate trap should be changed.

To cancel the error code, press PB4 and PB5 together and hold for more than five seconds.

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Menu	Menu description	Value							
		A	b	C	d	E	F	H	J
1	Gas type	ULPG	NG	N/A	N/A	N/A	N/A	N/A	N/A
2	Model	2626	2426	2024	1620	N/A	N/A	N/A	N/A
3	Fixed / Max. temp	55 °C	65 °C	60 °C	50 °C	42 °C	40 °C	N/A	N/A
4	OFF water flow rate	+ 3 °C	+ 6 °C	N/A	N/A	N/A	N/A	N/A	N/A
5	50 °C delivery adjustment temp.	0	N/A to NZ—Australian models only					+1 °C	+2 °C
6	Remote controller safe program	ON	OFF	N/A	N/A	N/A	N/A	N/A	N/A
7	OHS	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A
8	**EF26 only** Condensation prevention on manifold	Default							
9	**A24/A26 only** Fan revolution	180 Hz	100 Hz	Setting change to reduce fan noise if customer states unit is too noisy (Ver. 7, PCB label G)					
0	Post fan time	65 sec	120 sec	240 sec	480 sec	To reduce the HEX temp. after combustion			

If the settings are changed, please note these on this sheet for future reference. These will be needed if a PCB replacement is required and a manual data transfer is needed.

Dark shaded sections = default setting

Parameter setting notes

- 2: Values in Menu 2 cannot be adjusted.

- 4: Menu 4 OFF water flow rate
  The temperature of the outgoing hot water is monitored by a built-in sensor. If the temperature of the outgoing hot water rises more than 3 °C (default, or 6 °C if 4b) above the selected temperature shown on the digital monitor or the preset limit when water controllers are fitted, the burner will automatically go out.

- 6: Menu 6 Remote controller safe program
  Factory default is ON. If a controller has been continuously connected for more than six hours, the PCB automatically defaults to controller only mode, making the assumption that the water heater will always be connected to and operated by a controller. This means if a controller is disconnected, the inbuilt safe program will only allow the unit to deliver a maximum temperature of 42 °C. If this safe program is not needed, change menu 6 from A (ON) to b (OFF).

- 7: OHS for solar applications
  N/A for New Zealand models, this is for Australian models only that have different temperature settings. Please remember that the A-Series and the EF26 are not suitable and will not be warranted for solar applications.

- 8: Prevention of condensation on the manifold (EF26 only)
  If exhaust gases go back into the combustion chamber, condensation on the manifold nozzle causes error 11. To prevent this, the post-fan time (fan revolution after combustion) can be controlled as follows.

8	Prevention of condensation on the manifold	A	b	C	d
	Post fan time	Outside temp. > 15 °C → 15 sec. Outside temp. ≤ 15 °C → 120 sec.	15 sec	240 sec	480 sec
	Post fan revolution	X (Hz), X depends on the model, e.g. 180 Hz	X (Hz)	X(Hz) + 50 Hz	X(Hz) + 50 Hz

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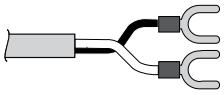
A-Series controller communication cables

Wired water controllers operate at an extra low voltage (12 V DC) which is supplied from the water heater, a 10 m long communication cable is supplied for connection to the water heater. Only Rinnai supplied communication cables may be used.

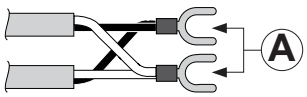
The water heater end of the cables is fitted with spade terminals. Only two pairs of cables (four spade connectors in total) may be terminated. When attaching three or four cables it is necessary to join the cable terminators as shown below.

For each pair cut off the existing spade connectors and re-terminate each pair into a new spade connector (A). Spade connectors are available from your local electrical component retailer

Single cables can be used when terminating up to two communication cables.



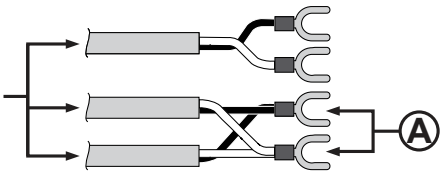
Paired cables are to be used when terminating three or four communication cables.



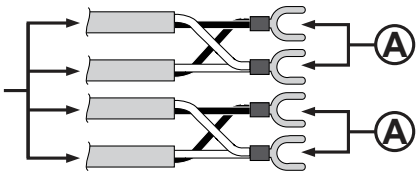
Connecting one or two communication cables
Follow steps one through five below to terminate the cables to the water heater.

Connecting three or four communication cables
To connect three or four cables, separate all the cables to be fitted into pairs.

When terminating three cables



When terminating four cables



Follow steps one through five below to terminate the joined cable pairs to the water heater.

1. Isolate the power supply by switching the power point off and removing the power plug of the water heater from the electric power socket.

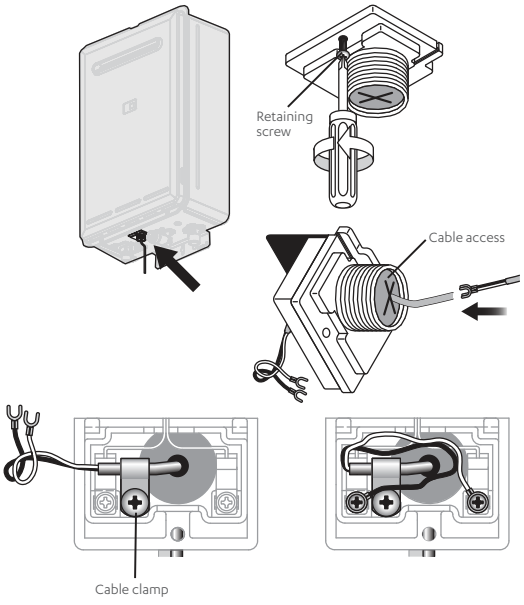
2. Removing the retaining screw of the cable connector at the base of the unit.

3. Swing the cable connector door open and thread the cable through the weather seal of the cable access hole, allowing sufficient cable length so that the sheath of the cable can be secured with the cable clamp supplied with the transceiver.

4. Loosen the screw terminals and connect the cable spade connectors to these terminals and re-tighten.

   Polarity is not important, either wire colour can be connected to either terminal.

5. Return the cable connector to the original position, taking care not to damage the cable wires in the process, and replace the retaining screw.



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EF26 controller communication cables

Wired water controllers operate at an extra low voltage (12 V DC), which is supplied from the water heater. A 10 m long communication cable is supplied for connection to the water heater. Only Rinnai supplied communication cables may be used.

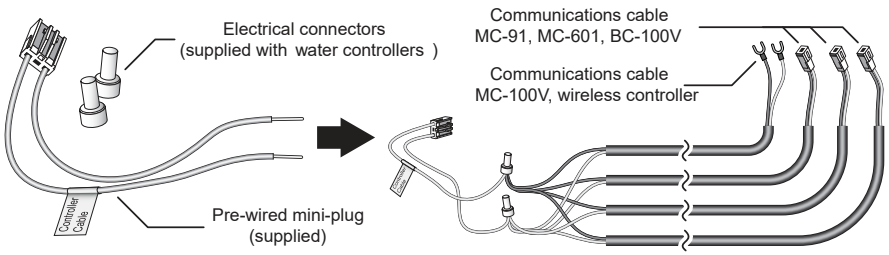
Connecting communication cables to the mini-plug

CAUTION

DO NOT attempt to connect water controller cables to the mini-plug when it is plugged into the PCB unless the power to the water heater is switched OFF, otherwise damage to electrical components may occur.

Water controllers are connected to the PCB by a dedicated pre-wired mini-plug.

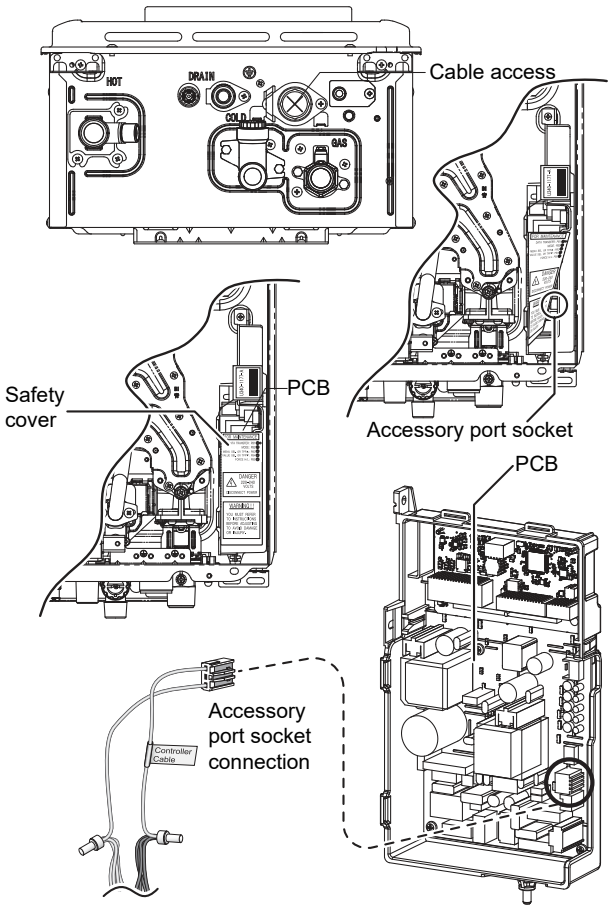
Standard electrical cable connectors can be used to terminate the water controller wires to those on the mini-plug. The existing spade connectors, of the communication cables, will need to be removed prior to termination. Controllers are not polarity sensitive, however to avoid confusion it is recommended that like coloured wires be terminated together.



Connecting communication cables to the PCB (refer image below)

DO NOT attempt to connect the mini-plug or water controller cables to the water heater unless the power to the water heater is switched OFF, otherwise damage to electrical components may occur.

1. Isolate the power supply by switching the power point off and removing the water heater plug from the power socket.
2. Remove the front cover of the appliance.
3. Insert the mini-plug and the connected water controller cables through the cable access at the base of the appliance. Ensure the cable connectors are located inside the appliance for protection.
4. Locate the PCB (bottom right of the appliance), and carefully move the plastic safety cover out of the way.
5. Locate the accessory port socket (bottom front of PCB).
6. Plug the mini-plug into the accessory port socket, the plug and socket are keyed so that they can only be plugged into the one direction).
7. Proceed with the water controller installation and connect the communication cables to the controllers.



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Rinnai.co.nz

Installation guide

Tel: 0800 746 624
http://www.youtube.com/rinnainz
http://facebook.com.rinnainz

U340-1336X02(00)
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Marshall Innovations Construction Solutions

TEKTON SPECIFICATION

PRODUCT DESCRIPTION

Tekton Wall Underlay is a synthetic breather-type Wall Underlay for use as a wall underlay and air barrier under direct and non-direct fixed wall cladding on timber and steel framed buildings. The product is a coated spun-bonded polypropylene, and is approximately 0.6mm thick. Tekton Wall Underlay is supplied in rolls 2740mm x 37m and 1370mm x 37m.

FEATURES /BENEFITS

- Tekton Wall Underlay can be used in all wind zones up to and including very high and extra high with RAB Systems.
- Tekton Wall Underlay is fire retardant with a zero flammability index and can be used without restriction on all buildings, however must be separated from fireplaces, heating appliances, flues and chimneys in accordance with the NZ Building Code.
- Tekton Wall Underlay can be installed as an air barrier to walls that are not lined, such as gable ends.
- Tekton Wall Underlay has superior water hold out - keeping framing drier while permanent cladding is installed.
- Tekton Wall Underlay has 50 year durability.
- Tekton Wall Underlay can be left exposed for up 60 days.
- Tekton Wall Underlay has optimal surfactant resistance (will not lose integrity if exposed to most soaps, detergents and cleaning chemicals).
- Tekton Wall Underlay is Branz appraised # 548 (2013)
- Tekton Wall Underlay can be used as a non-rigid backing material for stucco plaster and as a slip layer over rigid backing for stucco plaster.
- Tekton Wall Underlay is compatible with metal cavity battens.

APPLICATION RANGE

TIMBER FRAMED BUILDINGS

- With absorbent wall claddings directly fixed to the framing.
- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity.
- With masonry veneer.
- In building wind zones up to and including very high.

STEEL FRAMED BUILDINGS

- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity.
- With masonry veneer.
- In building wind zones up to and including very high.

Tekton Wall Underlay can also be used on buildings subject to specific weathertightness design.

STORAGE

Tekton Wall Underlay must be stored on its end in a clean and dry environment. It is the responsibility of the installer to protect the roll from damage and weather.

SURFACE PREPARATION

Studs must be provided at a maximum of 600mm centres. Nogs must be fitted flush between the studs at a maximum of 1200mm centres. The framing must be free from any sharp protrusions that may damage the wall underlay.

TEKTON Specification

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INSTALLATION

PLACEMENT

- The branded side of the wall underlay must face away from the framing.
- The wall underlay must run horizontally.
- The wall underlay must extend from the upper side of the top plate to the underside of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs.
- Horizontal laps must be no less than 75mm with the direction of the lap ensuring that water is shed to the outside.
- End laps must be made over framing and be no less than 150mm wide.

It is preferable to tape all joins.

APPLICATION

- Position the roll of Tekton Wall Underlay against the framing with a short length of wall underlay free of the roll.
- Align the guide marks printed on the Tekton Wall Underlay with visible studs and nail /staple to the framing

Fix the wall underlay into place using 6-8mm zinc/ stainless plated staples, hot dip galvanised large head clouts or proprietary wall underlay fixings.

- Unroll the wall underlay across the framing and fix to all framing members at a maximum of 300mm centres.
- Keep the wall underlay straight and taut over the framing.
- The wall underlay should be run over any openings and these should be left covered until the windows and doors are ready to be installed. To form the openings cut the wall underlay at a 45 degree diagonal in from each corner. Fold and staple the wall underlay to the inside of the framed opening. Excess wall underlay can be trimmed.
- All openings must be detailed using a Branz appraised flexible flashing system like Super-Stick, Protecto One Piece Sill Tape or the Protecto Sill System.
- Where cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens to prevent the wall underlay bulging into the cavity space when insulation is installed.
- Tekton Wall Underlay can be added as a second layer over head flashings as per E2/AS1 or the headflashing can be sealed to the wall underlay using Protecto Head Flashing Tape.
- Any damaged areas of the wall underlay must be repaired by overlapping with new material and taping, or by taping small tears .

When fixing wall underlay in windy conditions, care must be taken due to the large sail area created by the roll widths.

WARRANTY

Tekton Wall Underlay meets the durability requirements of NZBC B2.3.1(a), 50 years and B2.3.1(b), 15 years. Tekton Wall Underlay is warranted to be free of defect in manufacture. This warranty is limited to replacement of the Tekton Wall Underlay material. Marshall Innovations NZ/AUS Ltd (the distributor) is not liable for incorrect installation or any accidental or wilful damage to the product.

TEKTON Specification

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Thermakraft™

Installation Guide

THERMAKRAFT 215

Self-supporting bituminous wall and roof underlay

Commonly referred to as “Building Paper” Thermakraft 215 is a self-supporting, kraft paper based, bituminous building underlay that is suitable for use on roofs and walls in residential buildings. It is vapour permeable, meaning that liquid water from the outside is prevented from penetrating but water vapour from the inside can pass through and escape the building envelope. Thermakraft 215 is easy to install.

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Installation Guide

Application Method (Roofing)

Thermakraft 215 is a bituminous building underlay used on roofs in residential buildings.

- Thermakraft 215 can be used in direct fix or cavity fix for roof construction.
- Run NO longer than 10m.

Long-run metal roofing/vertical or horizontal installation method

- Fix using stainless steel 8-12mm staples or 20mm flat head clouts, or appropriate proprietary fastenings on timber framed structure. Fixing at 300mm centres. Fixing types and requirements for steel framed structure can be found in the MRM Code of Practice.
- Refer to table below to determine underlay support requirements.

Roof Pitch	Span	Underlay Support Required	
		Horizontally Installed	Vertically Installed
≥ 10°	> 1200mm	Yes	Yes
	≤ 1200mm	No	No
< 10° (Min 3°)	> 1200mm	Yes	Yes
	≤ 1200mm	No	Yes

- Thermakraft 215 upper sheet lapped over lower sheets (shiplap) to ensure water is shed to the outer face.
  Note: Thermakraft 215 can move downwards. To prevent this, it must be "Captured" by the fastenings at each purlin. Horizontal fix must not be used on purlin distance greater than 1100mm to allow for 150mm laps.
- Must be laid firmly (tight/taut) without creases. All laps either vertical or horizontal must be a minimum of 150mm lap.
- When underlay support is required, Thermakraft recommend using AUSMESH Safety Mesh, AUSNET hexagonal netting or Thermastrap 201.
- Thermakraft 215 can be installed above the battens or purlins for profiled metal roof claddings and otherwise in accordance with NZBC E2/AS1.
- If required to achieve a lap seal (refer to NZ Metal Roofing Code of Practice), use Thermakraft Aluband window sealing tape or Thermakraft White General Purpose Tape.
- Thermakraft 215 will provide temporary weather protection during construction, same day coverage recommended. DO NOT over expose the product to the weather or UV for more than 7 days in any roof applications.
- Thermakraft 215 may be unwound to the full length from the gutter to the ridge. However, when ridge ventilation is required Thermakraft 215 may be terminated or slit at the ridge purlin to allow a free passage of air.
- Thermakraft 215 must NOT overhang the gutter line by more than 20 mm, or if eaves flashings are used, terminate on the upper side of the flashing. More details can be found in the MRM Code of Practice.
- Flue penetrations must have a minimum distance of 50mm from Thermakraft 215 (refer to NZ Metal Roof and Wall Cladding Code of Practice 10.11.5).
- Thermakraft 215 must be free of tears and punctures, fit tightly and be lap taped around all penetrations (except flue penetrations), to provide drainage for any condensation, or surface water from leaks.

Note: Do not use Aluband on penetrations where Polybutene water pipes have been installed. Refer Pipe Manufacturers for instructions on sealing penetrations.

Concrete/Metal tile roofing

- Thermakraft 215 must be laid over rafters prior to fixing the tile battens. The maximum span between rafters for Thermakraft 215 is 1200mm. Masonry tile roofs must have antiponding boards in accordance with NZBC E2/AS1 Paragraph 8.2.5.
- Installed Thermakraft may be laid over the top of the antiponding boards and draped into the gutter by no more than 20mm. Antiponding boards must be treated in accordance with NZS 3604.
- Do NOT Run Thermakraft 215 longer than 10m in length.

Application Method (Wall)

- Fix Thermakraft 215 underlay with printed side facing the exterior.
- Fix to all exterior walls from below bearers to the top plate. Pull the Thermakraft 215 underlay tight and fix securely to the frame with fasteners such as galvanized Little Grippers, 6mm-8mm staples or 20mm large head galvanized clouts at 300mm centres horizontally and vertically. Additional fasteners should be used around each opening to be cut out. Fixing types and requirements for steel framed structure can be found in the MRM Code of Practice.

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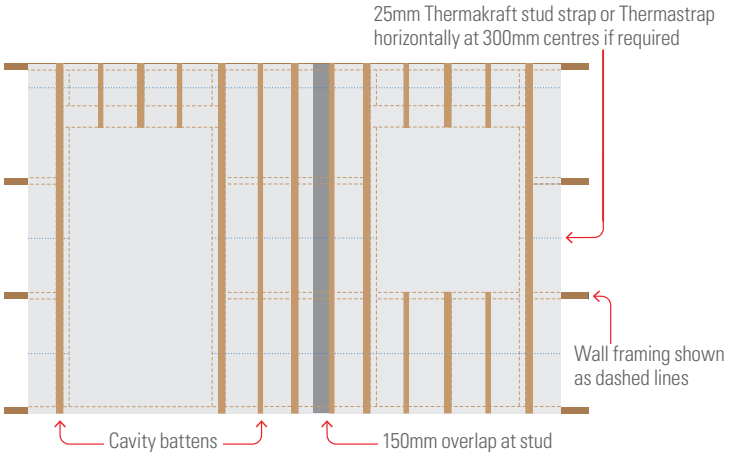
Installation Guide

- When fixing Thermakraft 215 underlay to Steel framing the same procedures applies, use adhesive spray or tape or flat head screws to fasten to the framing or thermal break, the exterior cladding fastenings will act as the permanent fixings.
- Cover all windows and door openings with Thermakraft 215 underlay.
- It is recommended that the Thermakraft 215 underlay is not cut and prepared for window installation until the arrival of the windows. minimum of 150mm lap is required at joins, all vertical laps must be made over studs. Horizontal laps to be laid ship lap style allowing water to be shed to the outer face of the membrane.
- When windows and doors are ready for installation, the Thermakraft 215 underlay covering the openings should cut at 45° and folded into the opening and securely fastened. Thermakraft window flashing tapes are recommended as the window flashing system.
  Note: In accordance with NZBC Acceptable Solution E2/AS1, wall underlay must be prevented from bulging into the drained cavity. Where stud spacing is greater than 450mm Thermakraft stud strap run horizontal at 300 centres is an acceptable means of prevention.
- Once installed, Thermakraft 215 must not be left exposed to the weather or UV for a maximum of 28 days. Thermakraft 215 underlays will provide temporary weather protection during construction allowing work to continue. Internal linings and insulation must not be installed until the exterior cladding is completed.
- Fastenings behind Brick Veneer Cladding must have an equivalent service life to that of Brick Veneer (50 years). Refer to NZS 3604.
- Make good any forced tears with Thermakraft window flashing tapes. Any large areas which require repair may be covered with a second layer of underlay, a lap of 150mm is required.
- For wall cavity systems where stud spacings are greater than 450mm centres, another means of restraint is required on the flexible underlay to prevent insulation bulge (refer to E2/AS1).
- Thermakraft 215 underlay must be installed by a licensed building practitioner.



Application Tips

- Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent chemical to flash off in a well ventilated area. Recommended minimum 7 days.

Handling and Storage

Thermakraft 215 underlay must be handled with care to prevent damage such as tearing and roll deformation. Due to the width of the product, care should be taken when installing in windy conditions.

The product must be stored under cover well away from direct moisture, rainfall contact and sunlight (UV). Care should be taken not stack other materials on top of the product.

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The recommendations contained in Thermakraft's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to any conditions contained in the Warranty. All product dimensions and performance claims are subject to any variation caused by normal manufacturing process and tolerances. Furthermore, as the successful performance of the relevant system depends on numerous factors outside the control of Thermakraft (for example quality of workmanship and design), Thermakraft shall not be liable for the recommendations in that literature and the performance of the Product, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code, regulations and standards. Literature subject to change without notification. Latest documentation can be found on the website. E&OE.

Issue 1, November 2019

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Thermakraft™

Product Data Sheet

THERMAKRAFT 215

Self-supporting bituminous wall and roof underlay

Commonly referred to as “Building Paper” Thermakraft 215 is a self-supporting, kraft paper based, bituminous building underlay that is suitable for use on roofs and walls in residential buildings. It is vapour permeable, meaning that liquid water from the outside is prevented from penetrating but water vapour from the inside can pass through and escape the building envelope. Thermakraft 215 is easy to install.

Thermakraft 215 comes in two roll sizes:

1250mm wide	20m long	25m^2 coverage*
1250mm wide	40m long	50m^2 coverage*

* **Note:** m2 is the roll size for actual coverage, allow for laps and joins.

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Thermakraft 215

Self-supporting bituminous wall and roof underlay

Scope of Use (Roof Application)

- Suitable with masonry tile, metal tile and profiled metal roof cladding.
- Direct fix or cavity fix.
- Can be used on roofs up to and including NZS 3604 'Extra High' wind zones.
- Refer to installation guide regarding underlay support requirements.
- Will provide temporary weather protection during construction (maximum 7 days), same day coverage recommended.

Scope of Use (Wall Application)

- Suitable for use with both timber and steel framing, either direct fix or in conjunction with an 18mm minimum drained cavity.
- Can be used with absorbent wall claddings (e.g. timber, brick or fibre cement) or non-absorbent wall claddings (e.g. metal or plastic).
- Can be used with masonry veneer in accordance with NZS 3604.
- Suitable for buildings situated in NZS3604 Building Wind Zones up to and including 'Very High'.
- Thermakraft 215 can be used as an air barrier to reduce wind entry and is highly water resistant.
- Will provide temporary weather protection during construction (maximum 28 days).

General

Unaffected by LOSP or other solvent based treated timber. However, LOSP or other solvent based treated timber must have sufficient time for the solvent chemical to flash off in well ventilated area. Recommended minimum 7 days.

Limitations

- In roofing applications must NOT be exposed to the weather or UV for more than 7 days.
- In wall applications must NOT be exposed to the weather or UV for more than 28 days.
- Must NOT be used under translucent sheeting.
- Is not fire retardant.
- Not suitable for School Property, please refer to Ministry of Education; Weather-Tightness & Durability requirements for School Property.

Compliance

Thermakraft 215 meets the requirements of NZBC Acceptable Solutions E2/AS1, Table 23 and NZS 2295:2006 for both wall & roof underlay.

Durability

Meets the Performance Requirements of NZBC Clause B2, Durability B2.3.1 (a) 50 years and B2.3.1 (b) 15 years, E2 External Moisture providing:

- It is installed in accordance to Thermakraft Installation Guide.
- Run length is no greater than 10 meters.
- Is NOT left exposed to the weather or UV for more than 7 days on roof.
- Is NOT left exposed to the weather or UV for more than 28 days on walls.
- Is installed by or under guidance of Licensed Building Practitioners.
- Is installed in accordance with the MRM Code of Practice.
- Is compatible with the cladding system used.*

* **Note:** roof cladding system compatibility testing must be done first before installation.

Property Performance

NZBC E2/AS1 Wall Underlay Requirements					
NZBC E2/AS1 Table 23 (NZS2295) Roof Underlay Properties	**Absorbency**	**Vapour Resistance**	**pH of Extract**	**Shrinkage**	**Water Resistance**
Property Performance Requirement	≥ 150gsm	≤ 7 MN.s/g	≥ 5.5 and ≤ 8	≤ 0.5%	100mm for 24 hrs
Property Performance	Pass	Pass	Pass	Pass	Pass

NZS2295:2006 Classification			
NZBC E2/AS1 Table 23 (NZS2295) Roof Underlay Properties	**Flammability Index**	**Wind Zone**	**NZS2295:2006 Index**
Property Performance Requirement		R2	R2
Property Performance	Non-Fire Retardant	Up to Extra High	Self - Support

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Thermakraft 215

Self-supporting bituminous wall and roof underlay

Control of Condensation

In climatic regions where condensation risks are high, such as cold or high humidity areas, care needs to be taken in specifying the correct design and installation method to prevent moisture build-up in the roof cavities.

Factors which adversely affect the condensation risk in roofing systems include:

- Humid, and/or cold climatic regions.
- Warm/Skillion roof construction.
- Low roof cavity air volume and restricted air movement.
- Omitting Vapour Control Layers.
- Occupancy activities which have high moisture loading on conditioned spaces.
- Ceiling penetrations and entry of warm air into roof cavities.
- Low pitched roof.
- Bulk insulation.
- Building structures ability to naturally dry construction moisture.

Skillion and Warm Roof Construction are particularly sensitive to moisture accumulation and the design and installation of roof construction needs to take into account the higher condensation risks. Refer to MRM Code of Practice for details.

For passive ventilation of the roof space, it is recommended that all roof underlays are terminated at the ridge, and if not it should be slit or slotted to allow for passive ventilation. (For further information refer to the NZ MRM Roofing Code of Practice).

Product Warranty

Standard Thermakraft warranty applies. Refer to Thermakraft Warranty Statement for further details. This is available online at **thermakraft.co.nz** or call **0800 806 595.**

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Issue 6, November 2019

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

BRANZ Appraised
Appraisal No. 548 [2019]

TEKTON® BUILDING WRAP

Appraisal No. 548 (2019)

This Appraisal replaces BRANZ Appraisal No. 548 (2013)

BRANZ Appraisals

Technical Assessments of products for building and construction.

Marshall Innovations Limited
PO Box 9411
Greerton
Tauranga
Tel: 07 543 0948
Fax: 07 541 1029
Web: www.mwnz.com

BRANZ
1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz

Product

1.1 Tekton® Building Wrap is a synthetic breather-type flexible wall underlay and air barrier for use under direct and non-direct fixed wall cladding on timber and steel framed buildings. The product is manufactured of a coated spun-bonded polypropylene.

Scope

2.1 Tekton® Building Wrap has been appraised for use as a flexible wall underlay on timber framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- with absorbent wall claddings directly fixed to framing; and,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
- with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
- situated in NZS 3604 Wind Zones up to, and including Very High.

2.2 Tekton® Building Wrap has been appraised for use as a flexible wall underlay on steel framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
- with masonry veneer subject to specific design; and,
- situated in NZS 3604 Wind Zones up to, and including Very High.

2.3 Tekton® Building Wrap has been appraised for use as a flexible wall underlay over rigid wall underlays on timber and steel framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
- with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1 for timber framed buildings or specific design for steel framed buildings; and,
- situated in NZS 3604 Wind Zones up to and including Extra High.

2.4 Tekton® Building Wrap has also been appraised for use on buildings subject to specific weathertightness design. Building designers are responsible for the building design and for the incorporation of Tekton® Building Wrap into their design in accordance with the declared properties and the instructions of Marshall Innovations Limited.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Tekton® Building Wrap, if used, designed, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet, or contribute to meeting the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (a), not less than 50 years, B2.3.1 (b), 15 years and B2.3.2. Tekton® Building Wrap meets these requirements. See Paragraphs 9.1 and 9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the cladding system, Tekton® Building Wrap will contribute to meeting this requirement. See Paragraphs 12.1 – 12.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Tekton® Building Wrap meets this requirement and will not present a health hazard to people.

Technical Specification

4.1 Tekton® Building Wrap is a 100 g/m^2 light grey sheet polypropylene membrane material approximately 0.6 mm thick.

4.2 The product is supplied in rolls 1.370 m x 37 m and 2.743 m x 37 m. The product is printed with the Tekton® logo repeated along the length of the roll. The rolls are wrapped with an instruction sticker.

Accessories

4.3 Accessories used with Tekton® Building Wrap which are supplied by the installer are:

- Fixings – staples, clouts, screws or proprietary wrap fixings, or other temporary fixings to attach the wall wrap to the framing.
- Wall underlay support – polypropylene strap, 75 mm galvanised mesh or galvanised wire, or vertical cavity battens where required to support the wall wrap in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

Handling and Storage

5.1 Handling and storage of the product, whether on or off site, is under the control of the installer. The rolls must be protected from damage and weather. They must be stored on end, under cover, in clean, dry conditions and must not be crushed.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Tekton® Building Wrap. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Timber and Steel Framing

7.1 Studs must be provided at maximum 600 mm centres. Dwangs must be fitted flush between the studs at maximum 1200 mm centres.

General

7.2 Tekton® Building Wrap is intended for use as an alternative to conventional building papers which are fixed over timber and steel framed walls in order to limit the entry of wind into building cavities, and to act as a secondary barrier to wind-driven rain.

7.3 The material also provides a degree of temporary weather protection during early construction. However, the product will not make the building weathertight and some wetting of the underlying structure is always possible before the building is closed in. Hence, the building must be closed-in and made weatherproof before moisture sensitive materials such as wall or ceiling linings and insulation materials are installed.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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7.4 Tekton® Building Wrap must not be exposed to the weather or ultra violet light for a total of more than 60 days before being covered by the wall cladding.

7.5 Tekton® Building Wrap is suitable for use under wall claddings as a wall underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23, except that it must not be used with non-absorbent wall claddings such as vinyl or metal based sidings or weatherboards in direct fixed installations. Tekton® is suitable for use under cavity based wall claddings as a non-absorbent synthetic wall underlay as called up in NZS 2295, Table 2.4 on steel framed buildings. Refer to Table 1.

7.6 Tekton® Building Wrap is also suitable for use as an air barrier to walls that are not lined, such as attic spaces at gable ends, as called up in NZBC Acceptable Solution E2/AS1, Paragraph 9.1.4 (c). Refer to Table 1.

Table 1: NZBC E2/AS1 Table 23 Requirements

NZBC E2/AS1 Table 23 Wall Wrap Properties	Property Performance Requirement	Actual Property Performance
Absorbency	≥ 100 g/m^2	Classified as non-absorbent (see paragraph 7.5)
Vapour Resistance	≤ 7 MN s/g	Pass
Water Resistance	≥ 20 mm	Pass
pH of Extract	≥ 5.5 and ≤ 8	9.78 *(Note 1)*
Shrinkage	≤ 0.5%	Pass
Mechanical	Edge tear and tensile strength	**Edge tear:** Machine direction = 228 N Cross direction = 186 N **Tensile strength:** Machine direction = 4.4 kN/m Cross direction = 3.9 kN/m
Air Barrier	Air resistance: ≥ 0.1 MN s/m^3	Pass

Note 1: Further testing of Tekton® Building Wrap was completed to determine the effect of the high pH level on the wall underlay and materials it is likely to come into contact with during its serviceable life. The testing confirmed that the high pH had no adverse effects on the wall underlay performance, or the performance of other materials.

7.7 In cavity installations where the cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens to prevent the wall underlay bulging into the cavity space when bulk insulation is installed in the wall frame cavity in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

Stucco Plaster

7.8 Tekton® Building Wrap is suitable for use as a non-rigid backing material for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.5.1. The wall underlay must be supported with 75 mm galvanised mesh or plastic tape or wire at 150 mm centres run across the cavity battens to limit deflection to a maximum of 5 mm.

7.9 Tekton® Building Wrap may also be used as a slip layer over rigid backings for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.3.1 (b).

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Structure

8.1 Tekton® Building Wrap is suitable for use in all Wind Zones of NZS 3604 up to, and including, Very High when used as a flexible building underlay, and all Wind Zones of NZS 3604 up to, and including, Extra High when used as an overlay for rigid building underlays.

Durability

9.1 Tekton® Building Wrap meets code compliance with NZBC Clause B2.3.1 (a), not less than 50 years for building wraps used where the cladding durability requirement or expected serviceable life is not less than 50 years, and code compliance with NZBC Clause B2.3.1 (b), 15 years for building wraps used where the cladding durability requirement is 15 years.

Serviceable Life

9.2 Provided it is not exposed to the weather or ultra-violet light for a total of more than 60 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, Tekton® Building Wrap is expected to have a serviceable life equal to that of the cladding.

Control of Internal Fire and Smoke Spread

10.1 Tekton® Building Wrap has an AS 1530 Part 2 flammability index of not greater than 5 and therefore meets the requirements of NZBC Acceptable Solutions C/AS2 to C/AS6, Paragraph 4.17.8 b), for the surface finish requirements of suspended flexible fabric used as an underlay to exterior cladding that is exposed to view in occupied spaces. It may therefore be used with no restrictions in all buildings.

Prevention of Fire Occurring

11.1 Separation or protection must be provided to Tekton® Building Wrap from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

12.1 Tekton® Building Wrap must be used behind claddings that meet the requirements of the NZBC, e.g. such as those covered by NZBC Acceptable Solution E2/AS1, or claddings covered by a valid BRANZ Appraisal.

12.2 Tekton® Building Wrap, when installed in accordance with the Technical Literature and this Appraisal, will assist in the total cladding systems compliance with NZBC Clause E2.

12.3 When used as an air barrier, particular care must be taken to ensure an air tight barrier is achieved, and weather sealing at all openings and penetrations through the cladding meets the requirements of the NZBC.

Installation Information

Installation Skill Level Requirements

13.1 Installation must always be carried out in accordance with the Tekton® Building Wrap Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant Licence Class.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Wrap Installation

14.1 Tekton® Building Wrap must be fixed to all framing members at maximum 300 mm centres with hot-dip galvanised, large-head clouts 20 mm long, zinc plated 6-8 mm staples, self-drilling screws, or proprietary wrap fixings. The membrane must be pulled taut over the framing before fixing.

14.2 Tekton® Building Wrap must be run horizontally and must extend from the upper-side of the top plate to the under-side of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs. Horizontal laps must be no less than 75 mm wide, with the direction of the lap ensuring that water is shed to the outer face of the membrane. End laps must be made over framing and be no less than 150 mm wide.

14.3 The wall underlay should be run over openings and these left covered until windows and doors are ready to be installed. Openings are formed in the membrane by cutting on a 45 degree diagonal from each corner of the penetration. The flaps of the cut membrane must be folded inside the opening and stapled to the penetration framing. Excess wall underlay may be cut off flush with the internal face of the wall frame.

14.4 Tekton® Building Wrap can be added as a second layer over head flashings in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.3.

14.5 When fixing the product in windy conditions, care must be taken due to the large sail area created by wide roll widths.

14.6 Any damaged areas of Tekton® Building Wrap, such as tears, holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping, or by taping small tears.

Inspections

14.7 The Technical Literature must be referred to during the inspection of Tekton® Building Wrap installations.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

15.1 The following tests have been carried out on Tekton® Building Wrap by Scion: Folding strength of paper in accordance with AS/NZS 1301.423; edge tear resistance and tensile strength in accordance with AS/NZS 4200.1 and air resistance in accordance with BS 6538-3.

15.2 The following tests have been carried out on Tekton® Building Wrap by BRANZ: Absorbency in accordance with AS/NZS 4201.6, Vapour transmission in accordance with ASTM E 96B, Shrinkage in accordance with AS/NZS 4201.3, Water barrier in accordance with AS/NZS 4201.4 and pH of extract in accordance with AS/NZS 1301.421. A range of these tests were completed before and after Tekton® Building Wrap was exposed to ultra-violet light.

15.3 The Flammability Index of Tekton® Building Wrap has been evaluated in accordance with AS 1530.2.

Other Investigations

16.1 A durability opinion was given by BRANZ technical experts.

16.2 Site inspections were carried out by BRANZ to assess methods used for the installation of Tekton® Building Wrap, and to examine completed installations.

16.3 The marketer's Technical Literature, including installation instructions, have been examined by BRANZ and found to be satisfactory.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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Quality

17.1 The manufacture of Tekton® Building Wrap has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ has taken note of product certification by ICC-ES and CCMC covering quality aspects associated with the product.

17.2 The quality of supply to the market is the responsibility of Marshall Innovations Limited.

17.3 Building designers are responsible for the design of the building, and for the incorporation of the wall wrap into their design in accordance with the instructions of Marshall Innovations Limited.

17.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Marshall Innovations Limited.

Sources of Information

- AS 1530.2 – 1993 Test for flammability of materials.
- AS/NZS 1301.421s: 1998 Determination of the pH value of aqueous extracts of paper, board and pulp – cold extraction method.
- AS/NZS 4200.1: 1994 Pliable building membranes and underlays – materials.
- AS/NZS 4201.1: 1994 Pliable building membranes and underlays – Methods of test – Resistance to dry delamination.
- AS/NZS 4201.2: 1994 Pliable building membranes and underlays – Methods of test – Resistance to wet delamination.
- AS/NZS 4201.3: 1994 Pliable building membranes and underlays – Methods of test – Shrinkage.
- AS/NZS 4201.4: 1994 Pliable building membranes and underlays – Methods of test – Resistance to water penetration.
- AS/NZS 4201.6: 1994 Pliable building membranes and underlays – Methods of test – Surface water absorbency.
- BS 6538.3: 1987 Method for determination of air permeance using the Garley apparatus.
- NZS 2295: 2006 Pliable, Permeable Building Underlays.
- NZS 3604: 2011 Timber-framed buildings.
- Acceptable Solutions and Verification Methods for New Zealand Building Code External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 (Amendment 8, 30 November 2018).
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

BRANZ

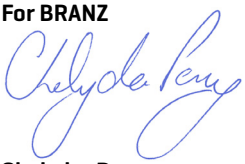
In the opinion of BRANZ, Tekton® Building Wrap is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Marshall Innovations Limited, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Marshall Innovations Limited:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Marshall Innovations Limited.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Marshall Innovations Limited or any third party.

For BRANZ



Chelydra Percy
Chief Executive

Date of Issue:
14 June 2019

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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BRANZ Appraised
Appraisal No. 846 [2019]

SUPER-STICK FLEXIBLE FLASHING TAPE

Appraisal No. 846 (2019)

This Appraisal replaces BRANZ Appraisal No. 846 (2013).

BRANZ Appraisals

Technical Assessments of products for building and construction.

Marshall Innovations Limited
PO Box 9411
Greerton
Tauranga
Tel: 07 543 0948
Fax: 07 541 1029
Web: www.mwnz.com

BRANZ
1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz

Product

1.1 SUPER-STICK is a flexible flashing tape used around framed joinery openings as a secondary weather resistant barrier.

1.2 SUPER-STICK is installed into and around the framed joinery opening over the building wrap and exposed frame to cover both the face and edge of the opening framing. SUPER-STICK is also used at joinery heads to seal flashing upstands to the building wrap.

Scope

2.1 SUPER-STICK has been appraised as a flexible flashing system for use around window and door joinery openings for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- with wall cladding systems complying with NZBC Acceptable Solution E2/AS1 or a valid BRANZ Appraisal that specifies a flexible flashing tape system; and,
- with wall underlays compatible with the flexible flashing tape; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

2.2 SUPER-STICK has also been appraised as a flexible flashing system for use around window and door joinery openings for steel framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, with regards to building height and floor plan area; and,
- constructed with steel framing complying with the NZBC; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- with wall cladding systems covered by a valid BRANZ Appraisal that specifies a flexible flashing system; and,
- with wall underlays compatible with the flashing tape and steel frame; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

Note: Marshall Innovations Ltd offer SUPER-STICK as a jointing and flashing tape for use with rigid air barrier systems that do not require a flexible wall underlay, but this aspect is outside the scope of this Appraisal. Contact the rigid air barrier system proprietor for system details including recommended jointing and flashing tapes.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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BRANZ Appraised
Appraisal No. 846 [2019]

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, SUPER-STICK, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:**

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years and B2.3.2. SUPER-STICK meets these requirements. See Paragraphs 8.1 and 8.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. SUPER-STICK contributes to meeting this requirement. See Paragraphs 7.1 - 7.4 and 11.1.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. SUPER-STICK meets this requirement and will not present a health hazard to people.

Technical Specification

4.1 SUPER-STICK is a multi-layered silver polyester faced, copolymer, self-adhesive tape. The tape is supplied in rolls of 75 mm x 22.86 m, 150 mm x 22.86 m and 200 mm x 22.86 m.

Handling and Storage

5.1 Handling and storage of all materials supplied by Marshall Innovations Ltd, whether on or off site, is under the control of the installer. Rolls must be stored under cover, in clean, dry conditions away from direct exposure to sunlight.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for SUPER-STICK. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 SUPER-STICK meets the requirements of AC148: 2001 which is an alternative solution to the version of AC148 referenced by NZBC Acceptable Solution E2/AS1, Paragraph 9.1.5 (b). The installation method for SUPER-STICK is an alternative solution to the installation method shown within NZBC Acceptable Solution E2/AS1, Figure 72A and 72B.

7.2 The use of flexible flashing tape systems around window and door joinery openings is critical to assist the overall weathertightness performance of window and door joinery installations.

7.3 SUPER-STICK is suitable for use over flexible wall underlays compatible with the flashing tape in NZS 3604 Wind Zones up to and including Extra High. In the Extra High Wind Zone, the flexible underlay must be installed over a rigid underlay complying with NZBC Acceptable Solution E2/AS1, Table 23.

7.4 SUPER-STICK is designed to prevent air leakage and water penetration around window and door openings at framing junctions (e.g. at the sill trimmer and opening stud junction), and to keep any water that gets past the cladding, or through the joinery, from direct contact with the framing timber.

7.5 SUPER-STICK is not designed to overcome poor detailing and workmanship of the window or door joinery installation. The system must not be considered in isolation, but be considered as part of the wall cladding system. SUPER-STICK flashing tape is designed to be used in conjunction with air seals and joinery flashing systems, not as a substitute.

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

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7.6 When SUPER-STICK is used in conjunction with LOSP [light organic solvent preservative] treated timber, the solvent from the timber treatment must be allowed to evaporate [generally at least one week] prior to the installation of the system.

Durability

8.1 Assessment of durability to meet the NZBC is based on difficulty of access and replacement, and the ability to detect failure of SUPER-STICK both during normal use and maintenance of the building.

Serviceable Life

8.2 Provided it is not exposed to the weather or ultra-violet light for a total of more than 90 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, SUPER-STICK is expected to have a serviceable life equal to that of the cladding. The maximum exposure period may however be limited by the requirements of the substrate supplier.

Maintenance

9.1 No maintenance is required for SUPER-STICK. Regular checks, at least annually, must be made of the junctions between the joinery and wall cladding to ensure that they are maintained weathertight and that the primary means of weather resistance for the junction e.g. flashing, sealant, etc continues to perform its function, to ensure that water will not penetrate the cladding.

Prevention of Fire Occurring

10.1 Separation or protection must be provided to SUPER-STICK from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

11.1 Where a cladding manufacturer specifies the use of generic flashing tapes around window and door joinery openings at framing junctions as part of their system, or they specify the use of flexible flashing tapes that comply with NZBC E2/AS1, Paragraph 9.1.5 (b), SUPER-STICK may be used.

Installation Information

Installation Skill Level Requirements

12.1 Installation must always be carried out in accordance with the SUPER-STICK Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.

General

13.1 The selected building wrap must be installed in accordance with the manufacturer's instructions, and must completely cover the joinery opening. The wrap is then cut on a 45° angle away from each corner of the opening so the flaps can be folded into the opening and secured to the interior face of the timber framing.

13.2 Before SUPER-STICK is applied, the substrate surfaces must be clean, dry and free from any surface contaminants such as dust and grease that may cause loss of adhesion.

13.3 A 75 mm wide x 150 mm long sealing tape 'butterfly' must be installed at 45° across the corner of the jamb/sill junction overlapping the corner by 3 mm to create a seal at the corner junction. A length of SUPER-STICK is then cut to the length of the sill plus 300 mm. The tape is installed flush with the interior face of the opening and is applied along the entire length of the sill and 150 mm up each jamb. The overhanging tape is cut at the corner of the opening to allow the tape to be folded onto the face of the building wrap and "butterfly" installed across the corner. Cut another length of SUPER-STICK the exact length of the sill and overlay onto the already installed Tape to ensure nail sealability requirements are met.

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BRANZ Appraised
Appraisal No. 846 [2019]

13.4 A 300 mm length of SUPER-STICK must be installed 150 mm down the jamb and 150 mm along the lintel at each of the top corners of the window or door joinery opening. A 75 mm wide x 150 mm long sealing tape 'butterfly' must be installed at 45° across the corner of the head/jamb junction overlapping the corner by 3 mm to create a seal at the corner junction.

13.5 SUPER-STICK must not be stretched. When joining two sections of tape, the overlap must be 100 mm minimum.

13.6 If SUPER-STICK is exposed to the weather or UV light for more than 90 days, it must be replaced with new material.

Installation Temperature

13.7 SUPER-STICK must not be installed where temperatures are less than -5°C *[Note: Marshall Innovations Ltd approve the installation of SUPER-STICK down to -20°C. This has not been addressed by this Appraisal and is outside its scope.]*

Inspections

13.8 The Technical Literature must be referred to during the inspection of SUPER-STICK installations.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

14.1 Testing of SUPER-STICK has been completed by BRANZ to the requirements of ICC Evaluation Service Acceptance Criteria for Flashing Materials AC148. The adhesion of SUPER-STICK to black bituminous Kraft building paper complying with the requirements of NZBC Acceptable Solution E2/AS1, Table 23 and selected other synthetic wall underlays have been tested and found to be satisfactory.

Other Investigations

15.1 An assessment was made of the durability of SUPER-STICK by BRANZ technical experts.

15.2 Site inspections were carried out by BRANZ to examine the practicability of installation.

15.3 The Technical Literature has been reviewed by BRANZ and found to be satisfactory.

Quality

16.1 The manufacture of SUPER-STICK has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ undertakes an ongoing review of product quality on an inwards goods basis.

16.2 The quality of supply to the market is the responsibility of Marshall Innovations Ltd.

16.3 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and building wraps in accordance with the instructions of the designer.

16.4 The quality of installation, handling and storage on site is the responsibility of the installer in accordance with the instructions of Marshall Innovations Ltd.

Sources of Information

- ICC Evaluation Service, Inc, AC148 Acceptable Criteria for Flexible Flashing Materials, July 2001.
- NZS 3604: 2011 Timber-framed buildings.
- Acceptable Solutions and Verification Methods for New Zealand Building Code External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 [Amendment 8, 30 November 2018].
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

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HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

BRANZ

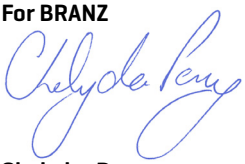
In the opinion of BRANZ, SUPER-STICK is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Marshall Innovations Limited, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Marshall Innovations Limited:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Marshall Innovations Limited.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Marshall Innovations Limited or any third party.

For BRANZ



Chelydra Percy
Chief Executive

Date of Issue:
7 June 2019

Readers are advised to check the validity of this Appraisal by referring to the Valid Appraisals listing on the BRANZ website, or by contacting BRANZ.

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

SUPER-STICK Building Tape SPECIFICATION

PRODUCT DESCRIPTION

Marshall Innovations SUPER-STICK Building Tape® is a high performance window and door flashing tape designed to be installed down to -5 C.It is a flexible flashing tape used around framed joinery openings as a secondary weather resistant barrier. No more issues regarding adhesion in the cool of winter or heat of summer. No additional primers or mechanical fasteners required. SUPER-STICK Building Tape utilizes a high tack pressure sensitive adhesive (PSA) combined with a high performance toughened film. It is a greener & cleaner building tape solution that contains No VOC's, HFCC's, nor CFC's. It is non-toxic and non-allergenic.

FEATURES AND BENEFITS

- Can be installed in extremely cold conditions to -5 Deg.C *
- Easy to install peel-and-stick application
- UV resistant for 90 days
- Will not react with sealants & no plasticizer migration. Marshall Innovations recommend checking with sealant manufacturers for suitability.
- Can be used with RAB systems – Plywood, fibre cement sheet
- Split back liner for easy install
- Can be installed in very hot conditions
- Extremely high puncture resistance & Tensile strength
- Residential & Commercial applications
- Very thin & no build up & won't affect cavity battens or window installation
- BRANZ Appraised # 846 (2013)
- CodeMark Certificate CM70015 Rev1
- Also forms part of The Marshall Weatherization System BRANZ # 621 (2020)

***Note:** Protecto SUPER-STICK Tape can be applied in extremely cold weather; however Marshall Innovations do not recommend applying tapes below 0ºC due to health and safety reasons.

SUPER-STICK INSTALLATION

100mm Framing Install with 150mm SUPER-STICK

The selected wall underlay must be installed in accordance with the Manufacturer's instructions. It must completely cover the joinery opening. The wrap is cut on a 45º angle away from each corner of the opening and secured to the inside of the opening.
Before SUPER-STICK is applied, all substrates must be clean, dry & free from any surface contaminants such as dust & grease that may affect adhesion. SUPER-STICK is available in 75 mm, 150 mm & 200 mm × 23 metre roll sizes.

- Cut 4 - 75 mm wide by 150 mm long sealing tape 'butterfly' pieces. Apply 2 strips on the bottom corners at a 45 degree angle.
- Overlap the corner by 3 mm to create a seal at the sill/jamb junction.
- Measure and cut a length of SUPER-STICK tape to the length of the sill + 300 mm. The tape is installed flush with interior face of the opening & is applied along the entire length of the sill & 150 mm up the jambs.
- Measure and mark 150mm up the jambs
- Remove 100mm of the release film off the inside back edge of the SUPER-STICK.
- Align this with the 150mm mark up the jamb and flush with the inside edge of the frame.
- Press the tape firmly onto the wrap and apply down the frame into the corner. Ensure the tape is formed tightly into the corner.
- Continue peeling the release film as you move along being careful to keep the tape aligned to the inside edge. Run tape up the opposite jamb 150 mm.
- The overhanging tape is cut at the corners of the opening to allow the tape to be folded onto the face of the wall underlay & butterfly tapes that are already in place. Peel off the release backing film & fold down & apply to wall underlay face & over butterfly tapes.

SUPER-STICK Building Tape

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

- ***Sill & Nail sealabillty** – Apply a layer of 75 mm SUPER-STICK over the top of the original flashing tape along the entire length of the sill. Align the tape to the inside face of the sill. This is a BRANZ requirement for horizontal surfaces with SUPER-STICK where water may pool & to ensure nail or staple penetrations self-seal* Alternatively apply a 150 mm by 150 mm square of Super-Stick on top of the original flashing tape on the sill where a nail, screw or staple will penetrate.
- Jamb/head application –Cut 2 pieces of SUPER-STICK at 300 mm. The tape is installed 150 mm down the jamb & 150 mm along the lintel at each of the top corners of the window or joinery opening. A 75 mm by 150 mm long sealing butterfly tape must be installed at 45 degrees across the corner of the head/jamb junction overlapping the corner by 3 mm to create a seal at the corner junction.
- 75 mm wide SUPER-STICK is used at joinery heads to seal flashing up stands to the wall underlay. This piece is cut 100 mm longer than the flashing & is to run past each end of the flashing by 50 mm.
- As SUPER-STICK is a pressure sensitive tape, after application ensure all the tape is pressed firmly onto the substrate
- 150 mm Framing Install with 200 mm wide Super Stick
- Cut 4 strips of 75mm x 200mm Super Stick. Apply 2 butterfly strips at a 45 degree angle to the 2 bottom corners only. Overlap the corner by 3mm to create a seal at the sill/jamb junction.
- Measure the length of the sill and cut a piece of SUPER-STICK 400mm longer than the length of the sill.
- Measure and mark 200mm up the jamb.
- Peel 100mm off the inside release film and apply the SUPER-STICK at the 200mm mark up the jamb. Continue to remove the release film as the SUPER-STICK is applied; ensuring tape is aligned with the inside of the joinery opening and care to ensure SUPER-STICK is formed tightly into the corners at the sill/jamb junction. Continue removing
- Release film as SUPER-STICK is applied along the length of the sill and 200mm up the other jamb. Remove the remaining release film. Cut the SUPER-STICK at the corners away from the frame and the overhanging SUPER-STICK can be folded over the face of the wall underlay and over the butterfly tapes at the corners.
- Cut another piece of SUPER-STICK the length of the sill. Overlay this onto the sill only. This is to ensure BRANZ requirements are met for nail, screw & staple sealability.
- Cut 2 pieces of at 400mm SUPER-STICK long. The tape is to be installed 200mm down the jamb & 200mm along the underside of the lintel. The install process is the same as for the sill except the two remaining 230 x 75mm butterfly pieces are applied last over the top at a 45 deg angle across the corner of the head/jamb junction overlapping by 3mm to create a seal at the corner junction.
- SUPER-STICK must not be stretched. When joining 2 sections of tape, the overlap must be 100 mm minimum
- Rigid Air Barrier INSTALLATION with no flexible wall underlay
- Tape must be installed continuously around the perimeter of the window / joinery opening.
-
- The Rigid Air barrier system* must be installed in accordance with the Manufacturer's specifications.
- Before SUPER-STICK is applied, all substrates must be clean & free from any surface contaminants such as dust & grease that may affect adhesion.

- Cut 4 - 75 mm wide by 150 mm long sealing tape 'butterfly' pieces. Apply 2 strips on the bottom corners at a 45 degree angle. Overlap the corner by 3mm to create a seal at the sill/jamb junction.
- Mark a line on the jamb 100mm above the midpoint between the sill and head.
- Measure and cut a length of SUPER-STICK tape to the length of the sill & jamb + 200mm *this will ensure sufficient lap of 100mm halfway up the jamb.*
- The tape is installed flush with interior face of the opening & is applied along the entire

SUPER-STICK Building Tape

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length of the sill & 100mm above the midpoint up each jamb.

- Start by peeling 100 mm of the wider inside release film back & starting on the marked line 100mm above midpoint of the window/door jamb. Continue peeling the release film as you move along being careful to keep the tape aligned to the inside edge of the sill and forming tight into the corners at the sill and jamb junction. Run tape up opposite jamb 100 mm above the halfway point up the opposite jamb.
- The overhanging tape is cut at the corners of the opening to allow the tape to be folded onto the face of the RAB & over the butterfly tapes that are already in place.
- ***Sill & Nail sealabillty** –Apply a layer of 75 mm SUPER-STICK over the top of the original flashing tape along the entire length of the sill. Align the tape to the inside face of the sill. This is a BRANZ requirement for horizontal surfaces with SUPER-STICK where water may pool & to ensure nail & staple penetrations self-seal.* Alternatively apply a 150 mm by 150 mm square of Super Stick on top of the original flashing tape on the sill where a nail or staple will penetrate.

- **Completing Install to Head & Jambs**

- Cut a length of SUPER-STICK to the length of the head + the length of a jamb. This will allow for a 100mm lap halfway up either jamb.
- Mark a line 100mm below where the SUPER-STICK terminates up either jamb.

- Start by peeling 100 mm of the wider inside release film back & starting on the marked line align the SUPER-STICK flush with the inside edge of the jamb. Continue peeling the release film as you apply the tape being careful to keep the tape aligned to the inside edge of the sill and forming tight into the corners at the head and jamb junction. Run tape along the underside of the lintel and down the opposite jamb. The SUPER-STICK will lap the previously installed tape by 100mm.
- The overhanging tape is cut at the corners of the opening to allow the tape to be folded onto the face of the RAB.
- The two remaining 75mm x 150mm 'butterfly' pieces are installed at 45 degrees across the corner of the head/jamb junction overlapping the corner by 3 mm to create a seal at the corner junction.
- 75 mm wide SUPER-STICK is used at joinery heads to seal flashing up stands to the building wrap. This piece is cut 100 mm longer than the flashing & is to run past each end of the flashing by 50 mm.
- 75mm SUPER-STICK can be used to seal vertical sheet joins in RAB systems to prevent moisture ingress. The split liner allows for ease of install to all corners and sheet joins. Ensure all tapes are pressed firmly to achieve adequate adhesion
- **NOTE IBS RigidRAP must be applied with a roller**

DURABILITY

Provided it is not exposed to the weather or UV light for a total of more than 90 days & provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, SUPER-STICK is expected to have a serviceable life equal to that of the cladding.

SUPER-STICK meets NZBC Clause B2 Durability performance B2.3.1 (b) 15 years & Clause E2 External Moisture performance E2.3.2. SUPER-STICK also complies with NZBC E2/AS1 9.1.5 (b)

***Check suitability of all sealants when used over SUPER-STICK with the sealant manufacturer**.

MAINTENANCE

No maintenance is required for SUPER-STICK. However regular checks of the joinery between the joinery & wall cladding have to be made at least annually to check that they remain weather tight.

HANDLING & STORAGE

SUPER-STICK rolls must be stored under cover in clean dry conditions & away from direct exposure to sunlight.

SUPER-STICK Building Tape

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PFL Acrylic Sealer

PFL Acrylic Sealer is a water based concrete sealer for interior and exterior residential concrete floors.

1. Description

PFL Acrylic Sealer is a transparent sealer for use on concrete floors. It can be applied to both internal and external concrete floors, giving a semi-gloss finish. PFL Acrylic Sealer displays excellent adhesion to correctly prepared surfaces, is no-hazardous, solvent free, and is very easy to apply.

Applications:
- Interior and exterior residential concrete floors.

Characteristics:
- Water based - no odour and VOC free (certified).
- Designed and manufactured in New Zealand.
- Easy to apply, and quick drying.

Limitations:
- Not for use on commercial floors.
- Exterior concrete must be appropriately textured to ensure sealer does not make the surface slippery.
- Cannot be used as a waterproofing agent
- Does not act as a filler - any cracks or defects should be repaired prior to application.
- Not as durable as PFL Epoxy Sealer on internal concrete floors.
- PFL Acrylic Sealer is a coating, so whilst durable, it is still susceptible to scratching.

This product guide covers the preparation, application, and maintenance of PFL Acrylic Sealer - if there is any question as to the suitability or application of this product please contact Peter Fell Ltd prior to use. Refer to the SDS for full Health and Safety information.

2. Precautions

- Do not seal any concrete under 28 days old.
- Do not apply to highly burnished or very 'tight' floors.
- Do not apply to concrete surfaces that have been treated with concrete densifiers/hardeners.
- Do not apply to concrete surfaces that are not *completely* dry, not just surface dry.
- Do not apply to any surface that has been previously treated with another product i.e. other sealers, curing compounds, etc.
- Do not seal concrete if the concrete temperature (not atmospheric) is below 12°C or above 30°C.
- Do not dilute.
- Do not add PFL Anti-Slip.
- Do not use as a filler – any cracks, pitting or pinholes must be treated prior to application.
- Clean up any spills immediately to avoid staining.

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3. Test Area

Prior to application of the sealer it is recommended that a test area is conducted first.
This test area is to ensure that the sealer adheres correctly to the surface and gives the desired look and finish.
Slip resistance: it is important to check that application of the sealer to exterior surfaces does not make the concrete slippery.

- Once the sealer is cured, wet the area and check that the surface has required level of slip resistance.
- If slip resistance is not sufficient do not apply.

It is recommended that test area of 0.5 - 1.0 m^2 is executed according to the following protocol.

- If possible do the test area on a part of the floor that will be covered or hidden when the job is complete i.e. in a wardrobe or under a kitchen island inside, or under furniture or fixtures outside.

Test pots and small volumes of all the sealer and preparation and cleaning products are available from Peter Fell Ltd.

4. Preparation

Prior to application it is important to establish that PFL Acrylic Sealer can be applied to the floor.

- PFL Acrylic Sealer cannot be applied to new floors treated with curing compounds or other similar products.
- Some highly burnished or ground/honed floors are too dense or 'tight' to allow the adequate adhesion.
- Old floors previously treated with other sealing compound, or contaminated and stained, will also not accept a water based sealer.

A simple 'water test' can quickly show if the floor will 'accept' the coating:

- Drop a small amount of water on the concrete surface.
- If the water penetrates (darkens) the concrete within 15 - 30 seconds the concrete is likely to accept the sealer.
- If the water beads on the surface this would indicate that the concrete has high surface tension (too dense) and is not suitable for sealing with PFL Acrylic Sealer.
- Beading could be due to other factors such as contaminants or other treatments in or on the concrete.
    - These contaminants or treatments must be removed prior to any sealer application.

The floor must be completely dry before applying PFL Acrylic Sealer. If it is uncertain whether the floor is dry, conduct a Plastic Sheet Test (ASTM D4263) to confirm:

- Tape a plastic sheet (45 x 45 cm) onto the concrete surface being tested; ensuring an airtight seal between the concrete and the plastic is formed. After 24 hours remove the plastic sheet. Concrete can be coated if no moisture/condensation is present on the underside face of the sheet, or if concrete has not darkened (compared to adjacent concrete).
    - Use low tack tape to avoid marking the concrete surface.
- If moisture is present, allow to dry and repeat test.

If PFL Acrylic Sealer is able to be applied to the floor, and the floor is dry, then prepare the concrete as follows:

New interior concrete floors:

- All protective covers must be lifted at least one week prior to sealing to allow the floor to dry.
    - If a non-breathable cover was used (i.e. polythene) it will need to be lifted much earlier to allow drying.
    - Ensure good air flow over the floor (open all doors and windows) to allow moisture from the building.
- If dirty, clean the floor with **PFL Neutralizer & Cleaner** or **PFL Concrete Cleaner** (see Product Guides for application instructions).
- Prepare the floor for sealing with **PFL Surface Preparation** followed by **PFL Neutralizer & Cleaner** (see Product Guide's for application instructions).

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New exterior concrete floors:

- If dirty, clean the floor with **PFL Neutralizer & Cleaner** or **PFL Concrete Cleaner** (see Product Guides for application instructions).
- Prepare the floor for sealing with **PFL Surface Preparation** or **PFL Surface Prep Lite** followed by **PFL Neutralizer & Cleaner** (see Product Guide's for application instructions).

Ground or burnished concrete floors:

- PFL Acrylic Sealer can be applied to floors ground to 120 metal bond or less only if they have *not* been densified.
- Ground or honed floors typically do not require treatment with PFL Surface Preparation (acid wash).
- Ensure the floor is clean and dust free – clean with PFL Concrete Cleaner if required then rinse the floor with fresh clean water.

Old concrete floors:

- Any existing coating should be removed by grinding and the water test repeated to ensure all remnants have been removed.
- Any contaminated areas should be treated with appropriate cleaning agents and pass the water test prior to application of the sealer.
- Once any coatings have been removed and contaminated areas treated, clean the floor with **PFL Concrete Cleaner**, then rinse once with fresh clean water.
    - A wet and dry vacuum cleaner should be used to remove all residual water from the concrete surface.

5. Equipment

- Paint tray
- PFL Acrylic Sealer can be applied with any of the following:
    - Roller (5mm nap mohair roller or similar), recommended for smooth interior surfaces
        - microfibre mop can be used for second and any subsequent coats.
    - Broom or brush (soft bristle), recommended for textured exterior surfaces.
- Safety Equipment – see section 11. Personal Protective Equipment.

6. Application

PFL Acrylic Sealer should only be applied when new concrete floors are fully cured (at least 28 days after pouring), and as with old concrete surfaces, concrete prepared as above.

New power float finished (interior) concrete floors:

- Apply with roller in thin coats, avoid pooling.
- Apply minimum 2 coats.
    - Second coat can be applied with microfiber mop.
    - 'open' or porous floors may require a third coat to form an even surface coating.
- Drying time between coats is typically 4 - 6 hours after application.
- Recoating must be done within 24 hours.
    - sanding between coats is recommended if more than 24 hours between coats.

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Ground or burnished concrete floors:

- PFL Acrylic Sealer can be applied to floors ground to 120 metal bond or less only if they have *not* been densified.
- Apply with roller or microfiber mop in thin coats, avoid poling.
  - Roller is recommended for the first coat.
- Apply minimum 2 coats.
  - most ground floors will require a third or fourth coat to form an even surface coating.
- Drying time between coats is typically 1 - 2 hours after application.
- Recoating must be done within 24 hours
  - sanding between coats is recommended if more than 24 hours between coats.

Old concrete floors:

- Apply the same as the appropriate type of floor above.

Drying Time:

- Allow 24 hours drying before light foot traffic.
- The sealer will be fully cured after 3 days.
  - Joinery and furniture should not be placed onto the newly sealed floor until the coating is fully cured to minimise scratching and marking of the sealer.
- Apply **PFL CoverSeal** to internal floors ONLY when sealer is fully cured.

Coverage:

- Approximately 8 – 12 m^2/L
  - Coverage will vary greatly depending on the porosity and texture of the concrete.

Clean-up:

- All equipment can be cleaned with water.

7. Maintenance

- Floors sealed with PFL Acrylic Sealer should be cleaned using with **PFL Concrete Cleaner**.
  - Refer to the Product Guide or contact Peter Fell Ltd for product information.
- Do not use ammonia or amine containing cleaners (e.g. Janola) – they will damage the sealer.
- Do not use steam mops to clean the floor.
  - Excess heat and steam from the mop can breakdown the sealer leading to 'cloudy' patches
- We recommend that felt pads are used on the bottom of all furniture (i.e. chair and table legs) to minimise scratching or damaging the sealer.
- ALL internal concrete floors sealed with PFL Acrylic Sealer should be maintained with **PFL CoverSeal**.
  - PFL CoverSeal should be applied routinely (every 6 months) to maintain sealer appearance and performance – refer to the Product Guide or contact Peter Fell Ltd for product information.

8. Re-sealing

PFL Acrylic Sealer can be re-applied over sealed floors that are in good condition. If the sealer or concrete surface is worn, stained, or damaged it is recommended that the floor is ground/honed prior to re-sealing. This process will alter the surface appearance by exposing the aggregate which should be considered prior to re-sealing.

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For standard re-sealing:

- Clean floor thoroughly with **PFL Concrete Cleaner**.
- Using low grit sandpaper (less than 240 grit) lightly sand the floor to provide a key for re-seal.
  - Take great care not to scratch or mark the concrete surface.
  - Ensure any worn or damaged areas of sealer are sanded back appropriately.
- Clean floor thoroughly with **PFL Concrete Cleaner** and then rinse once with fresh clean water and allow to dry completely.
- Apply sealer with a roller or microfiber mop in thin coats, avoid pooling.
- Apply additional coats as required to form an even surface coating
- Drying time between coats is typically 1-2 hours after application.
- Recoating must be done within 24 hours.
  - sanding between coats is recommended if more than 24 hours between coats.

9. Removal

Removal of PFL Acrylic Sealer is difficult and can result in damage or alteration of the concrete surface and as such is not recommended. If required the sealer should be removed mechanically by grinding/honing the floor. This process will alter the appearance of the floor by exposing the aggregate (stones) which should be considered prior to removal of the sealer.

10. Storage and Handling

Pack Sizes: 1, 2, 5, 10, and 20 L units

Handling: Wear suitable protective clothing - see section 11. Personal Protective Equipment.

Storage: Store in cool, dry, well ventilated place in original container. Store out of reach of children. Store away from direct sunlight, oxidizing agents (e.g. nitrates), acids, anionic, detergents, and foodstuffs. Keep away from naked flames and other heat sources. Take precautions against static discharge. Ensure container is sealed when not in use and is checked regularly for leaks or spills. PFL Acrylic Sealer can be stored for up to 12 months.

11. Personal Protective Equipment

Eyes: Protective eyewear is not normally necessary when using this product. However, it is always prudent to use protective eyewear if splashes are likely.

Skin: Protective gloves and clothing are no normally necessary. However, it is prudent to wear gloves when handling chemicals in bulk or for an extended period.

Respiratory: Respirator is not required under normal use. Ensure adequate natural ventilation.

12. First Aid

Swallowed: DO NOT induce vomiting. Give water or milk to drink. Obtain medical attention immediately. For emergency information contact the *National Poisons Centre (0800 764 766)*.

Eyes: Immediately flood with copious quantities of water, holding eye open if necessary, for at least 15 minutes. Seek urgent medical attention.

Skin: Remove contaminated clothing and shoes and wash skin thoroughly with excess water. If irritation occurs or persists, seek medical attention. Launder clothing and clean shoes before re-use.

Inhalation: Remove patient from exposure, keep warm and at rest. If there is respiratory distress, give oxygen and seek immediate medical attention.

Refer to the SDS for full Health and Safety information.

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13. Physical Properties and Identification

Appearance (in pack):	White milky liquid
Appearance (when dry):	Transparent
Odour:	Faint 'plastic' odour
Solubility:	miscible in water
Wet film thickness:	approximately 35 - 50 micron
Dry film thickness:	approximately 20 - 40 micron
UN Number:	n/a
HSNO Approval:	non-hazardous
Hazchem code:	n/a
DG Class:	n/a
Packing Group:	n/a

Product Warranty

The information contained in this document is true and accurate to the best knowledge of Peter Fell Ltd. We cannot however anticipate all conditions under which this information and our products may be used. Peter Fell Ltd therefore accepts no responsibility and offers no warranty with respect to results obtained by the application of our products, their suitability, or for their safe use. Peter Fell Ltd offers our products for sale subject to, and 'The Customer' and all users are deemed to have accepted, our Terms and Condition of Trade. Peter Fell Ltd warrants our products to be free of manufacturing defects. If the product when purchased was defective and was within recommended storage life when used, Peter Fell Ltd will replace the defective product with new product without charge to the purchaser. Peter Fell Ltd makes NO OTHER WARRANTY, either expressed or implied, concerning our products.

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PFL Acrylic Sealer
Safety Data Sheet

1. Identification of Substance & Company

Product	
Product name	PFL Acrylic Sealer
Product code	NA
HSNO approval	non hazardous
UN number	NA
Proper Shipping Name	NA
DG class	NA
Packaging group	NA
Hazchem code	NA
Uses	Acrylic sealer

Company Details	
Company	**Peter Fell LTD**
Address	81 Patiki Rd Avondale Auckland
Telephone	09 828 6460
Email	info@peterfell.co.nz

2. Hazard Identification

Approval

This product is considered non hazardous under the Hazardous Substances and New Organisms Act (HSNO).

Classes	Hazard Statements

None

SYMBOLS

None

Other Classifications

There are no other classifications that are known to apply.

Precautionary Statements

none

3. Composition / Information on Ingredients

Component	CAS/ Identification	Conc (%)
Ingredients not contributing towards HSNO, includes water	Mixture	100%

This is a commercial product whose exact ratio of components may vary. Trace quantities of impurities are also likely.

4. First Aid

General Information

If medical advice is needed, have product container or label at hand. You should call the National Poisons Centre if you feel that you may have been harmed by this product. The number is 0800 764 766 (0800 POISON) (24 hr emergency service).

Recommended first aid facilities: Ready access to running water is recommended.

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Exposure	
Swallowed	Do NOT induce vomiting. Give a glass of water to drink. Contact a doctor if concerned.
Eye contact	If product gets in eyes, wash material from them with running water for several minutes. If symptoms persist, seek medical advice.
Skin contact	Flush immediately with large amounts of water. Remove all contaminated clothing. Contact a doctor if experiencing symptoms
Inhaled	Generally, inhalation of vapours is unlikely to result in adverse health effects. If coughing, dizziness or shortness of breath is experienced, remove the patient to fresh air immediately. If patient is unconscious, place in the recovery position (on the side) for transport and contact a doctor.

Advice to Doctor

Treat symptomatically

5. Firefighting Measures

Fire and explosion hazards:	There are no specific risks for fire/explosion for this chemical. It is non-flammable.
Suitable extinguishing substances:	Carbon dioxide, extinguishing powder or water jet. Fight larger fires with water jet or alcohol resistant foam.
Unsuitable extinguishing substances:	Unknown.
Products of combustion:	Carbon dioxide, and if combustion is incomplete, carbon monoxide and smoke. Water. May form toxic mixtures in air and may accumulate in sumps, pits and other low-lying spaces, forming potentially explosive mixtures.
Protective equipment:	No special measures are required.
Hazchem code:	NA

6. Accidental Release Measures

Containment	There is no current legal requirement for containment of this product.
Emergency procedures	Generally, the containers size will limit a large spill from occurring. If a significant spill occurs: Stop leak if safe or necessary. Isolate area. Collect spill, see below. Transfer to container for disposal. Dispose of according to guidelines below (Section 13).
Clean-up method	This product is not considered flammable or ecotoxic. Small spills do not require any special clean up method. Larger spills (e.g., greater than 10kg) should be mopped up and collected.
Disposal	Mop up liquid. Collect recoverable material into labelled containers for recycling or salvage. Recycle containers wherever possible. This material may be suitable for approved landfill. Dispose of only in accord with all regulations.
Precautions	No special protective clothing is normally necessary.

7. Storage & Handling

Storage	Avoid storage of harmful substances with food. Containers should be kept closed in order to minimise contamination. Avoid contact with incompatible substances as listed in Section 10.
Handling	Keep exposure to a minimum, and minimise the quantities kept in work areas. See section 8 with regard to personal protective equipment requirements.

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8. Exposure Controls / Personal Protective Equipment

Workplace Exposure Standards

A workplace exposure standard (WES) has not been established by WorkSafe NZ for this product. There is a general limit of 3mg/m^3 for respirable particulates and 10mg/m^3 for inhalable particulates when limits have not otherwise been established.

NZ Workplace Exposure Stds	Ingredient	WES-TWA	WES-STEL
	No ingredient listed		

* These workplace exposure standards are also Prescribed Exposure Standards (PES) under the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016.

Engineering Controls

In industrial situations, it is expected that employee exposure to hazardous substances will be controlled to a level as far below the WES as practicable by applying the hierarchy of control required by the Health and Safety at Work Act (2015) and the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016. Exposure can be reduced by process modification, use of local exhaust ventilation, capturing substances at the source, or other methods. If you believe air borne concentrations of mists, dusts or vapours are high, you are advised to modify processes or increase ventilation.

Personal Protective Equipment

Eyes	Protective eyewear is not normally necessary when using this product. However, it always prudent to use protective eyewear if splashes are likely.
Skin	Protective gloves and clothing are not normally necessary. However, it is prudent to wear gloves when handling chemicals in bulk or for an extended period of time.
Respiratory	Respirator is not required under normal use. Ensure adequate natural ventilation.

WES Additional Information

Not applicable

9. Physical & Chemical Properties

Appearance	Cream liquid
Odour	Low odour
pH	7.5
Vapour pressure	No data
Viscosity	No data
Boiling point	No data
Volatile materials	No data
Freezing / melting point	No data
Solubility	Miscible in water
Specific gravity / density	~1g/mL
Flash point	No data
Danger of explosion	Not explosive
Auto-ignition temperature	No data
Upper & lower flammable limits	No data
Corrosiveness	Non corrosive

10. Stability & Reactivity

Stability	Stable
Conditions to be avoided	Containers should be kept closed in order to avoid contamination. Keep from extreme heat and open flames.
Incompatible groups	Strong oxidising
Substance Specific Incompatibility	None known
Hazardous decomposition products	None known
Hazardous reactions	None known

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11. Toxicological Information

Summary

IF SWALLOWED: may cause vomiting, nausea and irritation of the gastrointestinal tract.
IF IN EYES: liquid may be irritating to eyes.
IF ON SKIN: Repeated skin contact may be a mild irritant.

Supporting Data

Acute	**Oral**	Using LD_{50}'s for ingredients, the estimated LD_{50} (oral, rat) for the mixture is >5,000 mg/kg.
	Dermal	No evidence of dermal toxicity.
	Inhaled	No evidence of acute inhalation toxicity.
	Eye	The mixture is not considered to be an eye irritant.
	Skin	The mixture is not considered to be a skin irritant under HSNO.
Chronic	**Sensitisation**	No ingredient present at concentrations > 0.1% is considered a sensitizer.
	Mutagenicity	No ingredient present at concentrations > 0.1% is considered a mutagen.
	Carcinogenicity	No evidence of carcinogenicity.
	Reproductive / Developmental	No ingredient present at concentrations > 0.1% is considered a reproductive or developmental toxicant or have any effects on or via lactation.
	Systemic	No evidence of systemic toxicity.
	Aggravation of existing conditions	None known.

12. Ecological Data

Summary

This mixture is not considered ecotoxic.

Supporting Data

Aquatic	No evidence of aquatic ecotoxicity.
Bioaccumulation	No data
Degradability	No data
Soil	No evidence of soil ecotoxicity.
Terrestrial vertebrate	No evidence of toxicity towards terrestrial vertebrates.
Terrestrial invertebrate	No evidence of toxicity towards terrestrial invertebrates.
Biocidal	no data
Environmental effect levels	No EELs are available for this mixture or ingredients

13. Disposal Considerations

Restrictions	There are no product-specific restrictions, however, local council and resource consent conditions may apply, including requirements of trade waste consents.
Disposal method	Dispose of residue and solutions that cannot be reused to sewer. If this is not possible dilute with water (at least 5 times as much water) and drain.
Contaminated packaging	Rinse containers with water before disposal. Preferably re-cycle container, otherwise send to landfill or similar.

14. Transport Information

There are no specific restrictions for this product (not a dangerous good).

UN number:	NA	**Proper shipping name:**	Not regulated for transport.
Class(es)	NA	**Packing group:**	NA
Precautions:	NA	**Hazchem code:**	NA

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15. Regulatory Information

This product is not considered hazardous under the Hazardous Substances and New Organisms Act (HSNO).

Specific Workplace Controls (as per HSNO approval referenced to Controls Matrix)

Key workplace requirements are:	
SDS	Not required.
Labelling	No removal of labels and/or decanting of product into other containers can occur.
Emergency plan	Not required.
Certified handler	Not required.
Tracking	Not required.
Bunding & secondary containment	Not required.
Signage	Not required.
Location compliance certificate	Not required.
Flammable zone	Not required.
Fire extinguisher	Not required.

Note: The above workplace requirements apply if only this particular substance is present. The complete set of controls for a location will depend on the classification and total quantities of other substances present in that location.

Other Legislation

In New Zealand, the use of this product may come under the Resource Management Act and Regulations, the Health and Safety at Work Act 2015 and the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016, local Council Rules and Regional Council Plans.

16. Other Information

Abbreviations

Approval Code	NA
CAS Number	Unique Chemical Abstracts Service Registry Number
Ceiling	Ceiling Exposure Value: The maximum airborne concentration of a biological or chemical agent to which a worker may be exposed at any time.
Controls Matrix	List of default controls linking regulation numbers to Matrix code (e.g. T1, I16).
EC_{50}	Ecotoxic Concentration 50% – concentration in water which is fatal to 50% of a test population (e.g. daphnia, fish species)
EPA	Environmental Protection Agency
HAZCHEM Code	Emergency action code of numbers and letters that provide information to emergency services, especially fire fighters
HSNO	Hazardous Substances and New Organisms (Act and Regulations)
IARC	International Agency for Research on Cancer
LEL	Lower Explosive Limit
LD_{50}	Lethal Dose 50% – dose which is fatal to 50% of a test population (usually rats).
LC_{50}	Lethal Concentration 50% – concentration in air which is fatal to 50% of a test population (usually rats)
MSDS (SDS)	Material Safety Data Sheet (or Safety Data Sheet)
PES	Prescribed Exposure Standard means a WES or a biological exposure standard that is prescribed in a regulation, a safe work instrument or an approval under HSNO (including group standards).
STEL	Short Term Exposure Limit - The maximum airborne concentration of a chemical or biological agent to which a worker may be exposed in any 15 minute period, provided the TWA is not exceeded
TWA	Time Weighted Average – generally referred to WES averaged over typical work day (usually 8 hours)
UEL	Upper Explosive Limit
UN Number	United Nations Number
WES	Workplace Exposure Standard - The airborne concentration of a biological or chemical agent to which a worker may be exposed during work hours (usually 8 hours, 5 days a week). The WES relates to exposure that has been measured by personal monitoring using procedures that gather air samples in the worker's breathing zone.

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References

Data	Unless otherwise stated comes from the EPA HSNO chemical classification information database (CCID).
Controls	EPA notices, www.epa.govt.nz, Health and Safety at Work (Hazardous Substances) Regulations 2017, www.legislation.govt.nz
WES	The latest NZ Workplace Exposure Standards, published by WorkSafe NZ and available on their web site – www.worksafe.govt.nz.
Other References:	Suppliers SDS

Review

Date	Reason for review
May 2018	Not applicable – new SDS

Disclaimer

This SDS was prepared by Datachem LTD and is based on our current state of knowledge, including information obtained from suppliers. The SDS is given in good faith and constitutes a guideline (not a guarantee of safety). The level of risk each substance poses is relevant to its properties (as summarised in the SDS) AND HOW THE SUBSTANCE IS USED. While guidelines are given for personal protective equipment, such precautions must be relevant to the use. The likely HSNO classifications for this SDS have been estimated based on general information from the supplier and other similar mixtures (e.g., hazard, toxicological), the full formulation details were not available to Datachem LTD. This SDS is copyright Datachem and must not be copied, edited or used for other than intended purpose. To contact the SDS author, email info@datachem.co.nz or phone: ***+64 9 940 30 80.***

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Form 2A

Memorandum from licensed building practitioner: Certificate of design work

Section 45 and section 30c , Building Act 2004

The building

Street address of building: ***153 Innes Road***

Suburb: ***Amberley, HURUNUI***

Town/City: ***CHRISTCHURCH***

The owner

Name(s): ***Bryan & Philippa Donnelly***

Address: 176 Kivers Road, Burnham, CHRISTCHURCH

Telephone number: 027 375 1899

Email address: ***bryanvizbuilt@gmail.com***

Basis for providing this memorandum

I am providing this memorandum in my role as the:

() **Sole** designer of all 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 and 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

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Identification of design work that is restricted building work

I ***AW Carleton*** carried out or supervised the following design work that is restricted building work:

Design work that is restricted building work	**Description**	**Carried out/ supervised**	**Reference to plans and specifications**
[Tick]	*[If appropriate, provide details of the restricted building work]*	*[Specify whether you carried out this design work or supervised someone else carrying out this design work]*	*[If appropriate, specify references]*
Primary structure – B1			
ALL RBW design work relating to **B1** (✓)	***EXCEPT TRUSS DESIGN***	() Carried out () Supervised	
Foundations and subfloor framing (✓)	***FIRTH RIB RAFT FLOOR***	() Carried out (✓) Supervised	***FIRTH & NZS 3604:2011 Section 3,4,5,6,7***
Walls (✓)	***Timber framed***	() Carried out (✓) Supervised	***NZS 3604:2011 Section 8,9,10,11***
Roof (✓)	***Timber trusses- PRECUT***	() Carried out (✓) Supervised	***Design & PS1 by PLACEMAKERS pre-cut attached***
Columns and beams (✓)	***Lintels & Beams- PRECUT SPECIFIED***	() Carried out (✓) Supervised	
Bracing (✓)	***GIB bracing***	() Carried out (✓) Supervised	***NZS 3604:2011 Section 4,5. GIB EZY BRACE***
Other ()		() Carried out (✓) Supervised	
External moisture management systems – E2			
ALL RBW design work relating to E2 (✓)		() Carried out (✓) Supervised	
Damp proofing (✓)		() Carried out (✓) Supervised	
Roof cladding or roof cladding system (✓)	***METALCRAFT LONGRUN COLORSTEEL ROOFING***	() Carried out (✓) Supervised	
Ventilation system *(for example, subfloor or cavity)* (✓)	***Ventilated cavity***	() Carried out (✓) Supervised	
Wall cladding or wall cladding system (✓)	***J/HARDIE AXON PANEL CAVITY FIXED***	() Carried out (✓) Supervised	***Full product specs attached. NZS3604:2011 section 11***

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Waterproofing (✓)	***As per E2/AS1***	(✓) Carried out (✓) Supervised	
Other ()	***N/A***	() Carried out () Supervised	
Fire safety systems			
Emergency warning systems, evacuation and fire service operation systems, suppression or control systems, or other ()	***N/A***	() Carried out () 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.*

Note: continue on another page if necessary.

Are waivers or modifications of the building code required? () Yes (✓) No

If Yes, provide details of the waivers or modifications below:

Clause	**Waiver/modification required**

Note*: continue on another page if necessary.*

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Issued by

Name:	***AW Carleton***			
LBP or registration number:	***BP110082***			
The practitioner is a:	(✓) Design LBP	( ) Registered architect	( )	Chartered professional engineer
Mailing address:	***P.O. Box 3011, Tauranga***			
Street address or registered office:	***459 Glue Pot Road, Tauranga***			
Phone number:	Landline:		Mobile:	***021 446 999***
	Daytime:		After hours:	
Fax number:				
Email address:	***easylivingdesign@outlook.com***			
Website:				

Declaration

I ***Alastair W Carleton***

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:

(a) complies with the building code; or

~~(b) complies with the building code subject to any waiver or modification of the building code recorded on this form.~~

Signature:

Date: ***02 September 2021***

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PROPOSED NEW DWELLING

153 INNES ROAD
AMBERLEY, GLASNEVIN

For
Bryan & Pip Donnelly

ACOUSTIC REPORT

Prepared by
Earcon Acoustics Limited

For Consent

September 2021
Ref J004904

Level 26, PWC Tower - 188 Quay St – Akld 1010
Tel: 09 443 6410 **Fax:** 09 443 6415

PO Box 301561 Albany - North Shore – Akld 0752
Mob: 021 437893

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

QUALITY ASSURANCE

Document: **153 Innes Rd – New Dwelling**
Acoustic Report – For Consent

Contact	Issue	Date	Rev
Fadia Sami fadia.sami@earcon.co.nz 021 437893	For Consent	21-09-2021	0

Level 26, PWC Tower - 188 Quay St – Akld 1010
Tel: 09 443 6410 **Fax:** 09 443 6415
PO Box 301561 Albany - North Shore – Akld 0752
Mob: 021 437893

HDC Approved Consent Document (In accordance with BA 2004, Cl. 49(1)) - Processed by : Brenna Ogier - BC No. 210485

1. INTRODUCTION

This report addresses the requirements of meeting the internal noise limits within the new residential dwelling centrally on the site at 153 Innes Road, in Amberley, Glasnevin from external sources (mainly frost control fans) as required by the conditions of the Hurunui District Plan.

For this analysis, attention is confined to the building envelope construction for the purpose of meeting the internal noise limits from external sources; these being primarily Frost Control Fans

This report is based on the architectural drawings dated Jan 2019 by Trident Homes.

2. SITE

The proposed dwelling is to be located at 153 Innes Rd in Amberley, Glasnevin – zoned in accordance with the Hurunui District Plan as *Rural Zone*. The primary source of noise originates from Frost Control Fans in the vicinity.

Figure 1: Aerial view of site

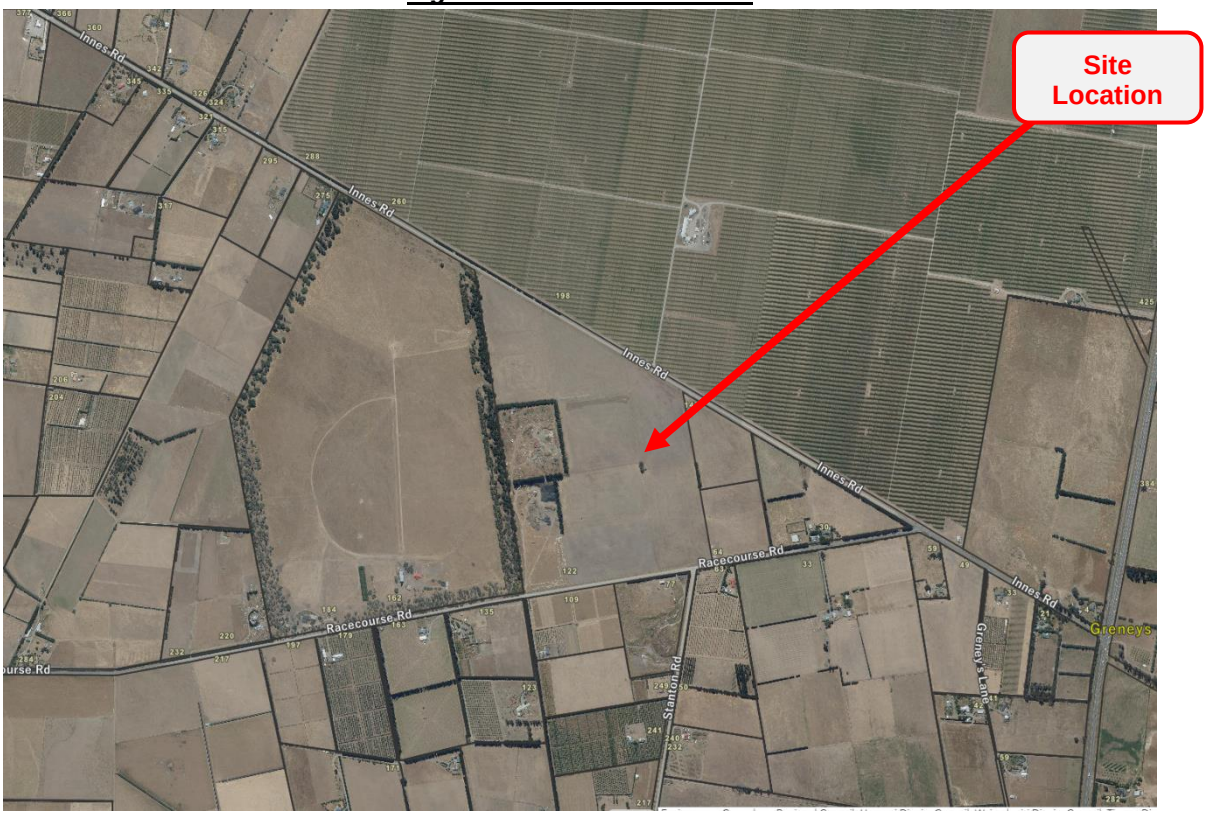
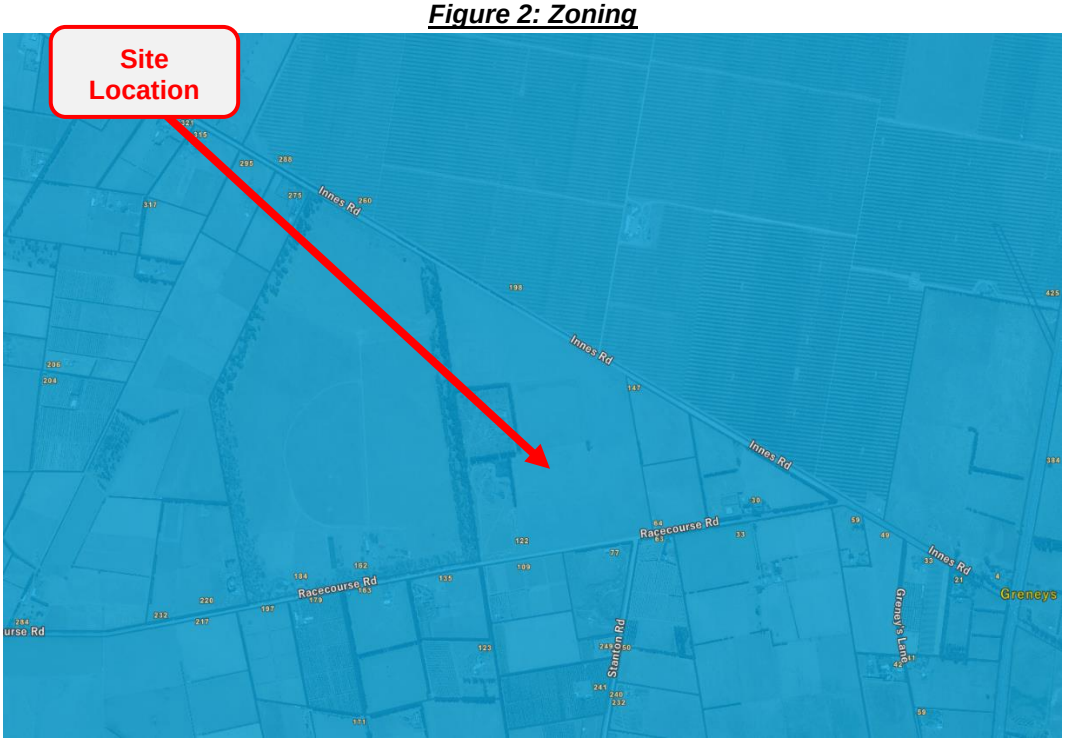


Figure 2: Zoning



3. REQUIREMENTS

The following conditions, as detailed in the Hurunui District Plan, apply:

- *Chapter 3 – Rural;*
  - *3.4 Rules*;
    - *3.4.3 Standards for permitted activities;*
      - *3.4.3.22 Acoustic insulation near frost control fans*

22. Acoustic insulation near frost control fans

(a) Any new dwelling located on a separate lot under different ownership within 1000 m of any frost control fan must be designed and constructed to ensure that the noise level inside any bedroom of the dwelling will not exceed 30 dB L_{Aeq} with all fans operating at normal duty. Compliance with this standard must be demonstrated by the production of a design certificate from an appropriately qualified and experienced acoustic engineer. The design certificate must be based either on actual noise measurements with all fans operating at normal duty, or on an assumed noise level from any one frost fan as shown below, corrected for the number of fans present at the time.

Octave centre frequency (dB)								
Hz	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**dB L_{Aeq}**
Design sound pressure level for one frost fan at 500 m	64	61	49	44	45	38	27	50

As per the requirements of the plan, it is noted that dwellings are required to comply with noise limit of **30dB L_{Aeq}** in bedrooms, with all fans operating at normal duty, as detailed in the frequency distribution Sound Pressure Levels in the rule above.

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4. ENVIRONMENT

Figure 3 below, shows the locations of fans in the vicinity of the proposed dwelling

Figure 3: Locations of Fans

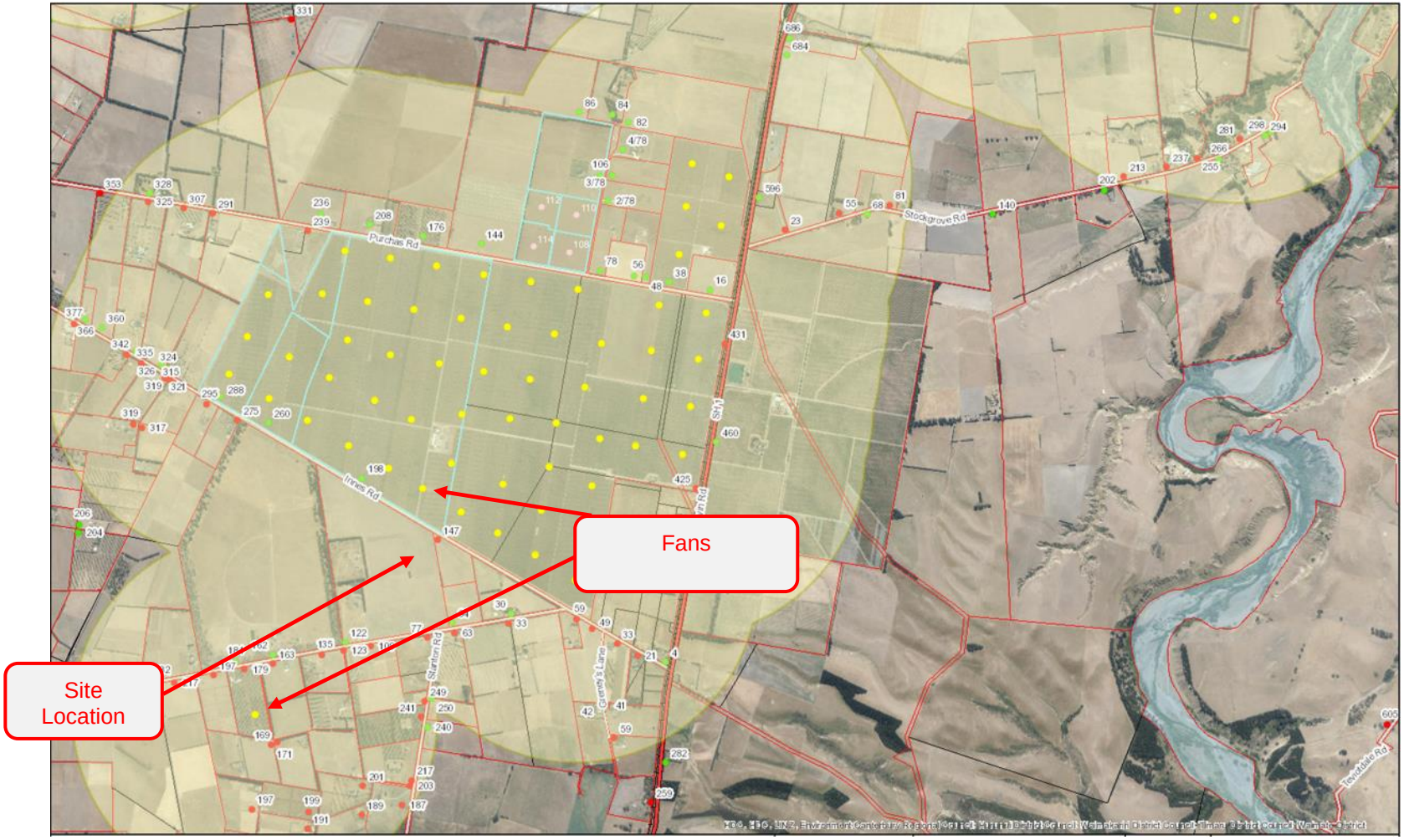

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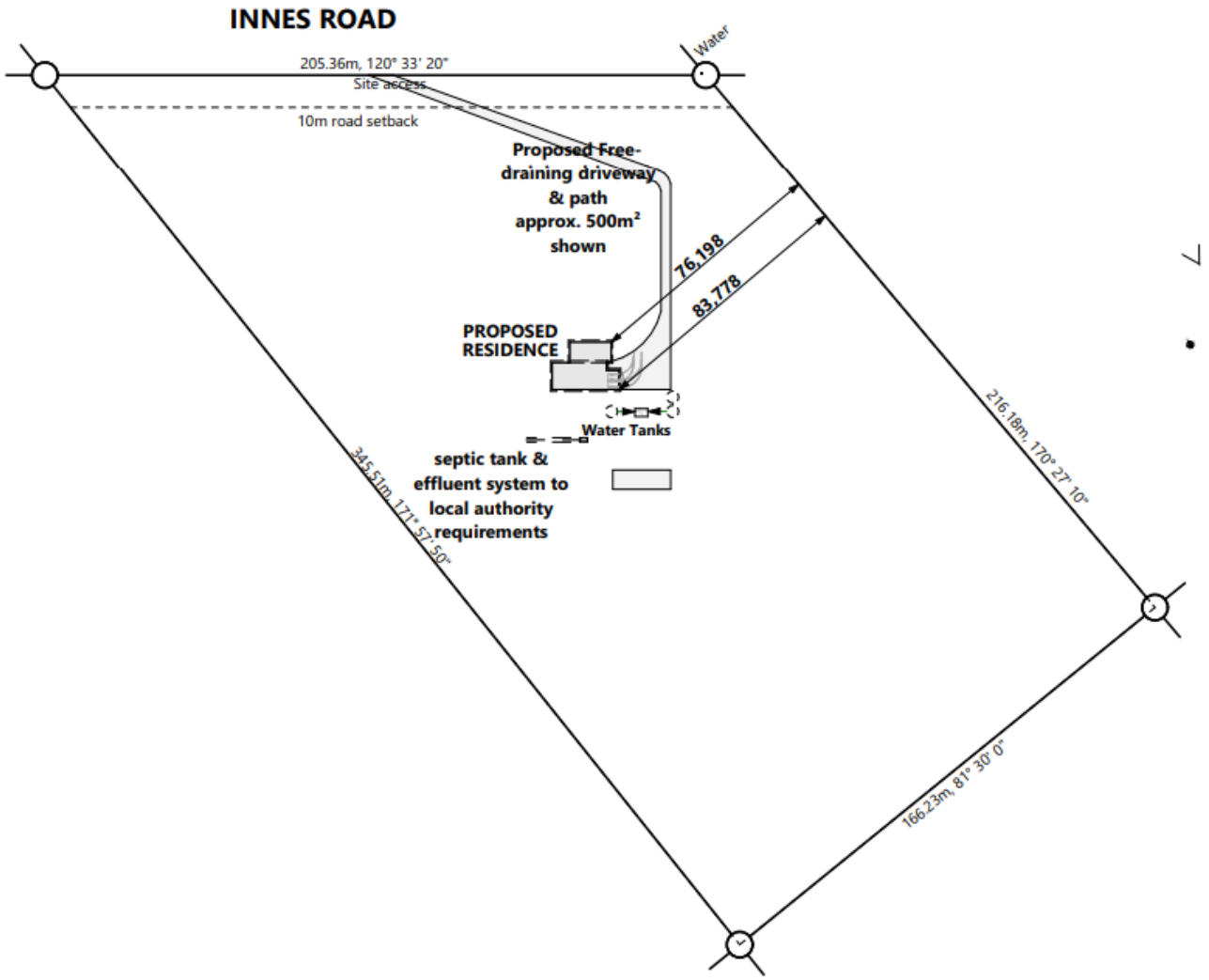
Figure 5 below, shows the location of the proposed dwelling:

Figure 4: Proposed Dwelling Location



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5. NOISE MODELLING

To predict noise propagation at the subject site from the Fans, an environmental model was constructed for the area using the CadnaA version 2021 computer modelling program. The following applies to the modelling software CadnaA:

- The modelling method for noise propagation over distance is based on the international standard ISO 9613: “Acoustics – Attenuation of sound during propagation outdoors” methodology.
- The model allows importing digital ground elevation contours and data to define the topography, elevation and data for each of the noise sources, and the locations, geometry and elevations of the noise receivers.
- The program then calculates the LAeq dB level as the metric for the noise levels at the receivers for the purposes of this assessment.

The following legend identifies the colour codes of the modelled figures in the following section:

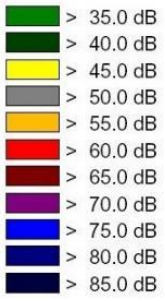

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Figure 5: Predicted Noise Levels in Region

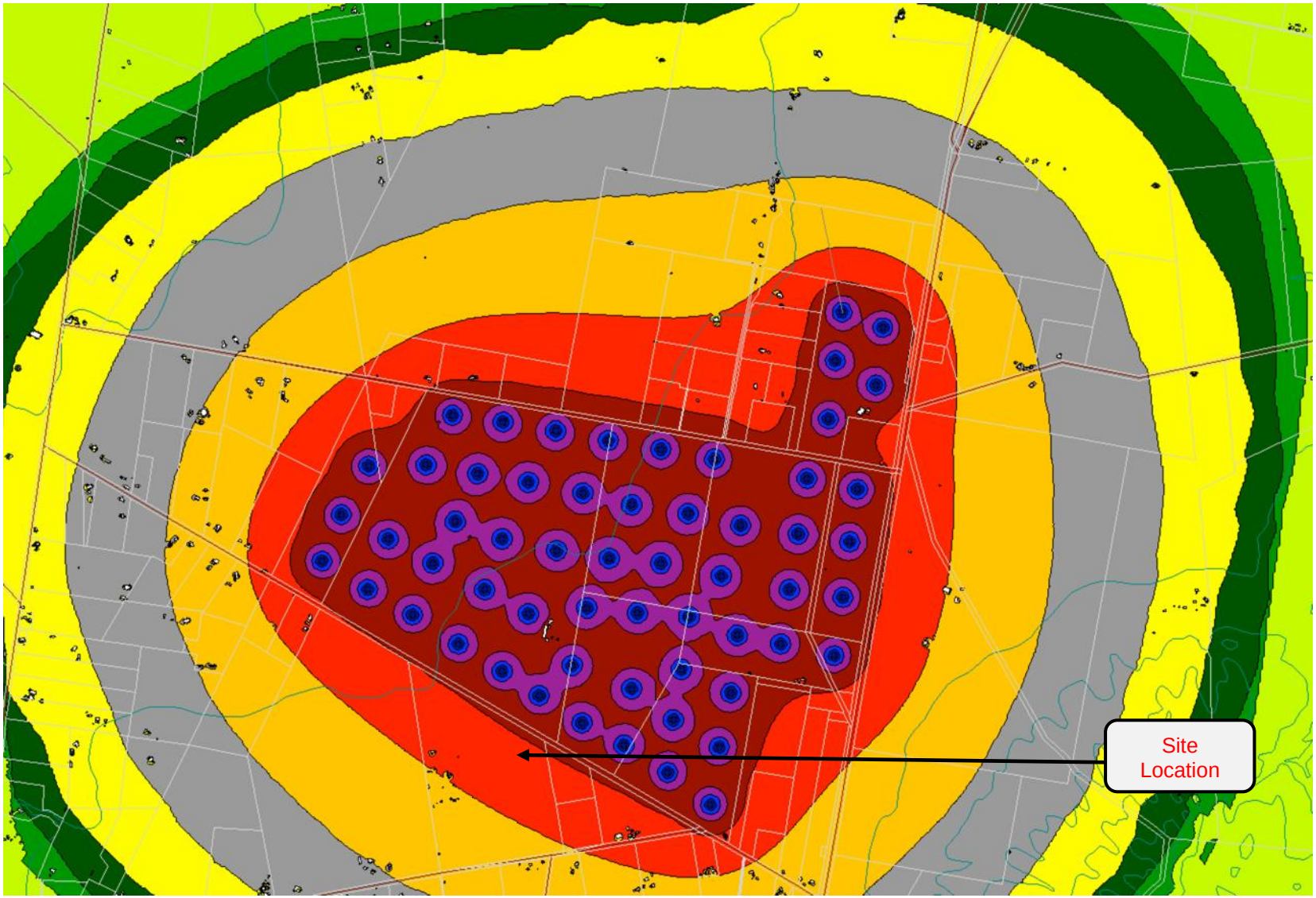

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Figure 6: Predicted Noise Levels in Region – Aerial Overlay

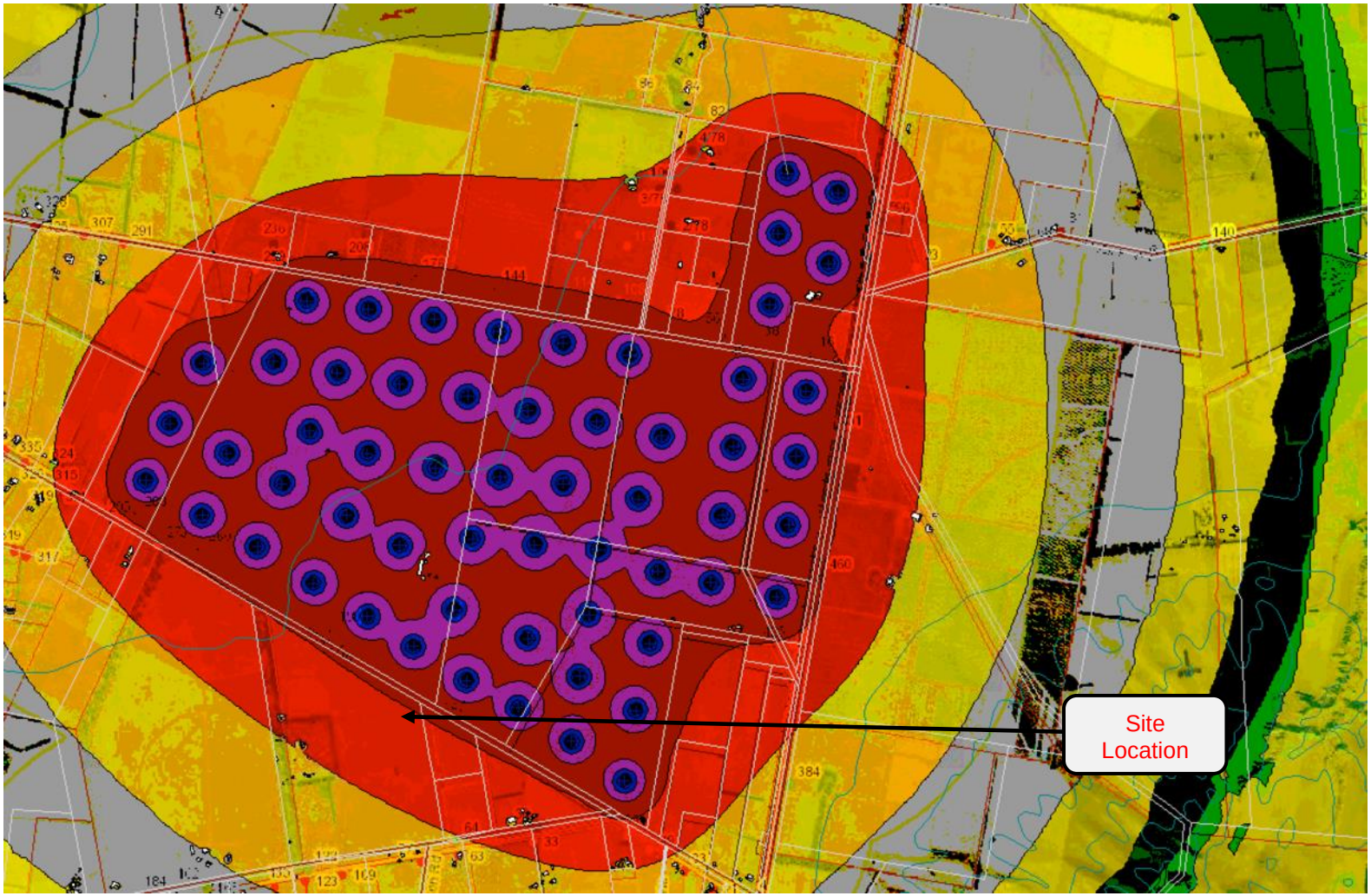

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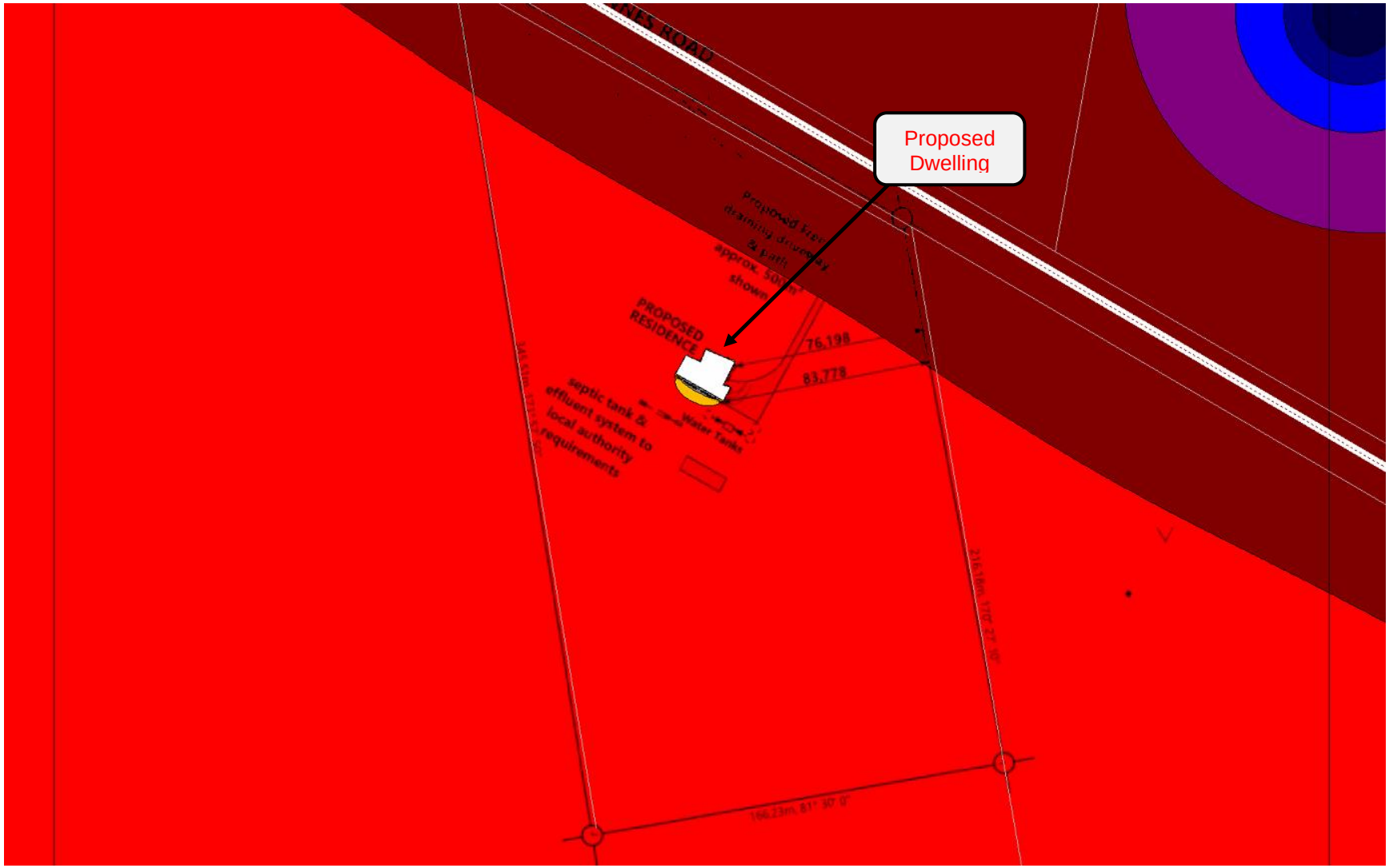
Figure 7: Predicted Noise Levels on Facades of Proposed Dwelling



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6. BUILDING ENVELOPE

6.1 External Walls

Reference the architectural drawings the proposed cladding for the external walls is James Hardie Axon Panel cladding. This construction will be complete with thermal insulation (R1.8 minimum) and 13mm Gib Noiseline or equivalent plasterboard. This construction will be rated STC (Sound Transmission Class) above 45 and is acoustically suitable. The acoustic criterion requires all penetrations to be acoustically sealed.

6.2 Glazing

The following glazing systems are required in all bedrooms to maintain adequate internal noise levels, reducing the noise from the Frost Fans.

The windows to bedrooms 3 and 4 are required to have a minimum STC (Sound Transmission Class) 34 in order to meet the internal noise level. This can be achieved by a double glazed unit IGU (5mm / 14mm air space / 4mm). No minimum requirements apply to the windows of bedrooms 1 and 2.

The window suites / frames are required to match the STC ratings noted above, complete with compressible weather seals.

In order to meet the internal noise levels, windows in all bedrooms need to be closed. We would like to clarify that the windows are openable, i.e. those are not fixed windows.

6.3 Roof

The proposed roofing is Colorsteel Endura Trapezoidal Roofing. The roof system will be complete with R3.6 thermal insulation blanket and internal lining of 1x13mm Gib Noiseline or equivalent plasterboard, whereby the STC rating will be above 40.

Penetrations for light fittings in the ceiling are required to be restricted to 1x130mm diameter recessed light in the ceiling per 2m2 in order for sound insulation not to be adversely affected. The acoustic criterion requires all penetrations to be acoustically sealed.

6.4 Doors

Where external doors to bedrooms consist of glazing, the glazing shall be rated the same as the windows noted in section 5.2. External doors to be complete with compression seals.

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7. CONCLUSIONS

In order to meet the internal noise levels in the new dwelling as set by the Hurunui District Plan, the requirements of section 6 must be applied

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458 Manchester Street, St. Albans, Christchurch 8014
phone: 03 967 9523 | mobile: 021 804 843
email: christopher@sephira.nz
www.sephiraenvironmental.co.nz

1 August 2021

Warren Hislop
c/o Angelique Hyde
61 Watties Road
RD1
Amberley 7482

WHISLOP-A0630-002L-v0

Dear Warren

Re: Limited Detailed Site Investigation – 122 Racecourse Road, Amberley

At the advice of Angelique Hyde, you have engaged Sephira Environmental Limited (Sephira Environmental) to undertake a Limited Environmental Site Investigation on a portion of the property you own located at 122 Racecourse Road, Amberley (Figure 1, the site). The legal description of the site is Lot 3 DP 502943.

Figure 1: Site Location Map (source: mapviewer.canterburymaps.govt.nz)

Background

We understand that you own the land located at 122 Racecourse Road, Amberley (Figure 2), and that you are in the process of subdividing the land for rural residential land use. A Preliminary Site Investigation (PSI) undertaken by Fraser Thomas in 2018 found that,

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Figure 2: The Full Property and Investigation Area (the Site) (source: mapviewer.canterburymaps.govt.nz)

except for a portion of land adjacent to the western site boundary that has been used as a scrap yard, no potential sources of contamination were identified, and the rest of the land was appropriate for subdivision.

However, due to a tyre fire that occurred within the scrap yard in late 2018, Hurunui District Council (HDC) has expressed concern about the potential that debris from the fire has contaminated the surrounding land with polycyclic aromatic hydrocarbons (PAH) and/or heavy metals. HDC has requested that a limited DSI be submitted with the resource consent application for the subdivision of the surrounding land, constituting proposed lots 5, 6, 7, 8, and 10. Figure 2 shows the entire property, the location of the tyre fire and the area covered by this investigation (red boundary line).

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Sampling

On 22 July 2021 Sephira Environmental personnel visited the site to collect 22 surface soil samples. Surface soil sampling is considered appropriate in this case since the concern is that contaminants entrained in smoke from the fire were deposited onto the ground surface. Observations made during the sampling event indicate that the tyre fire was contained to the paddock west of the area being investigated. We observed a small soil bund on the boundary between proposed Lot 6 and the paddock to the west where the fire occurred. There was no evidence that potentially contaminated ash from the fire was physically conveyed by fire-fighting activities to the investigation area. Sample locations (S-1 to S-22) were evenly distributed across proposed Lots 5, 6, 7, 8, and the southern half of Lot 10, based on their respective proximity to the tyre fire location. All sampling locations are displayed in Figure 3. Photographs taken during the site visit are in Attachment A to this letter.

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Figure 3: Approximate Sampling Locations (source: mapviewer.canterburymaps.govt.nz)

At each sampling location a pre-cleaned hand trowel was used to loosen soil to a depth of 0.15 m bgs. Freshly gloved hands and the hand trowel where then used to place a representative sample of soil into a clean, laboratory supplied glass jar. All jarred samples were labelled with a unique sample ID, the date, and the time of sampling, and then were stored in a chilly bin with freezer packs. Gloves were changed and hand tools were decontaminated with soap and water between each sample to prevent cross contamination.

On the day of the sampling event, all samples were transported under appropriate chain of custody to Analytica Laboratories in Christchurch, and then were transported by Laboratory courier to their Hamilton branch for analysis.

All samples were analysed for 10 heavy metals. The laboratory was also instructed to prepared seven (7) 2-part, 3-part or 4-part composite samples for analysis of polycyclic aromatic hydrocarbons (PAH). The composites were prepared as follows: Composite-1 had S-1, S-2, S-6 and S-7; Composite-2 had S-3, S-4, and S-5; Composite-3 had S-8, S-9, and S-10; Composite-4 had S-11, S-12, S-16, and S-17; Composite-5 had S-13, S-14, and S-15; Composite-6 had S-19 and S-20; and Composite-7 had S-21 and S-22 (Figure 3). The selection of which samples to composite together for PAH analysis was based on their proximity to the tyre fire. Additionally, sample S-18 was analysed for PAH as a discrete sample.

Results

The results of the soil metals laboratory analysis are presented in Table 1. The results of the soil PAH laboratory analysis are presented in Table 2. The results in both tables are compared to the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS 2011) Soil Contaminant Standard (SCS) applicable to rural residential land use and the regional background levels for heavy metals in soil (ECan 2007a) or the regional background levels for PAH in soil (ECan 2007b). The laboratory reports are included as Attachment B to this report.

The results indicate that, with one exception, all heavy metals concentrations in all samples were equal to or below the expected background level for the site. While boron is present at a concentration slightly higher than the expected regional background (ECan 2007a) at one location (S-1) in the southwest corner of proposed Lot 5, the consistency of all of the other heavy metals concentrations at this location and across the site at levels below the expected background concentrations indicates that this value is an outlier and not likely associated with the fire. The boron concentration at sample location S-1 is below the level that presents a risk to human health in a rural residential land use scenario (NESCS 2011).

The results of the PAH analysis on the seven composite samples and one discrete sample indicated that no PAH compound was present in any sample above their respective laboratory limit of detection. As no comparison was required, neither the applicable SCS

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Table 1: Soil Metals Analytical Results

Sample Title Depth: 0.0-0.15 m bgs	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	Regional Background Soil Concentration[4]	Rural Residential / Lifestyle Block 25% Produce[3]
Arsenic	3.3	2.8	2.9	2.9	2.8	2.7	3.1	3.0	3.1	3.3	3.5	6.35	17
Beryllium	0.41	0.39	0.36	0.39	0.39	0.36	0.37	0.35	0.36	0.40	0.39	NA	60[5]
Boron	7.4	6.2	5.5	4.7	5.0	4.7	4.8	4.6	4.5	5.5	5.2	6.5	>10,000
Cadmium	0.11	0.10	0.073	0.093	0.10	0.086	0.095	0.076	0.091	0.11	0.12	0.14	0.8
Chromium	12	11	11	11	12	13.0	12	12	11	12	12.9	19.89	290
Copper	5.9	5.5	4.7	5.1	5.0	4.7	6.1	4.9	5.9	7.0	6.5	11.68	>10,000
Lead	10.3	8.87	8.80	9.98	9.30	8.51	9.55	8.96	9.27	10.1	9.75	19.75	160
Mercury	0.032	<0.025	<0.025	<0.025	<0.025	<0.025	0.026	<0.025	<0.025	<0.025	<0.025	0.07	200
Nickel	8.12	7.15	6.94	7.18	7.65	7.55	7.38	7.41	7.23	7.93	8.17	13.91	400[5]
Zinc	52.8	53.2	46.2	50.3	51.3	48.2	51.3	46.2	48.9	53.9	54.0	69.58	7,400[5]

Table 1 continued: Soil Metals Analytical Results

Sample Title Depth: 0.0-0.15 m bgs	S-12	S-13	S-14	S-15	S-16	S-17	S-18	S-19	S-20	S-21	S-22	Regional Background Soil Concentration[4]	Rural Residential / Lifestyle Block 25% Produce[3]
Arsenic	3.1	3.6	3.1	2.9	2.7	3.0	2.9	2.9	3.1	3.5	2.9	6.35	17
Beryllium	0.34	0.39	0.41	0.40	0.36	0.37	0.44	0.37	0.39	0.40	0.46	NA	60[5]
Boron	4.0	4.6	5.1	4.5	5.2	6.0	6.1	6.0	5.4	4.5	6.4	6.5	>10,000
Cadmium	0.10	0.12	0.085	0.10	0.077	0.076	0.081	0.12	0.13	0.10	0.084	0.14	0.8
Chromium	12	12	12.7	12	12	12	12	12	12	12.9	12	19.89	290
Copper	5.7	5.6	4.6	6.3	5.1	5.3	5.2	6.1	6.2	6.4	4.9	11.68	>10,000
Lead	9.62	8.94	9.17	9.09	8.29	8.72	9.85	9.10	8.89	9.64	9.32	19.75	160

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Sample Title Depth: 0.0-0.15 m bgs	S-12	S-13	S-14	S-15	S-16	S-17	S-18	S-19	S-20	S-21	S-22	Regional Background Soil Concentration[4]	Rural Residential / Lifestyle Block 25% Produce[3]
Mercury	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.028	<0.025	<0.025	<0.025	0.030	0.07	200
Nickel	7.45	7.17	7.58	7.45	7.06	7.04	7.60	7.37	7.30	7.84	6.82	13.91	400[5]
Zinc	53.2	52.2	53.0	53.9	51.8	51.8	52.7	54.9	54.9	52.6	51.1	69.58	7,400[5]

Table 1 Notes:

1. All results, standard values and background concentrations presented in mg/kg.
2. **Bold Results** exceed the applicable soil contaminant standard. Underlined Results exceed the published Regional Background Concentration.
3. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS 2011), soil contaminant standards for rural residential land use.
4. ECan 2007a. Background Concentrations of Selected Trace Elements in Canterbury Soils, Addendum 1: Additional Samples and Timaru Specific Background Levels. Environment Canterbury Report R07/1/2, July 2007.
5. Guideline on the Investigation Levels for Soil and Groundwater, National Environmental Protection Measure (NEPM), Assessment of Site Contamination (National Environmental Protection Council, NEPC, Australia 1999, updated 2013).

Table 2: Soil PAH Analytical Results

Sample Title	Composite-1	Composite-2	Composite-3	Composite-4	Composite-5	Composite-6	Composite-7	S-18	Regional Background Soil Concentration[4]	Rural Residential / Lifestyle Block 25% Produce[3]
Sub-Samples	S-1, S-2, S-6, S-7	S-3, S-4, S-5	S-8, S-9, S-10	S-11, S-12, S-16, S-17	S-13, S-14, S-15	S-19, S-20	S-21, S-22	Discrete Sample		
BaP_{equiv}[9]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.922	6

Table 2 Notes:

1. All results, standard values and background concentrations presented in mg/kg.
2. **Bold Results** exceed the applicable soil contaminant standard. Underlined Results exceed the published Regional Background Concentration.
3. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS 2011), soil contaminant standards for applicable land use.
4. ECan 2007b. Background Concentrations of Polyaromatic Hydrocarbons in Christchurch Urban Soils. Environment Canterbury Report No. R07/19, July 2007.
5. For benzo(a)pyrene, the equivalent BaP concentration is calculated as the sum of each of the detected concentrations of nine carcinogenic PAHs (benzo(a)anthracene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene and indeno(1,2,3-cd) pyrene), multiplied by their respective potency equivalency factors.

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nor the expected regional background concentrations were adjusted to account for the compositing.

Conclusions and Recommendations

At the advice of Angelique Hyde, you engaged Sephira Environmental Limited (Sephira Environmental) to undertake a Limited Environmental Site Investigation on a portion of the property located at 122 Racecourse Road, Amberley.

You propose to subdivide the land for rural residential land use. A PSI undertaken by Fraser Thomas in 2018 found that, with the exception of a portion of land adjacent to the western site boundary that has been used as a scrap yard, no potential sources of contamination were identified, and the rest of the land was appropriate for subdivision including the area that is the subject of this DSI.

However, Hurunui District Council has requested that a limited DSI be submitted with the resource consent application for the subdivision of the portion of land constituting proposed Lots 5, 6, 7, 8, and 10, due to their concern about a tyre fire that occurred within the scrap yard in late 2018. Their concern was about the potential that debris from fire or contaminated smoke has contaminated the surrounding land with contaminants associated with the fire (polycyclic aromatic hydrocarbons (PAH) and heavy metals).

Sephira Environmental collected 22 evenly distributed surface soil samples across proposed Lots 5, 6, 7, 8, and the southern half of Lot 10, based on their respective proximity to the tyre fire location. All samples were analysed for heavy metals. Additionally, seven 2-part, 3-part or 4-part composite samples prepared by the laboratory and one discrete sample were analysed for PAHs.

The results indicated that all metals were within the range of the expected regional background concentrations (ECan 2007a) for the site. Additionally, no PAHs were detected above the laboratory limit of detection in any sample.

Based on the sampling results it is our opinion that the land is unlikely to present a risk to human health if the subdivision were to proceed. Furthermore, if any soil must be removed from proposed Lots 5, 6, 7, 8 and 10 as part of any future development works, it can be considered cleanfill for off-site disposal purposes.

In accordance with Canterbury Regional Land and Water Plan Rule 5.185, a copy of this investigation report will be provided to Environment Canterbury.

SQEP Declaration

Christopher and Helen Mongillo oversaw the sampling, data interpretation and preparation of this report. They are suitably qualified and experienced professionals (SQEPs) as required by Regulation 3 (a) of the NESCS (2011) and as defined in Section 2.1.1 of the Draft Users' Guide, NESCS, November 2011. They are recognised by multiple regional and district

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councils as SQEPs. They each have relevant tertiary degrees and over 30 years of contaminated land and water investigation, risk assessment and site remediation experience, which includes decades of hands-on field experience overseen by experts in these disciplines.

Report Limitations

1. The document was prepared based on a site-specific scope agreed between the client and Sephira Environmental Limited which has a specific purpose and it is not intended to be used for any other purpose. These purposes were outlined in the proposal to the client.
2. The methods used are those described in the report and methods not specified cannot be assumed to have been undertaken.
3. The results are based on published information and data from the site and we provide no warrantee that the conditions will be exactly as represented in the report. Due to the variability of site conditions the document cannot be held to represent a complete understanding of the conditions of a site and we assume no responsibility for unexpected conditions which may be discovered.
4. The document only describes the site conditions at the time the report was prepared. Changes to the site or near the site due to the effects of time or changes in legislation may occur which render the report conclusions as inapplicable.
5. The document was prepared with the standard of care generally accepted at the time it was prepared and no other warrantee is expressed or implied in regard to the conclusions of this report.
6. We accept no responsibility for the information provided to us for use in the document. It is assumed to be accurate as received regardless of the source. We have made no independent verification of the data received, beyond the agreed scope of the work.
7. We accept no responsibility to any third party or their actions related to reliance on this document. We prepared the document for the client only or for specific third parties who are authorised in the report.
8. This report should be read in full and we accept no responsibility for use of any part of the report.
9. This report does not include legal advice which should be gained from professional practitioners.

Closure

Sephira Environmental appreciates the opportunity to provide you with these environmental consulting services. If you have any questions or comments regarding this letter report please do not hesitate to contact me at your convenience, otherwise I look forward to working with you again in the near future.

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Kind regards,

Sylvia Wilson
Environmental Scientist
Letter reviewed by:

Christopher B. Mongillo
Director, Principal Environmental Scientist
Suitably Qualified and Experienced Environmental Practitioner
Sephira Environmental Limited
www.sephiraenvironmental.co.nz

References:

ECan 2007a. Background Concentrations of Selected Trace Elements in Canterbury Soils, Addendum 1: Additional Samples and Timaru Specific Background Levels. Environment Canterbury Report R07/1/2, July 2007.

ECan 2007b. Background Concentrations of Polyaromatic Hydrocarbons in Christchurch Urban Soils. Environment Canterbury Report No. R07/19, July 2007.

MfE 2011. Contaminated Land Management Guidelines No. 1 - Guidelines for Reporting on Contaminated Sites in New Zealand. Ministry for the Environment (MfE) 2011.

NESCS 2011. Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. Came in force on 1 January 2012.

Attachments:

A: Site Photos
B: Laboratory Results

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Attachment A – Site Photos

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Photo A2: Looking west from earthen bund separating tyre fire from Proposed Lot 6. Fire remnants under plastic sheeting in mid-background. Note approximately 20 m gap between paddock boundary where photographer is standing and nearest edge of fire.

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Photo A2: Looking east across proposed Lot 6 from same location as Photo A1 (above). No evidence of ash, debris or staining observed on the ground surface at this location or in any other portion of the investigation area.

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Photo A3: General condition of Proposed Lots 5, 6, 7, 8 and 10 on day of site visit.

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Attachment B – Laboratory Report

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ANALYTICA LABORATORIES

Analytica Laboratories Limited
Ruakura Research Centre
10 Bisley Road
Hamilton 3214, New Zealand
Ph +64 (07) 974 4740
sales@analytica.co.nz
www.analytica.co.nz

Certificate of Analysis

Sephira Environmental
458 Manchester Street, St Albans
Christchurch 8014

Attention: Christopher Mongillo
Phone: 021 804 843
Email: christopher@sephira.nz

Sampling Site: 122 Racecourse Road

Lab Reference: 21-32436
Submitted by: Christopher Mongillo
Date Received: 23/07/2021
Testing Initiated: 23/07/2021
Date Completed: 28/07/2021
Order Number: A0630
Reference: A0630

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.
Specific testing dates are available on request.

Heavy Metals in Soil

	Client Sample ID		S-1 0-150	S-2 0-150	S-6 0-150	S-7 0-150	S-3 0-150
	Date Sampled		22/07/2021	22/07/2021	22/07/2021	22/07/2021	22/07/2021
Analyte	Unit	*Reporting Limit*	21-32436-1	21-32436-2	21-32436-3	21-32436-4	21-32436-5
Arsenic	mg/kg dry wt	*0.125*	3.3	2.8	2.7	3.1	2.9
Beryllium	mg/kg dry wt	*0.013*	0.41	0.39	0.36	0.37	0.36
Boron	mg/kg dry wt	*1.25*	7.4	6.2	4.7	4.8	5.5
Cadmium	mg/kg dry wt	*0.005*	0.11	0.10	0.086	0.095	0.073
Chromium	mg/kg dry wt	*0.125*	12	11	13.0	12	11
Copper	mg/kg dry wt	*0.075*	5.9	5.5	4.7	6.1	4.7
Lead	mg/kg dry wt	*0.25*	10.3	8.87	8.51	9.55	8.80
Mercury	mg/kg dry wt	*0.025*	0.032	<0.025	<0.025	0.026	<0.025
Nickel	mg/kg dry wt	*0.05*	8.12	7.15	7.55	7.38	6.94
Zinc	mg/kg dry wt	*0.05*	52.8	53.2	48.2	51.3	46.2

Heavy Metals in Soil

	Client Sample ID		S-4 0-150	S-5 0-150	S-8 0-150	S-9 0-150	S-10 0-150
	Date Sampled		22/07/2021	22/07/2021	22/07/2021	22/07/2021	22/07/2021
Analyte	Unit	*Reporting Limit*	21-32436-6	21-32436-7	21-32436-8	21-32436-9	21-32436-10
Arsenic	mg/kg dry wt	*0.125*	2.9	2.8	3.0	3.1	3.3
Beryllium	mg/kg dry wt	*0.013*	0.39	0.39	0.35	0.36	0.40
Boron	mg/kg dry wt	*1.25*	4.7	5.0	4.6	4.5	5.5
Cadmium	mg/kg dry wt	*0.005*	0.093	0.10	0.076	0.091	0.11
Chromium	mg/kg dry wt	*0.125*	11	12	12	11	12
Copper	mg/kg dry wt	*0.075*	5.1	5.0	4.9	5.9	7.0

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation with the exception of tests marked *, which are not accredited.
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Heavy Metals in Soil

			Client Sample ID	S-4 0-150	S-5 0-150	S-8 0-150	S-9 0-150	S-10 0-150
			Date Sampled	22/07/2021	22/07/2021	22/07/2021	22/07/2021	22/07/2021
Lead	mg/kg dry wt	*0.25*		9.98	9.30	8.96	9.27	10.1
Mercury	mg/kg dry wt	*0.025*		<0.025	<0.025	<0.025	<0.025	<0.025
Nickel	mg/kg dry wt	*0.05*		7.18	7.65	7.41	7.23	7.93
Zinc	mg/kg dry wt	*0.05*		50.3	51.3	46.2	48.9	53.9

Heavy Metals in Soil

			Client Sample ID	S-11 0-150	S-12 0-150	S-16 0-150	S-17 0-150	S-13 0-150
			Date Sampled	22/07/2021	22/07/2021	22/07/2021	22/07/2021	22/07/2021
Analyte	Unit	*Reporting Limit*		21-32436-11	21-32436-12	21-32436-13	21-32436-14	21-32436-15
Arsenic	mg/kg dry wt	*0.125*		3.5	3.1	2.7	3.0	3.6
Beryllium	mg/kg dry wt	*0.013*		0.39	0.34	0.36	0.37	0.39
Boron	mg/kg dry wt	*1.25*		5.2	4.0	5.2	6.0	4.6
Cadmium	mg/kg dry wt	*0.005*		0.12	0.10	0.077	0.076	0.12
Chromium	mg/kg dry wt	*0.125*		12.9	12	12	12	12
Copper	mg/kg dry wt	*0.075*		6.5	5.7	5.1	5.3	5.6
Lead	mg/kg dry wt	*0.25*		9.75	9.62	8.29	8.72	8.94
Mercury	mg/kg dry wt	*0.025*		<0.025	<0.025	<0.025	<0.025	<0.025
Nickel	mg/kg dry wt	*0.05*		8.17	7.45	7.06	7.04	7.17
Zinc	mg/kg dry wt	*0.05*		54.0	53.2	51.8	51.8	52.2

Heavy Metals in Soil

			Client Sample ID	S-14 0-150	S-15 0-150	S-19 0-150	S-20 0-150	S-21 0-150
			Date Sampled	22/07/2021	22/07/2021	22/07/2021	22/07/2021	22/07/2021
Analyte	Unit	*Reporting Limit*		21-32436-16	21-32436-17	21-32436-18	21-32436-19	21-32436-20
Arsenic	mg/kg dry wt	*0.125*		3.1	2.9	2.9	3.1	3.5
Beryllium	mg/kg dry wt	*0.013*		0.41	0.40	0.37	0.39	0.40
Boron	mg/kg dry wt	*1.25*		5.1	4.5	6.0	5.4	4.5
Cadmium	mg/kg dry wt	*0.005*		0.085	0.10	0.12	0.13	0.10
Chromium	mg/kg dry wt	*0.125*		12.7	12	12	12	12.9
Copper	mg/kg dry wt	*0.075*		4.6	6.3	6.1	6.2	6.4
Lead	mg/kg dry wt	*0.25*		9.17	9.09	9.10	8.89	9.64
Mercury	mg/kg dry wt	*0.025*		<0.025	<0.025	<0.025	<0.025	<0.025
Nickel	mg/kg dry wt	*0.05*		7.58	7.45	7.37	7.30	7.84
Zinc	mg/kg dry wt	*0.05*		53.0	53.9	54.9	54.9	52.6

Heavy Metals in Soil

			Client Sample ID	S-22 0-150	S-18 0-150
			Date Sampled	22/07/2021	22/07/2021
Analyte	Unit	*Reporting Limit*		21-32436-21	21-32436-22
Arsenic	mg/kg dry wt	*0.125*		2.9	2.9
Beryllium	mg/kg dry wt	*0.013*		0.46	0.44
Boron	mg/kg dry wt	*1.25*		6.4	6.1
Cadmium	mg/kg dry wt	*0.005*		0.084	0.081
Chromium	mg/kg dry wt	*0.125*		12	12
Copper	mg/kg dry wt	*0.075*		4.9	5.2
Lead	mg/kg dry wt	*0.25*		9.32	9.85
Mercury	mg/kg dry wt	*0.025*		0.030	0.028

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Heavy Metals in Soil

			Client Sample ID	S-22 0-150	S-18 0-150
			Date Sampled	22/07/2021	22/07/2021
Nickel	mg/kg dry wt	*0.05*		6.82	7.60
Zinc	mg/kg dry wt	*0.05*		51.1	52.7

Polycyclic Aromatic Hydrocarbons - Soil

			Client Sample ID	S-18 0-150	Composite 1 (S-1, S-2, S-6, S-7)	Composite 2 (S-3, S-4, S-5)	Composite 3 (S-8, S-9, S-10)	Composite 4 (S-11, S-12, S-16, S-17)
			Date Sampled	22/07/2021				
Analyte	Unit	*Reporting Limit*		21-32436-22	21-32436-23	21-32436-24	21-32436-25	21-32436-26
1-Methylnaphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[a]pyrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Benzo[b]&[j] fluoranthene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[g,h,i]perylene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[k]fluoranthene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Chrysene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Dibenz(a,h)anthracene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Fluoranthene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
Fluorene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Naphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Pyrene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	*0.03*		0.030	0.030	0.030	0.030	0.030
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene-d10 (Surrogate)	%	*1*		100	100	100	100	100

Polycyclic Aromatic Hydrocarbons - Soil

			Client Sample ID	Composite 5 (S-13, S-14, S-15)	Composite 6 (S-19, S-20)	Composite 7 (S-21, S-22)
			Date Sampled			
Analyte	Unit	*Reporting Limit*		21-32436-27	21-32436-28	21-32436-29
1-Methylnaphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Acenaphthene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Anthracene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020
Benzo[a]pyrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Benzo[b]&[j] fluoranthene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020
Benzo[g,h,i]perylene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020
Benzo[k]fluoranthene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Chrysene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010

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Polycyclic Aromatic Hydrocarbons - Soil

			Client Sample ID	Composite 5 (S-13, S-14, S-15)	Composite 6 (S-19, S-20)	Composite 7 (S-21, S-22)
			Date Sampled			
Dibenz(a,h)anthracene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Fluoranthene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020
Fluorene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Naphthalene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Phenanthrene	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Pyrene	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	*0.03*		0.030	0.030	0.030
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	*0.01*		<0.010	<0.010	<0.010
Anthracene-d10 (Surrogate)	%	*1*		110	100	100

Moisture Content

			Client Sample ID	S-18 0-150	Composite 1 (S-1, S-2, S-6, S-7)	Composite 2 (S-3, S-4, S-5)	Composite 3 (S-8, S-9, S-10)	Composite 4 (S-11, S-12, S-16, S-17)
			Date Sampled	22/07/2021				
Analyte	Unit	*Reporting Limit*		21-32436-22	21-32436-23	21-32436-24	21-32436-25	21-32436-26
Moisture Content	%	*1*		21	22	21	23	21

Moisture Content

			Client Sample ID	Composite 5 (S-13, S-14, S-15)	Composite 6 (S-19, S-20)	Composite 7 (S-21, S-22)
			Date Sampled			
Analyte	Unit	*Reporting Limit*		21-32436-27	21-32436-28	21-32436-29
Moisture Content	%	*1*		24	25	20

Method Summary

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

PAH in Soil Solvent extraction, silica cleanup, followed by GC-MS analysis.
Benzo[a]pyrene TEQ (LOR): The most conservative TEQ estimate, where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the TEQ for that PAH.
Benzo[a]pyrene TEQ (Zero): The least conservative TEQ estimate, PAHs reported as less than the limit of reporting (LOR) are not included in the TEQ calculation.
Benzo[a]pyrene toxic equivalence (TEQ) is calculated according to *'Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health'*. Ministry for the Environment. 2011. (In accordance with in-house procedure).

Moisture Moisture content is determined gravimetrically by drying at 103 °C.

Emily Hanna, B.Sc.
Trace Elements Team Leader

Rong Zhang
Technician

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ENVIRONMENTAL TESTING

CHAIN OF CUSTODY

ANALYTICA LABORATORIES

CLIENT INFORMATION				Page #	1	of	2
Client	SEPHIRA ENVIRONMENTAL			Customer Comments / Instructions			
Address	CHRISTCHURCH						
Project Leader	CHRISTOPHER MONTGILLO						
Project ID	A0630	PO #	A0630				
Site	122 RACECOURSE RD.						
Sampler	CHRISTOPHER MONTILLO						
Phone	021 804 843						
Email	CHRISTOPHER@SEPHIRA.NZ						
Invoice Email	SYLVIA@SEPHIRA.NZ						

21-32436

LABORATORY USE ONLY								
Laboratory Job #	21-32436			Seal Status		Priority (mark with X)		
Date Received	23/7/21	Received By		Sample Temp Status		Routine		Urgent

TESTS REQUESTED

Lab ID	Sample ID	Depth	Date	Time	Matrix	# Cont.	Analysis Requests/Suites: 10 HEAVY METALS		Composit for PAH		Sample Comments
	S-1	0-150	22/7/21	10 47	S or W	1	✓				
	S-2			10 50	S or W	1	✓				
	S-6			11 06	S or W	1	✓				
	S-7			11 07	S or W	1	✓				
	S-3			1055	S or W	1	✓			✓	
	S-4			11 00	S or W	1	✓				
7	S-5			1105	S or W	1	✓				
	S-8			1108	S or W	1	✓			✓	
	S-9			1109	S or W	1	✓				
	S-10			11 10	S or W	1	✓				
	S-11			11 16	S or W	1	✓				
	S-12			11 17	S or W	1	✓			✓	
	S-16			11 20	S or W	1	✓				
14	S-17			11 30	S or W	1	✓				
	S-13			11 20	S or W	1	✓				
	S-14			11 21	S or W	1	✓			✓	
	S-15			11 23	S or W	1	✓				
	~~S-18~~			~~11 31~~	S or W	1	✓				~~NO PAH~~ NO PAH

Samples transferred to: Auckland / Hamilton / Wellington / Christchurch / Dunedin — Date: 22/07/21 — Initials: KE

Relinquished by		Received by		Courier	
Date	22/7/21 Time 13 58	Date	23/7/21 Time 7AM	Courier #	NZC 8042000957

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ENVIRONMENTAL TESTING

CHAIN OF CUSTODY

ANALYTICA LABORATORIES

CLIENT INFORMATION				Page #	2	of	2
Client	SEPHIRA ENVIRONMENTAL			Customer Comments / Instructions			
Address	CHRISTCHURCH						
Project Leader	CHRISTOPHER MONGILLO						
Project ID	A0630	PO #	A0630				
Site	122 RACECOURSE RD						
Sampler	CHRISTOPHER MONGILLO						
Phone	021 804 843						
Email	CHRISTOPHER@SEPHRA.NZ						
Invoice Email	SYLVIA@SEPHIRA.NZ						

LABORATORY USE ONLY							
Laboratory Job #	21-32436			Seal Status		Priority (mark with X)	
Date Received	23/7/21	Received By		Sample Temp Status		Routine	Urgent

TESTS REQUESTED

Lab ID	Sample ID	Depth	Date	Time	Matrix	# Cont.	Analysis Requests/Suites: 10 HEAVY METALS			COMPOSITE FOR PAH	INDIVIDUAL PAH	Sample Comments
	S-19	0-150	22/7/21	11 34	S or W	1	✓	→	→	✓		
	S-20	↓	↓	11 37	S or W	1	✓	→	→	↓	↓	
	S-21	↓	↓	11 43	S or W	1	✓	→	→	✓	↓	
21	S-22	↓	↓	11 45	S or W	1	✓	→	→	↓	↓	
	S-18	0-150	22/7/21	11 31	S or W	1	✓	↓	↓	↓	✓	
			/ /	:	S or W							
			/ /	:	S or W							
			/ /	:	S or W							
			/ /	:	S or W							
			/ /	:	S or W							
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			/ /	:	S or W							
			/ /	:	S or W							

Relinquished by				Received by				Courier	
Date	22/7/21	Time	1358	Date	/ /	Time	:	Courier #	

Analytica Laboratories Ltd
Ruakura Research Centre
10 Bisley Road, Private Bag 3123
Hamilton 3240, New Zealand
Phone +64 7 974 4740
Email enviro.reception@analytica.co.nz
analytica.co.nz

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PS1 Design

On site Wastewater system and Land Application for

Bryan Donnelly

153 Innes Road, Amberley

Lot 4 DP 502943

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12th October 2021

To Hurunui District Council

I, Joe Drury herby confirm that the sewage Land Application system for the above site, has been designed with sound and widely accepted principles to adequately dispose of the sewage effluent on site.

The standard of effluent treatment will meet and /or exceed the level specified within the Council recommendations for sewage treatment where municipal treatment is unavailable. The specified system will comply with AS/NZS 1547:2012 where applicable.

The design is detailed in the Specification and Working Drawings included in this document. As an independent suitably experienced design professional*, covered by a current policy of professional indemnity insurance (to indemnity value of $5,000,000), I believe on reasonable grounds that this system will adequately dispose of effluent on site and comply with N.Z Building Code G13.2, G13.3.4, G13/VM4 of the Building Regulation 1992 First Schedule and shall continue to satisfy the performance requirements of the First Schedule, Clause B2.3.1 (b) of the Building Amendment Reg 1997. Provided the system is installed as per specifications and the owner operates and maintains the system as detailed in the Owner's Manual, this Wastewater Treatment System will perform at the levels indicated.

Designed By:

Beth Roche
Wastewater Design

Reviewed By:

Joe Drury
General Manager

AUSTIN bluewater

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20 Illinios Drive
Rolleston
Christchurch

Office phone: 0800 287 846
Website: www.austinbluewater.co.nz

**Suitably qualified person being one who has such extensive experience and expertise which is proven to be equivalent to that qualification in the field of Wastewater Treatment Systems & Design".*

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Topography / Elevation Profile of LAS Envelope: 5
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Company Profile 15
Service Contract for Your Austin Bluewater ABS 2000 Series 19

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PS1 Design

On site Wastewater system and Land Application

This statement provides design specifications and technical information for an Austin Bluewater ABS2000 secondary treatment system (6 chamber septic system) and design specifications for the disposal field.

Customer details:

Applicant:	Bryan Donnelly		
Contact details:	Phone: 027 375 1899 Email: bryanvizbuilt@gmail.com		
Site Location:	153 Innes Road, Glasnevin Amberley		
Legal Description:	Lot 4 DP 502943		
Lot Size:	4.5ha		
Local Council:	Hurunui District Council		
Date site visit:	13/09/21		
Environment Canterbury Consent Info:	CRC 131130	Issued/Status:	Issued / Active

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Site Investigation:

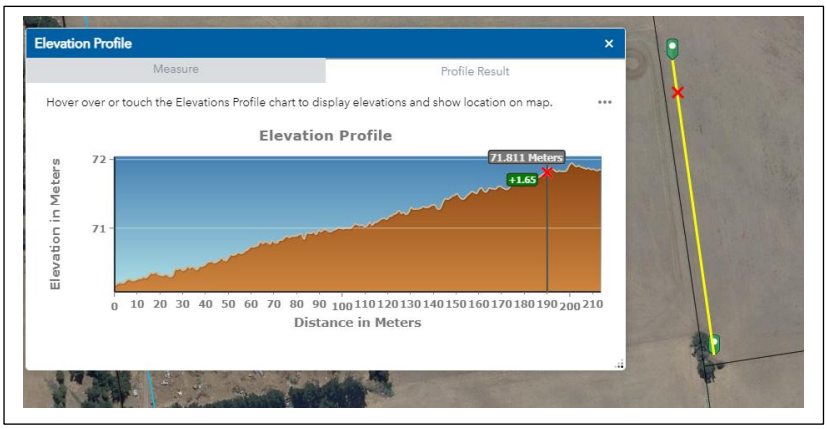
Steve Roche from Austin Bluewater met with the Bryan Donnelly at 153 Innes Road (Lot 4) on the 13/09/21 to discuss the proposed use for the property and assess the receiving environment in relation to wastewater treatment requirement and the regulations for the best practice environmental solution for the property.

At the onsite meeting the plan is to build a 4 bedroom dwelling on the property and install a ABS2000 to dripline as per consent conditions from Environment Canterbury CRC131130 which was issued on the 11/12/2012 all the conditions within the consenting document have been met by this design.

A detailed site and soil investigation was performed and the plan The property water is obtained by Council water scheme, closest well to the property is Well M34/5707 provides water to the community and is 243m S from the drip line location. The drip field is not within the community protection zone. There is a Waipara river is located 3,925m E from the dripline location and there are no open drains within 20m of the disposal field. The property is flat with no evidence of ground instability a test hole was dug within the designated LASE area, test hole depth was 1000mm with no evidence of mottling or groundwater.

Topography / Elevation Profile of LAS Envelope:

Flat <10 °



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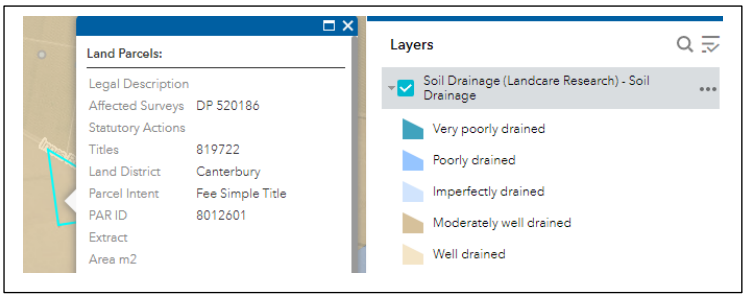
Soil Breakdown:

Test pit depth:	1000mm
Topsoil:	300mm
Subsoil:	300-700mm stony sandy loams 700-1000mm sandy gravels
Category:	2 (well drained)
Groundwater:	None
Mottling:	None
Unconfined / Coastal Confined:	Unconfined



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Design parameters:

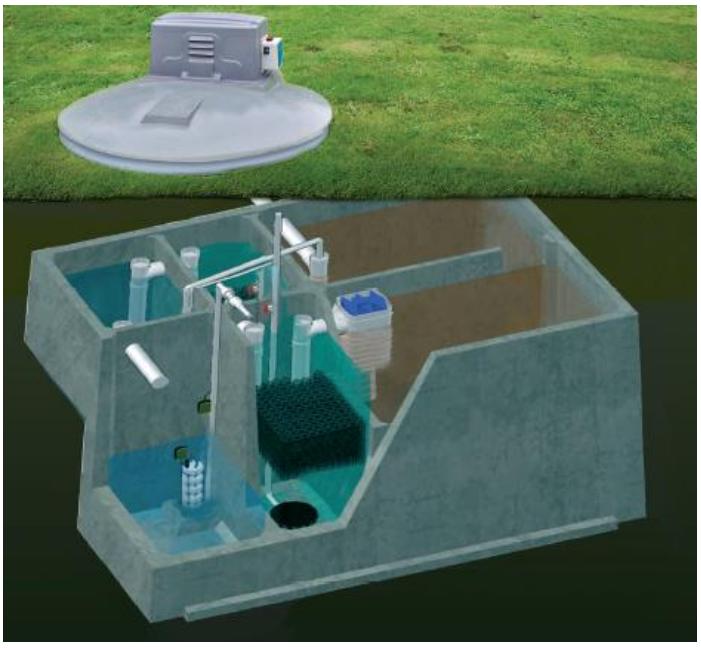
The chosen system has been designed in accordance with AS/NZS 1547:2012 On-Site Domestic Wastewater Management, the supply & installation of an ABS2000 on-site wastewater system dispersing to drip irrigation line

Dwelling	1 dwelling
Bedrooms	4 bedrooms
Population Equivalent:	7 people
Flow:	1400L/day
Dripline:	280m^2 drip irrigation line to be laid sub surface (150mm below ground level)
Drip irrigation rate:	5mm

- The Unit when used to its full potential will have a maximum wastewater flow of up to 1600L/day could be reached. (Accommodating 8 people maximum).

System Required:

Austin Bluewater ABS2000 is designed within accordance to AS/NZS 1547:2012 and process engineered to perform as specified in the On-site Effluent Treatment National Testing Programme (OSET NTP).



Technical Specifications

Primary pre-treatment chamber (gross)	2.33m³
Secondary pre-treatment chamber (gross)	2.33m³
Aeration Chamber 1 (gross)	.85m³
Aeration Chamber 2 (gross)	.85m³
Clarifying Chamber	.74m³
Pump Out Chamber	1.03m³
Total holding capacity (gross)	8.13m³
Working Tank Volume	6.71m³
Reserve Capacity	1.42m³

Tank construction - manufactured in special high grade 45mpa structural concrete.

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The ABS2000 is a 6 chambered secondary aeration wastewater treatment system:

1. The wastewater enters the first primary chamber has capacity of 2.33m3 through 100mm DW PVC and dropped into the mid-level of the tank to avoid any disturbance of the crust and then flows over a nib wall into
2. the second primary chamber of 2.33m3 capacity. The wastewater exits this chamber through a Polyloc PL525 filter into
3. the first aeration chamber of 0.85m3 Capacity where there is Bio-media located and a 9" air diffuser which exits up through 100mm DW PVC pipe tee into
4. The second aeration chamber of 0.85m3 Capacity where there is more Bio-media located and another 9" air diffuser which exits up through 100mm DW PVC pipe tee into
5. The first clarification chamber where at the angled base is a sludge return pipe that returns any heavy liquids back to the first primary chamber 0.74m3 Capacity, the treated wastewater exits up through 100mm DW PVC pipe tee into
6. The second clarification chamber of 1.03m3 Capacity, where the irrigation pump is located. The pump is operated on float switches, there is an alarm for high level, air pump failure and pump failure.

On-site Effluent Treatment National Testing Programme (OSET NTP)

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	A	B	C	D
BOD (mg/L)	2	0	A+	<5	<10	<20	<30	≥30
TSS (mg/L)	1	1	A+	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	27.6	6	C	<5	<15	<25	<30	≥30
NH_4- Nitrogen (mg/L)	0.04	2	A+	<1	<5	<10	<20	≥20
Total phosphorus (mg/L)	2.4	0.4	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	7,600	6,900	B	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)	1.75	0.3	B	0	<1	<2	<5	≥5

Land Application Irrigation System:

Discharge effluent from the ABS 2000 System into

- Soakage area to be a minimum 280m^2, multiple lines 16mm pressure compensating dripline x 1m apart.
- Disposal to be through 2.1Lt/hr with emitters at 0·6m centers 1m apart @ <5mm/day Rate. The dripline will be installed by being laid on the surface. This will allow soakage/treatment.
- The installation of the drip irrigation with correct placement within the area of disposal, of the Air/Vacuum Relief at the highest point of the field and Line flushing Valves at the end of every line of drip irrigation pipe as per working drawings & site plan.
- Recommend disposal area to planted in grass, which will assist in liquid and nitrogen uptake. (Maintenance of plants is the owner's responsibility).
- No stock or vehicles will have access to the discharge area.

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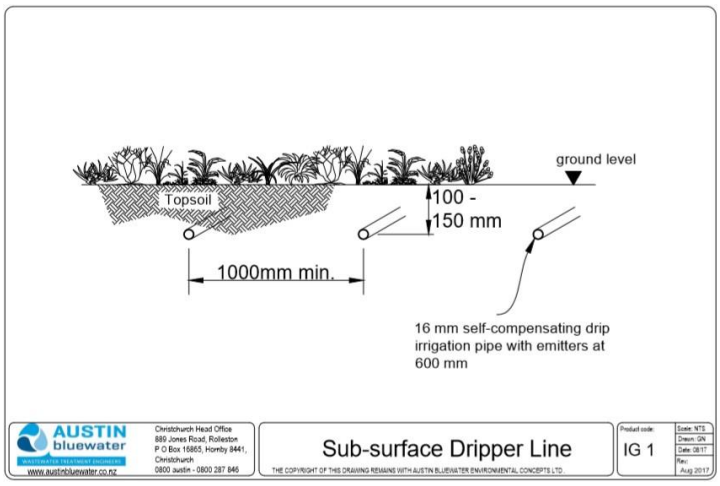

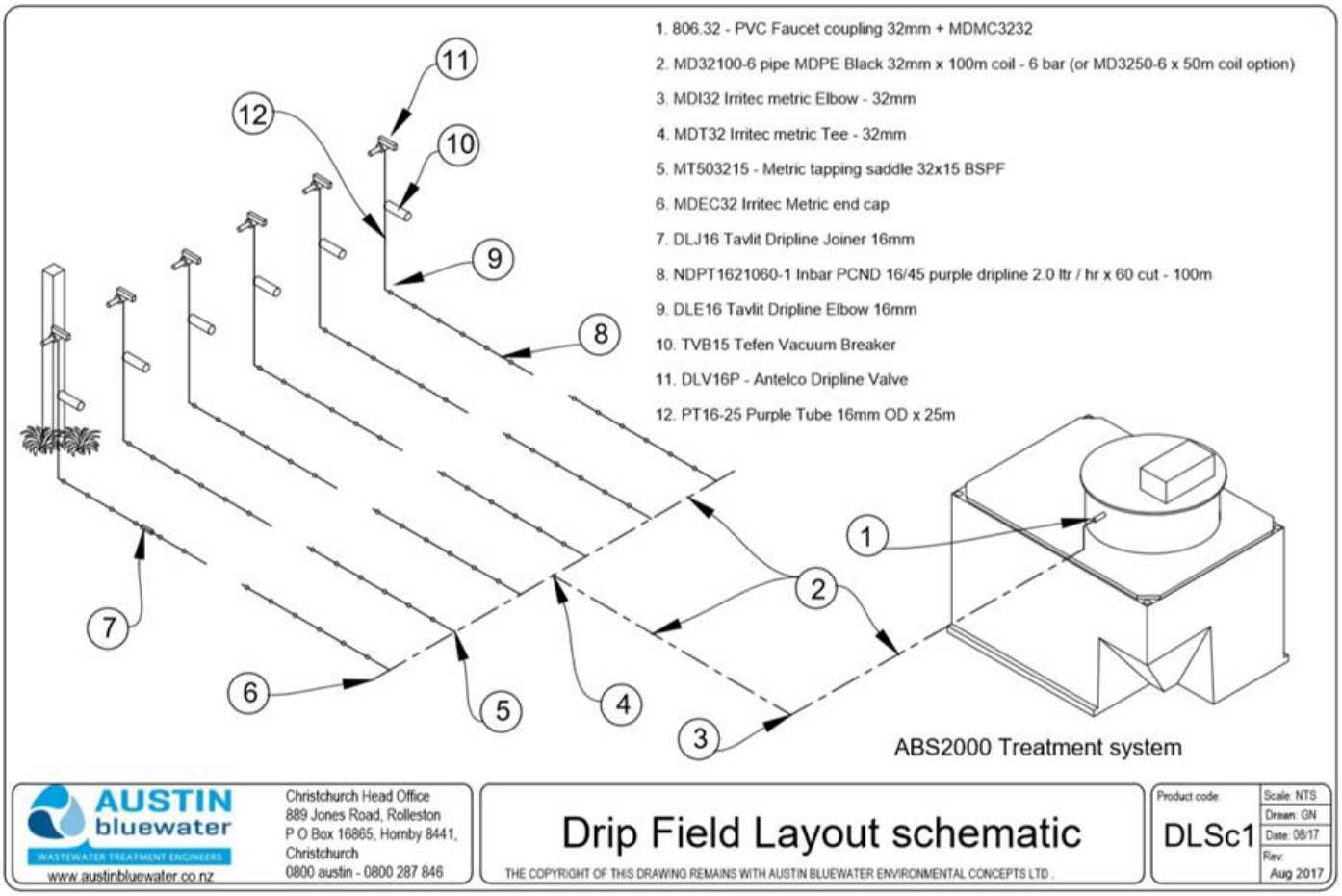

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Groundwater:

Groundwater/ Wells >1000m to Proposed Dripline Disposal Field Envelope						
WELL NO	WELL STATUS DESC	DEPTH	DISTANCE	HIGHEST WATER LEVEL	READING COUNT	YEARS
BV24/0105	130.75	Active (exist, present)	338m S	-9.030000299	1	July 17, 2019
M34/5603	108	Active (exist, present)	937m SE	-1.99999994	12	July 22, 2009, June 2, 2010
M34/0682	9.5	Active (exist, present)	436m SE	-2.609999895	2	November 26, 2000, May 7, 2001
M34/0666	24	Active (exist, present)	727m SW	-3.380000055	39	April 27, 1999, April 25, 2001
M34/5653	32.20000076	Active (exist, present)	414m SE	-1.98999992	318	July 8, 2007, April 28, 2016
M34/0659	28	Active (exist, present)	657m SW	-3.420000106	36	April 27, 1999, April 29, 2001
M34/0680	6.099999905	Altered (well has changed)	705m SE	-1.179999948	4	September 14, 1999, May 9, 2001
M34/5707	147	Active (exist, present)	314m S	-8.660000145	1	December 5, 2007
M34/0667	24	Active (exist, present)	541m SW	-3.019999921	57	April 27, 1999, May 15, 2002
M34/0713	8.800000191	Not Used	532m SE	-1.799999975	2	November 27, 2000, April 12, 2001
M34/0414	33	Not Used	536m SW	-5.199999809	2	November 26, 2000, May 8, 2001
M34/0077	25.10000038	Active (exist, present)	801m SW	-4.019999981	5	October 6, 1999, May 9, 2001
M34/0679	8.300000191	Active (exist, present)	649m E	-1.190000057	48	September 16, 1999, November 17, 2010
M34/0095	6.300000191	Active (exist, present)	510m S	-1.659999967	340	March 1, 1966, September 23, 2021
M34/5684	78.18000031	Active (exist, present)	780m SE	-3.130000114	102	August 10, 2006, September 23, 2021

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Water Entry:

- No other surface or stormwater to enter system either before or after the treatment process stage, indirect discharge only following secondary treatment standard.
- No adverse effects envisaged to the environment or neighbors due to the above standard of the irrigation and required separation from ground water.
- There are no open drains within 20m of the disposal field

Land application system for 153 Innes Road, Glasnevin Amberley
Bryan Donnolly
Lot 4 DP 502943 Section size 4.5ha

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Scale: 1:1,100 @A3
Map Created by Canterbury Maps on 12/10/2021 at 3:23 PM

Environment Canterbury Consent Number CRC131130

Condition 9: A fence shall be erected around the perimeter of each land application system, which is sufficient to exclude stock, vehicles and the public

Test hole location

LAS envelope >280m^2 drip irrigation line to be laid sub surface (150mm below ground level) as per diagram below

Innes Road

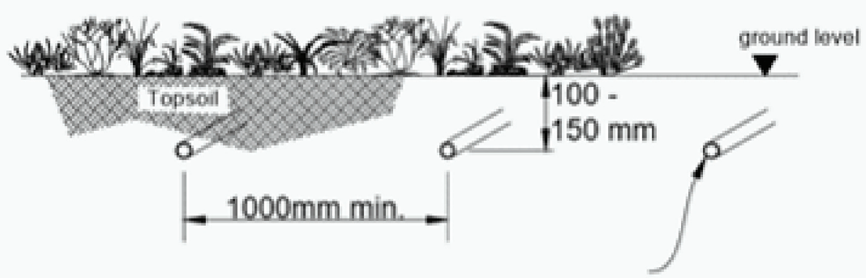
147

Boundary

2m off boundary

Proposed location 4 bedroom dwelling

Proposed location ABS2000 aerated treatment system



AUSTIN bluewater
Christchurch Head Office
880 Jones Road, Rolleston
P O Box 15885, Hornby 8441,
Christchurch
0800 austin - 0800 287 846
www.austinbluewater.co.nz

Sub-surface Dripper Line

IG 1

Scale: N°S
Drawn: GN
Date: 08/17
Rev: Aug 2017

Environment Canterbury, Waimakariri DC, LINZ, LINZ, Environment Canterbury, Environment Canterbury

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Installation:

Austin Bluewater Aeration is to be installed by a registered drainlayer and all associated drains connecting to tank and disposal field. Installation of the treatment unit to be in conjunction with manufacturers requirement. Rises and access lids to tank chambers are to be watertight. Access lids to be at ground level or above. Disposal field to be installed as per cross section and plan view drawings.

Site Clearance:

Upon completion of all drainage work, the site is to be left neat and tidy. (There will be a large volume of excavated material left over. The Drainlayer should check with owner if it needs to be removed or a location for it to be stock piled.)

Service Contract:

A Service Contract will need to be arranged, at the times required specified in Austin Bluewater **Home Owners Guide** to ensure the Aeration System is functioning properly. This contract must always be kept signed and active. This system requires servicing every six months.

Future proofing:

Currently the system will be operating @ 1400L/day. The system capacity to operate at 1600lt/day. The Dripline will need to be increased to accommodate any additional loading on the system.

Disclaimer:

The relevant parties incorporated with this wastewater design process are to be honest and transparent when providing Austin Bluewater with information relating to existing and/ or proposed wastewater activities on the site mentioned as this will impact on the calculations for proposed wastewater treatment. Examples of information provided are the potential number of bedrooms, other consent or activities on site, and also specifically to any water supply with any chemicals to wastewater connection and this potentially creating toxicants to the biological process. Any alterations to the proposed area of the land that could alter the soil profile or the potential daily wastewater quantity or quality must be reported Austin Bluewater. Parties who fail to report relevant information that could impact on this design & specification, will void authenticity of this document.

Consent must be sought and approved in order to use this document from Austin Bluewater**.** If any changes or variations to any particular specifications or plan in this documentation are thought as not relevant by the installer before, or at the time of installation. Failure to communicate necessary information will void this documentation which would result in Austin Bluewater not taking ownership for the wastewater design or functionality of the product. All expenses to variations of documentation created by introduced alterations after the design has been prepared, are the client or relevant parties' responsibility and expense. If the owner does not follow the Ecan/ Local Council requirements/ specifications of this product outlined in the Owner's Manual and does not have the recommended maintenance carried out, it will void the design and wastewater quality outcomes in this document.

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www.austinbluewater.co.nz

I certify that this treatment system has been designed in accordance with AS/NZS 1547:2012 (On site Domestic Wastewater Management). Providing the system is installed and maintained according to specifications and recommendations within this document and is operated and maintained correctly by the system owner, I believe the system will provide an effective, environmentally-safe system for treating and disposing of domestic wastewater into land then into groundwater.

For Austin Bluewater

BA Roche

Beth Roche
Wastewater Design

OWNER DECLARATION

I have read and understood this statement and will follow the usage/servicing requirements to maintain the system's as per the Environment Canterbury's decision document.

Owner: BRYAN DONNELLY

Date: 2/11/2021

Signature: Bryan Donnelly

Owner: PHILIPPA DONNELLY

Date: 2/11/2021

Signature: Philippa Donnelly

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Austin Bluewater Technical Specifications

Company Profile

The proprietor of Austin Bluewater, Lew Austin introduces the first Aerobic Wastewater Treatment Systems into New Zealand in 1991 and been manufacturing in 1992. Austin Bluewater continues to lead in the wastewater technology field and has associations with other leading authorities in Europe, USA and Australia. We manufacture all of our own products in our modern facility based in Christchurch.

TABLE OF CONTENTS

SECTION 1 - System Principles & engineering
SECTION 2 - Technical Specifications
SECTION 3 - System Performance Details
SECTION 4 - System Construction
SECTION 5 - System Componentry

Section 1 – System Principles

Austin Bluewater wastewater treatment systems are designed and manufactured with care & foresight. These are fine technical details that are born from the commitment to sustainability and performance, including quality & durable materials of the individual components that are installed in the system. The principle of the system is tried and true SAFE system (submerged aeration filtered effluent). Incorporating a structured filter media allows for a large specific surface area to volume ratio. When the media submerges in water & air diffuses from the media, this provides circulation of the wastewater & allows biological film (or bio film) to grow on the surface area, treating the waste water liquid as it passes through the various stages.
Efficient Technology: The Austin Bluewater residential treatment system is divided into 6 principle chambers.

Chamber 1: All wastes are delivered from dwelling into this anaerobic chamber. Capacity – 2.33m3.

Chamber 2: Secondary anaerobic pre-treatment chamber incorporating Polylok PS25 filter allowing for further breakdown of organic & inorganic waste. Capacity 2.33m3

Chambers 3 & 4: Dual Aeration Chambers – Our unique design incorporates two aeration chambers with additional bioblok media for further enhanced treatment & incorporating additional air & diffusers for a higher quality treated effluent with lower nitrogen levels. Joint capacity 1.7m3 **Chamber 5**: Clarification Chamber – The clarification chamber is purpose designed with a 60% slope to ensure fine particles settle for return to the primary pre-treatment chamber to assist denitrification. Capacity - .74m3

Chamber 6: Pumpwell Chamber: The separate pumpwell has a capacity of 1030 litres. The unit is fitted with an automatic irrigation pump specifically designed to suit the application.
SELF DIAGNOSTIC CONTROL PANEL: The Austin Bluewater system consists of a self-diagnostic controller complete with alarms displaying any abnormality occurring in the system. The blower operation automatically reduces to 30 mins an hour if no flow is detected for 48 hours, therefore reducing electricity usage.

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Section 2 – Technical Specifications

Primary Pre-Treatment Chamber (gross)	2.33m3
Secondary Pre-Treatment Chamber (gross)	2.33m3
Aeration Chamber 1 (gross)	.85m3
Aeration Chamber 2 (gross)	.85m3
Clarifying Chamber	.74m3
Pump Out Chamber	1.03m3
Total Holding Capacity (gross)	8.13m3
Working Tank Volume	6.71m3
Reserve Capacity	1.42m3

Tank construction- manufactured in special high grade 45mpa structural concrete.

System Dimensions

Overall Length 3 metres
Overall Width 2.1 metres
Overall Height (inc standard 500mm turret) 2.2 metres
Weight 7.7 tonnes
Invert Level (less extension turret) from bottom of tank 1.58 metres

Certification

Manufactured to AUS/NZS 1546-1 and 1547 standards. NZTP 58 Approved. Maximum rates capacity = 10 person domestic situation

Section 3 System Performance Criteria to AS/NZS1547

1: Performance Details (as discharged)

1BOD after 5 days	<20mg/l
2: Suspended Solids (TSS)	<30mg/l
3: Total Nitrogen	<30g/m3
4: Faecal Coliforms	<1000/100ml

2: Design Requirements
A Minimum daily flow of 160 litres per person
B Average daily BODs – 70 grams per person
C Average daily total SS – 70 grams per person

Section 4 - System Construction

Manufactured to AS/NZS 1546.1:2008, Austin Bluewater concrete tanks & lids are manufactured in 50mps concrete strength with 665 mesh for strength & durability. The lid is separate, recessed sealed to the tank. All internal walls are intergril as the tank is of monolithic poured construction (in one piece). The product is

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externally vibrated during the pouring process (note no fibre is used in our process). This manufacturing process eliminates any leakage caused by any movement of interim walls, common in other processes.

Concrete

Austin Bluewater's concrete is a high grade ready mix concrete design complying to NZS3104, relating to special grades, plant & testing. Concrete supplied for the manufacture exceeds the 154c standard and consists of 470kg of cement per cubic metre, 12mm aggrecates, with 80 slump. The final result is 50mpa strength at 28 days curing of each tank is carried out using steam curing.

Steel Mesh

Steel reinforcement mesh consists of 665 mesh centrally located in accordance with AUS/NZS 1546 and is supported with plastic bar chairs. All mesh overlaps at a rate of 2x per mesh pitch.

Section 5 - System Componentry Piston Air Pump

As standard a medo piston air pump or equivalent is incorporated into the system. Features of the superior piston air blower includes low noise, easy maintenance, high performance and longer life than comparable diaphragm blowers.

MODEL NOMINAL CAPACITY L/MIN
POWER CONSUMPTION
RATED PRESSURE OPERATING PRESSURE
LA-80B 80l/min 86w 50hz
0.15 bar 0.05.0.2 bar

Irrigation Pump

As standard a Bianco B42AC submersible pump is incorporated into the system. The model of pump may vary depending on final method of discharge (drip irrigation or other) or as designed by the engineer/approved designer.

Control Panel

The control panel is designed to perform the following duties: • Air fault LED – If air pressure switch isn't made for 5 seconds, alarm will activate. • High water fault LED – If high water alarm float is up, alarm will activate. • Check filter LED – If irrigation pump is running for greater than 20 mins, alarm will activate. • Automatic holiday mode – If irrigation pump has not discharged for 48 hours, controller will automatically enter holiday mode. Once pump runs again, holiday mode is deactivated. • System incorporates field isolator switch.

Polylok PL525 Biological Effluent Filter

The polylok PL525 is unique in its class as a filter with the largest surface area in its class. The unit has an automatic shut-off ball arrangement to prevent any over-flow effluent leaving the tank.

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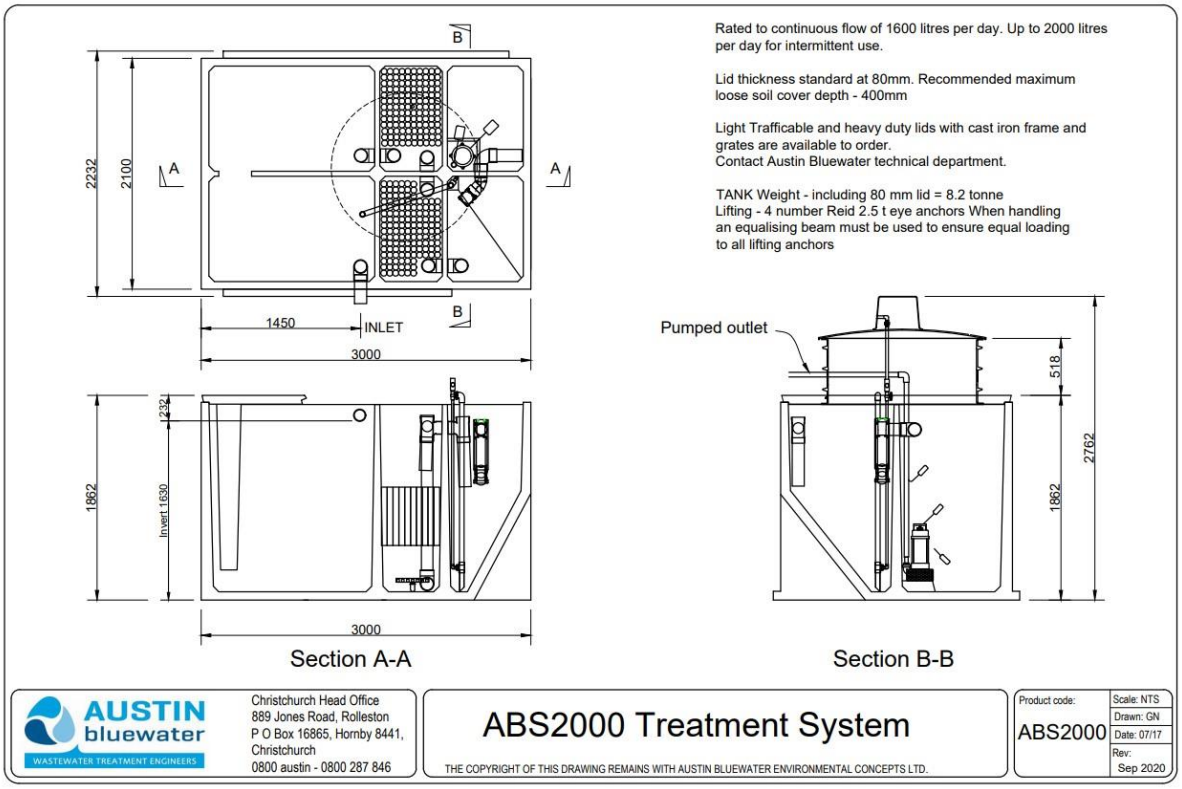

Please refer to separate attached technical drawing to this application for enlarged version.

BIA-B42AC – Bianco Submersible Clean Water Pump 105L/MIN 32M 550W 240V

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Service Contract for Your Austin Bluewater ABS 2000 Series

Owners name……..

Contact no……

Owners email address……

Property Address……..…

Dear Homeowner,

To comply with council Requirements under the conditions of your consent for your wastewater treatment system, the system requires servicing at 6 monthly intervals

Upon acceptance of this service contract, Austin Bluewater will supply the following:

1. Your system will be commissioned free of charge so we can show you how to look after it, then half yearly field service inspections for the ABS 2000 series, will be made by a factory trained service person as per your consent.

Inspections include:

- Any adjustment, cleaning (excluding de-sludging) and field service of the unit necessary for proper operation
- Inspection of control panel alarm and overload protection, blower or aerator, biomass, recycle pump, clarifier, filter, effluent quality, irrigation pump, drip line, flush valves and float alarm (where fitted)

2. Both Labour and materials will be charged for any emergency service call outside the calls specified above

3. In the event of any repairs being necessary to the components during the warranty period, due to damage which has occurred outside the warranty specifications, these repairs will be charged to you the homeowner, to include a callout and/or labour and materials. The above will also apply after the end of the warranty period on the system

4. All repairs are on a strictly C.O.D basis

5. This agreement does not bind Austin Bluewater Wastewater treatment engineers to be responsible for the quality of the effluent. However, it will at all times possible, recommend how the effluent quality can be maintained at its maximum and alter and adjust the system during these regular visits to obtain the best possible standards

6. Your Austin Bluewater service agent will require clear access on site to access your treatment system. Any gate alarm codes to access property will be on file at Austin Blue water office so we can access property. Or alternatively if preferred you may wish to be home when system is serviced.

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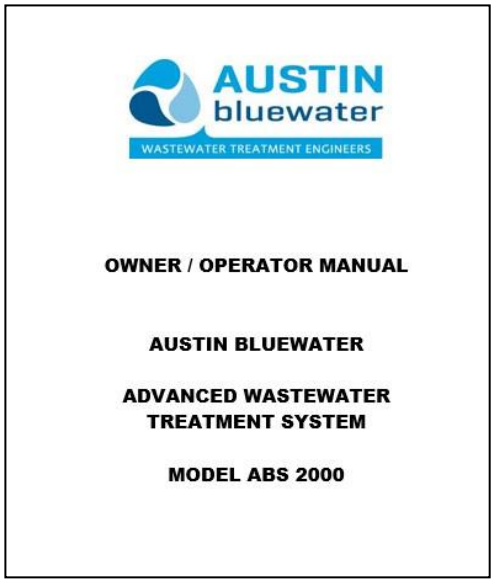
7. In applying for this agreement, the undersigned acknowledges that this Agreement is binding while they are owner/occupier of the premises. In the event of change of ownership any remaining services due will be honoured to the new owners until a new contract is negotiated with the new owner/occupier. Cancellation of this contract will be accepted upon written advise.

Price of service available on request from office 0800 287 846

SIGNED.....

DATED…….



Please find the Owner / Operator Manual as a separate document attached to the proposed application.

Phone: 03 595 2812
0800 287 846 or 0800 austin

Email: www.austinbluewater.co.nz

Please do not hesitate to contact Austin Bluewater if you have any questions about your Wastewater Treatment System or Disposal Area.

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Partial transfer submitted to Environment Canterbury 4/11/21

11 December 2012

Warren Miller Hislop
122 Racecourse Road
RD 2
Amberley 7482

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

NOTICE OF RESOURCE CONSENT DECISION(S)

RECORD NO: CRC131130
NAME: Warren Miller Hislop

The decision of Environment Canterbury is to grant your application(s) on the terms and conditions specified in the attached resource consent document(s). Your resource consent(s) commences from the date of this letter advising you of the decision. The reasons for the decision are:

1. Any adverse effects on the environment as a result of the proposed activity will be minor.
2. There are no persons considered to be adversely affected by this proposal.

For some activities a report is prepared, with officer recommendations, to provide information to the decision makers. If you require a copy of the report please contact our Customer Services section.

If you do not agree with the consent authority decision, you may object to the whole or any part. Notice of any objection must be in writing and lodged with Environment Canterbury within 15 working days of receipt of this decision.

Alternatively you may appeal to the Environment Court, PO Box 2069, Christchurch. The notice of appeal must be lodged with the Court within 15 working days of receipt of this decision, with a copy forwarded to Environment Canterbury within the same timeframe. If you appeal this decision, the commencement date will then be the date on which the decision on the appeal is determined. If you are in any doubt about the correct procedures, you should seek legal advice.

You can find online information about your consent document at http://ecan.govt.nz/publications/General/YourConsentDocumentBooklet09.pdf and also information regarding the monitoring of your consent at http://ecan.govt.nz/publications/General/monitoring-your-consent-booklet.pdf. These booklets contain important information about your consent and answers some commonly asked questions about what will happen next in the life of your resource consent. There is an Annual Compliance Monitoring Charge associated with every consent. For details of this, please refer to page 10 of the "Monitoring Your Consent' booklet.

Our Ref: **CRC131130**
Your Customer No: EC105878,EC162310
Contact: **Customer Services**

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Environment Canterbury takes every measure to improve both applications and processes, and we appreciate your feedback as an important component in ensuring this occurs. You can complete a consents survey on-line at http://www.ecan.govt.nz/services/resource-consents/pages/surveys.aspx. Alternatively, you can call our Customer Services Section on 0800 EC INFO who will be happy to complete the survey with you.

Charges, set in accordance with section 36 of the Resource Management Act 1991, shall be paid to the Regional Council for the carrying out of its functions in relation to the administration, monitoring and supervision of resource consents and for the carrying out of its functions under section 35 of the Act.

Thank you for helping us make Canterbury a great place to live.

For all queries please contact our Customer Services Section by telephoning (03) 353 9007, 0800 ECINFO (0800 324 636), or email ecinfo@ecan.govt.nz quoting your CRC number above.

Yours sincerely

CONSENTS PLANNING SECTION

CC Address:

Biotechnologies Limited
Attn To: Bill Cowie
PO Box 10091
Phillipstown
Christchurch 8145

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RESOURCE CONSENT CRC131130

Pursuant to Section 104 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO:	Warren Miller Hislop
A DISCHARGE PERMIT:	To discharge up to 1,400 litres of wastewater to land per day.
Commencement Date:	11 Dec 2012
Expiry Date:	11 Dec 2047
LOCATION:	220 Racecourse Road, Amberley

SUBJECT TO THE FOLLOWING CONDITIONS:

1 The discharge shall be only domestic wastewater originating from a property, located at RS 41520, Racecourse Road, Amberley as shown on Plan CRC131130A, attached to and forming part of this resource consent.

2 The volume of wastewater discharged shall not exceed 5.6 cubic metres per day.

3 The discharge shall be only from a maximum of four dwellings with a combined maximum of 16 bedrooms.

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4 The wastewater shall only be discharged into land via land application systems located within the discharge envelopes as shown on Plan CRC131130B,attached to and forming part of this consent, and as described below:

a. Wastewater from proposed Lot 1 shall only be discharged to land at or about map reference NZMS 260 M34:8724-8808/ Topo50 BV24:7724-2645;
b. Wastewater from proposed Lot 2 shall only be discharged to land at or about map reference NZMS 260 M34:8720-8828/ Topo50 BV24:7719-2665;
c. Wastewater from proposed Lot 3 shall only be discharged to land at or about map reference NZMS 260 M34:8703-8811/ Topo50 BV24:7703-2648; and
d. Wastewater from proposed Lot 4 shall only be discharged to land at or about map reference NZMS 260 M34:8698-8838/ Topo50 BV24:7698-2675.

5 Prior to discharge to the land application systems, the wastewater shall:

a. Receive secondary treatment in an aerated wastewater treatment system or alternative treatment system which provides the same or better quality treatment; and
b. Pass through a proprietary effluent filter.

6 The wastewater treatment systems and land application systems shall not include chlorine disinfection

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7 After exiting the treatment system, the wastewater shall be pumped to a land application system constructed in accordance with the design shown on Plan CRC131130C, attached to and forming part of this resource consent, and as described below:

a. The drip irrigation lines shall be installed at least one metre apart.
b. The emitters on the drip irrigation lines shall be spaced at not more than 600 millimetres apart.
c. The drip irrigation lines shall be installed a maximum of 150 millimetres below ground level and covered with between 100 and 150 millimetres of soil.
d. The soil above the drip irrigation tubing shall be grassed or planted with vegetation. The grass or plantings shall be kept in a healthy state. Replanting shall occur when erosion or die-off has resulted in bare or patchy soil cover.

8 The wastewater shall be evenly dosed over the land application systems, at a rate not exceeding five millimetres per day.

9 A fence shall be erected around the perimeter of each land application system, which is sufficient to exclude stock, vehicles and the public.

10 A minimum depth of 1000 millimetres of unsaturated soil shall be maintained at all times beneath the drip irrigation lines.

11 The discharge shall not result in any wastewater being visible on the land surface.

12 There shall be no discharge:

a. Within 20 metres of any surface water body;
b. To surface water as a consequence of the exercise of this consent.

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13 There shall be no discharge within:

a. 100 metres of well M34/5707; and
b. 50 metres in a down-gradient direction in relation to groundwater flow and 30 metres of any other authorised and/or existing bores.

14 Within one month of the installation of any treatment and land application system, the consent holder shall provide to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, the following:

a. A signed copy of a compliance certificate certifying:
    i. that the installation of the wastewater treatment systems, land application systems, any ancillary treatment devices and associated pipework has been installed by a person with at least two years experience in the installation of such systems; and
    ii. the installed wastewater treatment systems are capable of achieving the treatment standard specified in condition (5) of this consent; and
    iii. that the systems have been installed in accordance with the conditions of this consent.
b. A copy of a signed 'as built plan' which clearly shows the location of the installed wastewater treatment system and land application system, and the separation to property boundaries and surface water bodies; and
c. Photographs which show:
    a. the height of the installed distribution lines relative to ground level; and
    b. fencing of the perimeter of the land application systems.

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15 The wastewater treatment and land application systems shall be serviced at least once every six months by a qualified person with at least two years experience in the maintenance of such systems. The servicing shall include but not be limited to:

a. Ensuring that the lid(s) of the wastewater treatment system are readily accessible at all times;
b. Measuring the depth of solids and scum in the wastewater treatment system(s);
c. Pumping out the wastewater treatment tank(s) if the solids and scum layers combined are greater than two thirds the depth of the wastewater treatment tank(s);
d. A visual inspection of the components outlined in clauses (i) to (v) below, and cleaning, repairing or replacing as required:
    i. aeration devices;
    ii. proprietary effluent filter;
    iii. electrical parts;
    iv. audible alarms; and
    v. the distribution pump
e. Flushing the distribution lines
f. Inspection of the distribution pipes at the site of the land application system to ensure that they are operating correctly and replacing as required.

16 Following every service a written report shall be prepared and kept by the consent holder. In addition, the consent holder shall also keep written records of all repairs made to any part of the wastewater treatment and land application systems. The consent holder shall forward a copy of the written reports and records of repairs to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, on request.

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17 The Canterbury Regional Council may, once per year, on any of the last five working days of May or October, serve notice of its intention to review the conditions of this consent for the purposes of:

a. Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or
b. Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

18 The lapsing date for the purposes of section 125 shall be the 31 December 2017.

Issued at Christchurch on 11 December 2012

Canterbury Regional Council

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Consent No: CRC131130

Exercising of resource consent

It is important that you notify Environment Canterbury when you first start using your consent.

GRANTED TO: Warren Miller Hislop
A DISCHARGE PERMIT: To discharge up to 1,400 litres of wastewater to land per day.
LOCATION: 220 Racecourse Road, Amberley

Even if the consent is replacing a previous consent for the same activity, you need to complete and return this page.

Providing this information will:

- Validate your consent through to its expiry date
- Minimise compliance monitoring charges
- Help provide an accurate picture of the state of the environment.

If consent CRC131130 is not used before 31 Dec 2017 this consent will lapse and no longer be valid.

Declaration:

I have started using this resource consent.

Action taken: (e.g. pasture irrigated, discharge from septic tank/boiler/spray booth etc).

_____

Approximate start date (***Note: this may be different to the date the consent was granted)***:: _____

Signed: _____ **Date:** _____

Full name of person signing (please print): _____

Please return to:

Environmental Protection - Administration
Environment Canterbury
PO Box 345
Christchurch 8140

Environment Canterbury Regional Council

Plan CRC131130A

Scale 1 : 20000

The information for this plot has been taken from Environment Canterbury records. Every reasonable effort has been made to maintain current and accurate information on this site. The information contained within the GIS has been assembled in good faith, but its accuracy and completeness cannot be guaranteed.

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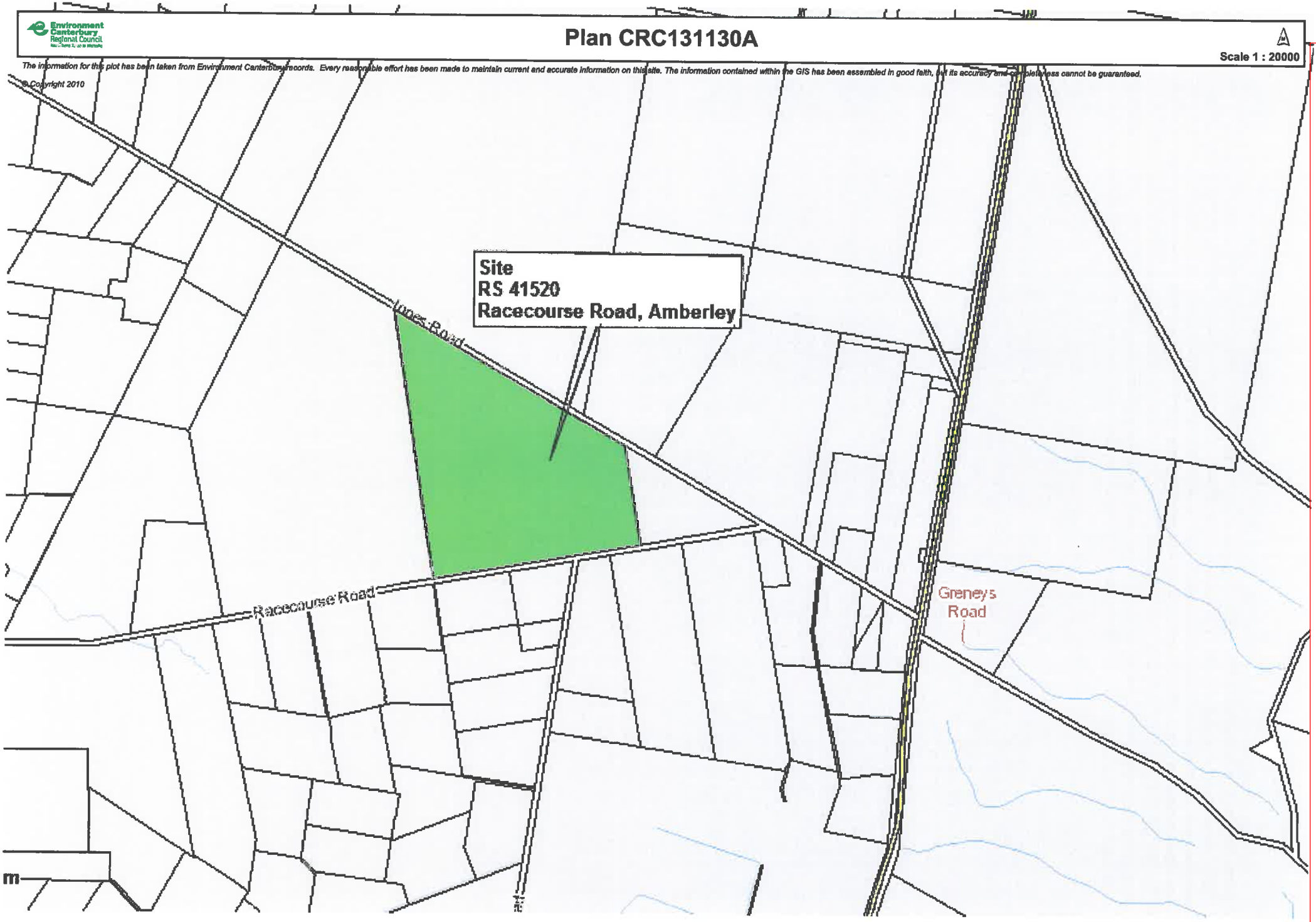

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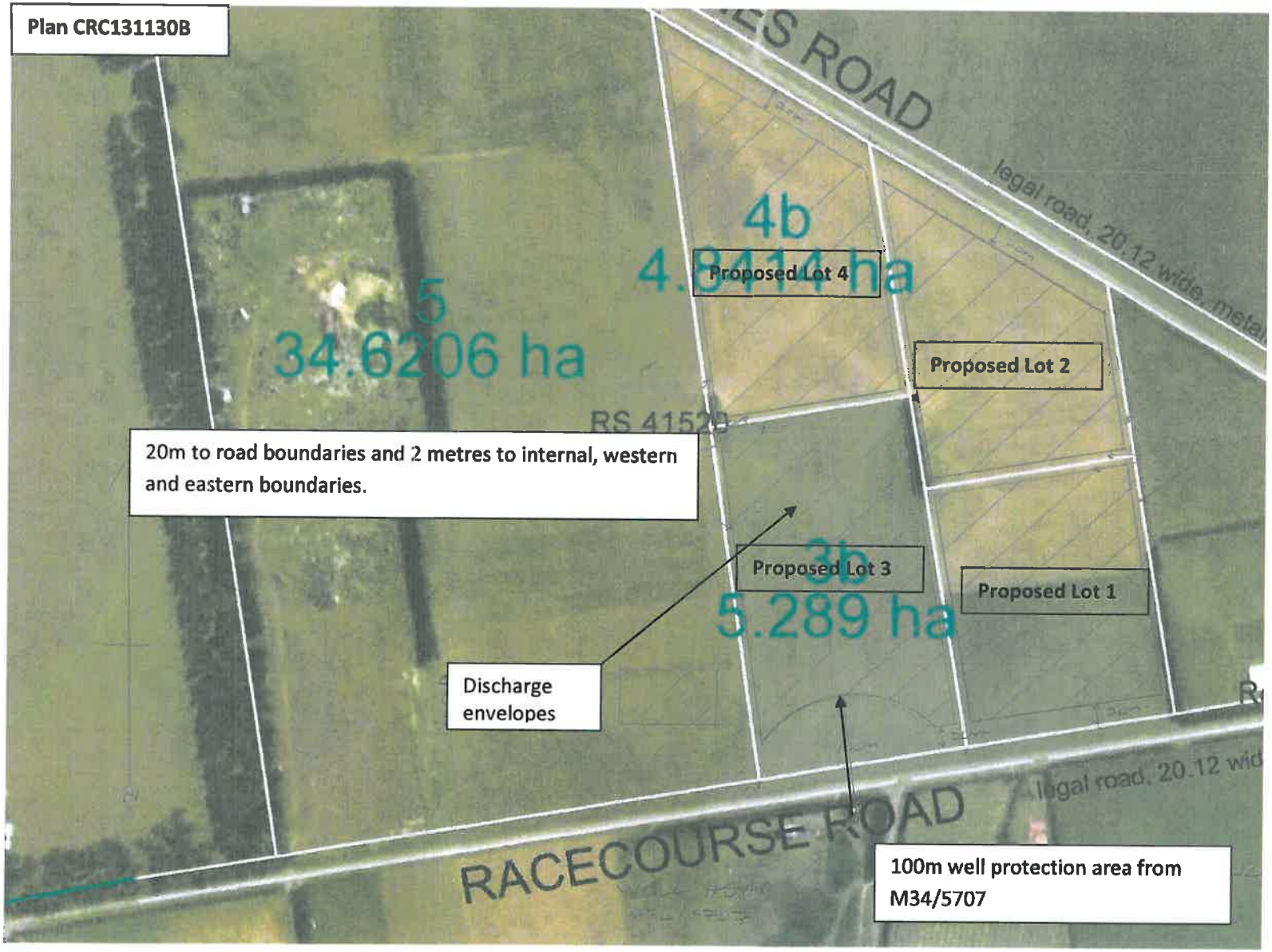

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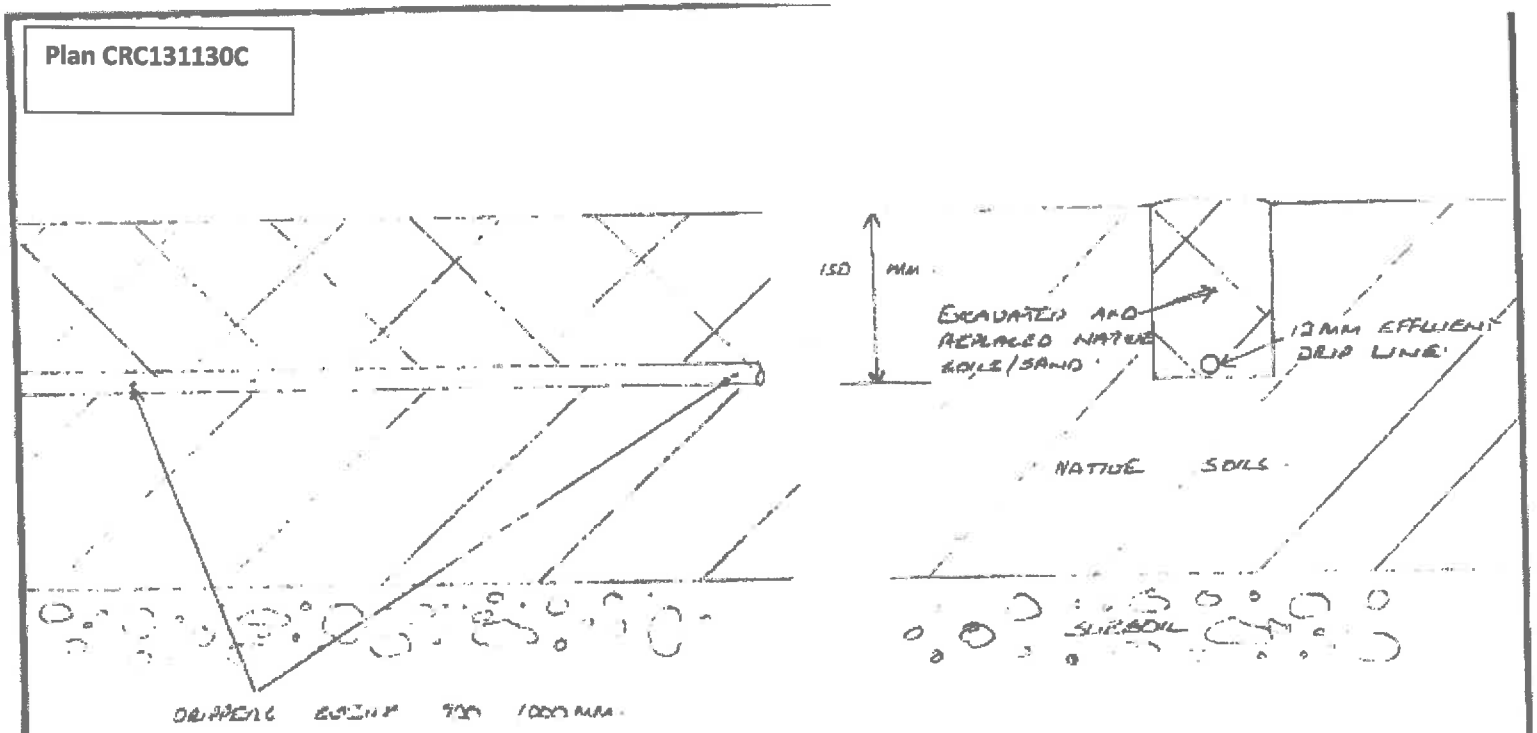
Plan CRC131130C



NOTES

1. 12MM EFFLUENT LINE TO BE LAID
2. LINE TO INCLUDE AIR RELIEF VALVE

EFFLUENT DRIP LINE SYSTEM SCHEMATIC		
SCALE: 1:5	APPROVED BY:	DRAWN BY W.J.C
DATE: 13.08.03		REVISED
		DRAWING NUMBER

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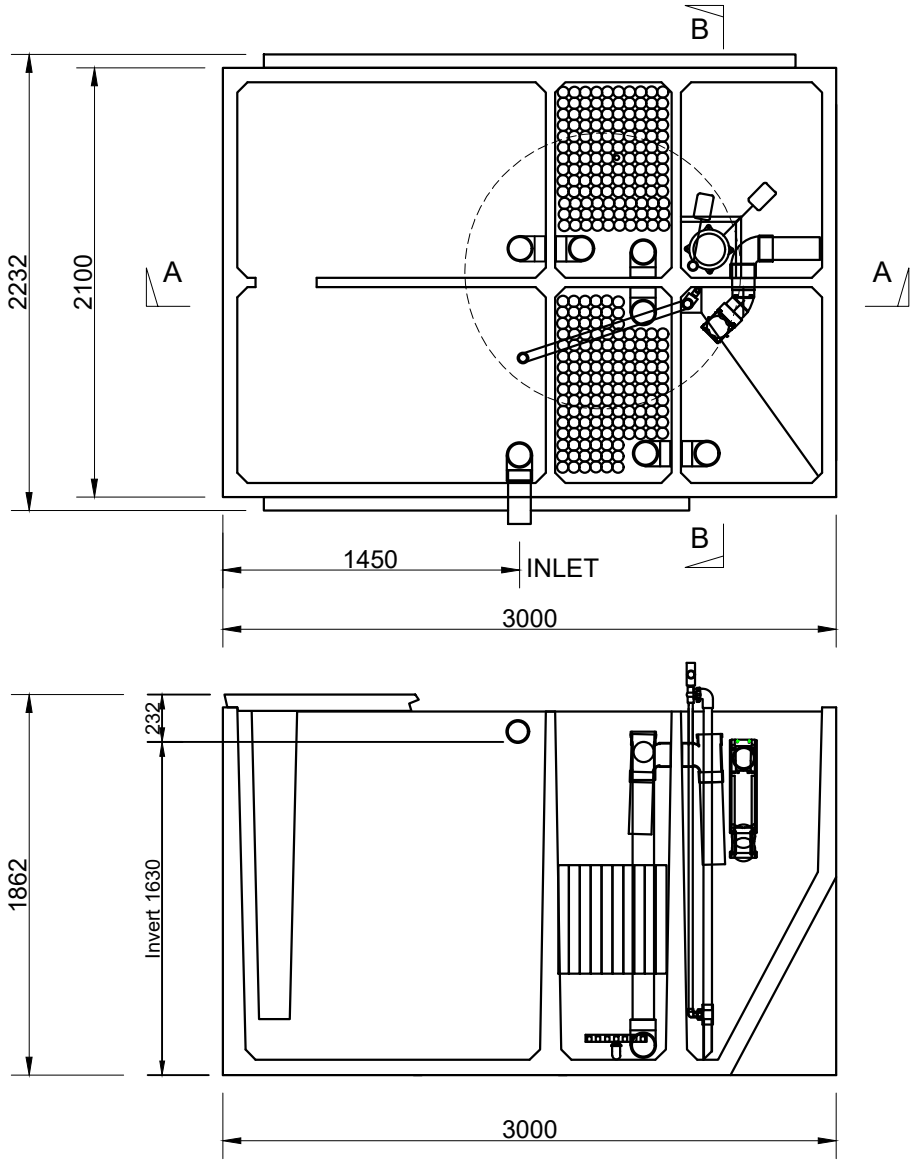


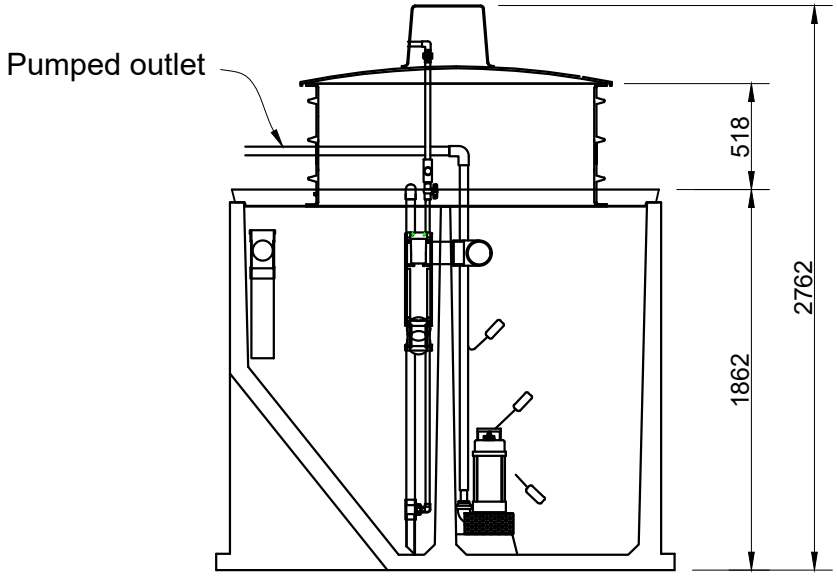
Section A-A

Rated to continuous flow of 1600 litres per day. Up to 2000 litres per day for intermittent use.

Lid thickness standard at 80mm. Recommended maximum loose soil cover depth - 400mm

Light Trafficable and heavy duty lids with cast iron frame and grates are available to order.
Contact Austin Bluewater technical department.

TANK Weight - including 80 mm lid = 8.2 tonne
Lifting - 4 number Reid 2.5 t eye anchors When handling an equalising beam must be used to ensure equal loading to all lifting anchors



Section B-B

AUSTIN bluewater
WASTEWATER TREATMENT ENGINEERS

Christchurch Head Office
889 Jones Road, Rolleston
P O Box 16865, Hornby 8441,
Christchurch
0800 austin - 0800 287 846

ABS2000 Treatment System

THE COPYRIGHT OF THIS DRAWING REMAINS WITH AUSTIN BLUEWATER ENVIRONMENTAL CONCEPTS LTD.

Product code:	Scale: NTS
ABS2000	Drawn: GN
	Date: 07/17
	Rev: Sep 2020

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On-site Effluent Treatment National Testing Programme (OSET NTP)

PERFORMANCE CERTIFICATE
Austin Bluewater AB2K
OSET NTP Trial 12, 2016/2017

System Tested

The Austin Bluewater AB2K submerged aerated filter wastewater treatment system participated in Trial 12 of the On-site Effluent Treatment National Testing Programme (OSET NTP). This commenced on 24 October 2016 and ran over nine months (39 weeks) during which the treated effluent discharge was monitored generally every six days. The test flow rate was 1,000 L/day to represent the daily domestic wastewater flow from a 3-bedroom dwelling with 5 to 6 occupants. Note that the manufacturers advised design capacity for this plant is 1600 L/day.

Test Flow Rate

The Austin Bluewater AB2K submerged aerated filter wastewater treatment system was tested at 1,000 litres/day (equivalent to servicing a 3-bedroom 5 to 6 person household) over an 8 month (35 week) period October 2016 to June 2017 followed by a 1 month (4 week) high load effects test involving 5 days at 2,000 litres/day then 1,000 litres/day over the following 3 weeks.

Testing and Evaluation Procedures

A total of 39 treated effluent samples of organic matter (BOD_5) and suspended solids (TSS) at generally six day intervals during weeks 9 to 35 were tested and evaluated against the secondary effluent quality requirements of the joint Australia/NZ standard AS/NZS 1547:2012.
A total of 16 treated effluent samples of organic matter (BOD_5), total suspended solids (TSS), total nitrogen (TN), ammonia nitrogen (NH_4-N), total phosphorus (TP) and faecal coliforms (FC) at generally six day intervals during weeks 23 through 35 were tested and the results benchmarked and rated on their median values. In addition, the energy used by the treatment system was assessed on the mean of consumption levels over the 16 sample days.

General Performance

In terms of effluent quality the Austin Bluewater AB2K plant performed well overall, with very low and stable BOD and TSS results. Good nitrification was achieved throughout with very low levels of NH_4-N. Denitrification was initially moderate but it declined through the test with increasing TOXN and TN and available alkalinity reduced. The plant handled the high flow test well with respect to BOD and TSS but had a sharp increase in NH_4 with no significant improvement over the following two weeks. Bacteria removal was good throughout for a secondary treatment plant without disinfection producing effluent with a median of 7600 cfu/100 ml (ie a 3.2log reduction).

The plants power usage of 1.75 kWh/day was typical for a package secondary treatment plant.

Apart an unfortunate incident when the manufacturer unfortunately left the power 'off' after the plant was insulated the plant operated without attendance throughout the trial.

Service requirements are 6 monthly where disposal is to dripline.

AS/NZS 1547:2012 Secondary Effluent Quality Requirements

These requirements are that 90% of all test samples must achieve a BOD_5 of $\leq$ 20 g/m^3 and TSS of $\leq$ 30 g/m^3 with no one result for BOD_5 being >30 g/m^3 and no one result for TSS being >45 g/m^3. The Austin Bluewater AB2K plant had **97% of BOD_5** results and **97% of TSS** results within the **Secondary Effluent Quality** requirements for both the 90%ile and maximum limits above. **The Austin Bluewater AB2K plant thus achieved AS/NZS 1547 secondary effluent quality performance requirements** when operated at 1,000 L/day, which is only 62% of the manufacturers advised design capacity of 1600 L/day.

Benchmark Ratings

The Austin Bluewater AB2K system achieved the following effluent quality ratings over the sixteen benchmarking results in weeks 20 to 35 (when operated at 1,000 L/day or 62% of the advised plants design capacity):

On-site Effluent Treatment National Testing Programme,
c/- Technical Manager 10 Tide Close, Mount Wellington, AUCKLAND 2013
Mob: 021 626 772 E-mail: ray@hedgland.co.nz

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On-site Effluent Treatment National Testing Programme (OSET NTP)

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	*A*	*B*	*C*	*D*
BOD (mg/L)	*2*	*0*	A+	*<5*	*<10*	*<20*	*<30*	*≥30*
TSS (mg/L)	*1*	*1*	A+	*<5*	*<10*	*<20*	*<30*	*≥30*
Total Nitrogen (mg/L)	*27.6*	*6*	C	*<5*	*<15*	*<25*	*<30*	*≥30*
NH_4- Nitrogen (mg/L)	*0.04*	*2*	A+	*<1*	*<5*	*<10*	*<20*	*≥20*
Total phosphorus (mg/L)	*2.4*	*0.4*	B	*<1*	*<2*	*<5*	*<7*	*≥7*
Faecal Coliforms (cfu/100mL)	*7,600*	*6,900*	B	*<10*	*<200*	*<10,000*	*<100,000*	*≥100,000*
Energy (kWh/d) (mean)	*1.75*	*0.3*	B	*0*	*<1*	*<2*	*<5*	*≥5*

This Certificate of Performance applies to an Austin Bluewater AB2K wastewater treatment plant with a rated capacity of 1600 L/day, constructed from a single precast concrete tank comprising 6 chambers: 2 Primary (1970L each), 2 Aeration (700L each), Clarifier (540L), Pump Chamber (850L), and fitted with 6 blocks of Bioblok 150 growth media in the aeration tanks plus an 80Lpm air blower, and having 1400L emergency storage capacity.

This certificate is valid for 5 years from 20 December 2017. For the full OSET NTP report on the performance of the Austin Bluewater AB2K wastewater treatment plant contact Lew Austin,
Mobile 021 356 736 or Email: lew@austinbluewater.co.nz

Authorised By:

Ray Hedgland, Technical Manager, OSET NTP
23 March 2018

On-site Effluent Treatment National Testing Programme,
c/- Technical Manager 10 Tide Close, Mount Wellington, AUCKLAND 2013
Mob: 021 626 772 E-mail: ray@hedgland.co.nz

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AUSTIN bluewater

WASTEWATER TREATMENT ENGINEERS

OWNER /OPERATOR MANUAL

AUSTIN BLUEWATER
ADVANCED WASTEWATER TREATMENT SYSTEM
MODEL ABS 2000

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IMPORTANT INFORMATION

We recommend you keep this Manual with other important household manuals for future reference.

If you have questions regarding the safety and operation of your Austin Bluewater ABS Treatment System contact your Local Authorised Service Technician.

- Do not attempt to service components of the system yourself, call your Accredited Service Technician.
- Only Authorised Service Personnel are to remove covers on the Treatment System.

NB Potential System Problems:

Problems with advanced treatment systems can be difficult to analyse.

Whenever your system is not functioning correctly, it is best to contact a trained professional, such as manufacturer or trained technician to recommend the best procedure.

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SECTION ONE

ABOUT AUSTIN BLUEWATER ENVIRONMENTAL CONCEPTS

Austin Bluewater Environmental Concepts is a proven leader with over twenty five years hands on experience designing and manufacturing waste water treatment systems.

Quality, reliability and innovation are the pillars of our success, making us a true pioneer and the leader in onsite waste water treatment in New Zealand.

Austin Bluewater has a strong commitment to continually developing new and improved products by way of research and development activities. The Austin Bluewater Model ABS is a product of this research. Most importantly, Austin Bluewater has a continuing commitment to its clients, the end user of its products.

SECTION TWO

THE TREATMENT SYSTEM

The Nature of Household Sewage

Household sewage is a combination of wastewater from several sources including sinks, toilets, showers, washing machines and dishwashers. The largest source of household sewage may vary depending upon the number of residents and water-using appliances within the home. Organic matter comes mostly from toilets, while sinks, showers, and washing machines contribute large amounts of wastewater containing only small amounts of soap and dirt (including grease, detergents, lint and vegetable matter).

Your Treatment System Process

Step 1 & 2

All wastewater from the home flows by gravity into a 2-stage primary and secondary septic system. Anaerobic (no oxygen) bacteria establish themselves in these chambers and partially digest organic matter.

Step 3 & 4

Your system is unique as it comprises 2 aeration chambers for higher quality treatment. Air is introduced into the aeration chamber producing aerobic bacteria which proliferate and digest most of the remaining organic material.

Fixed bio-blok assist the retention and growth of the bio-mass.

Step 5

The purpose built clarifier acts as a final settling chamber, removing settled sludge back to the primary area, to assist in de-nitrification of the system.

Step 6

The automatic irrigation pump disposes highly treated effluent to the irrigation field for re-use and final treatment into the soil.

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Septic Tank Effluent Filters

The Austin Bluewater ABS System is fitted with the Polylok PL525 Effluent Filter, recognised as the most efficient filter available.

While effluent filters are partially self-cleaning, they must be thoroughly cleaned when the tank is inspected. When operating properly, they provide a fail-safe reminder that your tank needs pumping.

Pumped Systems

Site conditions, engineers and local Councils will determine the type of pump to be installed.

Pump systems also allow for even pressure dosing of dispersal fields resulting in a longer life to the field than under gravity conditions. Effluent levels in the pump chamber are controlled by internal switches that turn the pump on and off, sending effluent to the system by dosing or pressure distribution.

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SECTION THREE

INTRODUCING PRODUCTS INTO THE SYSTEM

SECTION A: WHAT UPSETS THE BALANCE

The greatest cause of problems with your treatment plant are **cleaning products and the washing machine.**

Cleaning Products

Unfortunately, what we call cleaning products, may harm your treatment system. Like humans, some poisons kill us while others will just make us sick and the same will happen to the bacteria in your system. You must use environmentally friendly products.

Your treatment system relies on bacteria for your system to work effectively. Any product used that kills bacteria is harmful to your system. If you wish to use some of the harsher cleaning products, it is suggested that you use a bucket and discard the contents in the garden. This also applies to disinfectant, surface spays and wipes.

Washing Machines

Try to evenly spread your washing over a period of a week. Avoid, where possible, washing everything in one day. It puts too much pressure on the system and your unit will struggle to cope. Liquid soaps breakdown easier than granulate styles do. **Try not to be heavy handed with the amount of soaps you use.**

When working properly, your treatment system will work efficiently with no odours or problems.

It needs a happy balance.

Suitable Products

All products should be used in moderation.

DISHWASHING LIQUIDS

Adds	Morning Fresh	Bushlands	Rix
Palmolive	Sunlight	Greenapple	Kit

Finish for Dishwashers (limit quantity)

SURFACE CLEANERS

Jiff Cream Cleaner	Spray & Wipe (limit quantity)
Nifty	Swipe
Shower Power	Windex

TOILET CLEANERS

Jiff Cream Cleaner or any cream cleaner – toilet fresheners are not recommended.

FLOOR CLEANERS

Use hot water and detergent.

LAUNDRY POWERS AND LIQUIDS

Please look at the Independent Laundry Product Research which is on the next couple of pages.

Avoidable Products

ANTIBACTERIAL SOLUTIONS

Antibiotics	Nappy Plus	Pineoclean	Blue Loo
Napisan	Preen Soaker	Bio-Ad	Nappy Soft
Tri-zyme	Bio Jo	Nappy Fresh	Toilet Duck
Milton Tablets	Nursil	Toilet Cleaners	

BLEACHES

Domestos	lemon Bleach	White King	Budget Lemon
Zixo	Fiesta	Marolinn	

OTHER CLEANERS

Ajax	ESP Herbal	Metho or Kero	Swipol
Aussa	Exit Mould	Flea, Tick Wash	
Handy Andy	Bubble Baths	Floor Cleaners	
Spirits/Alcohol	Draino	Caustic Oven Cleaners	
Green Coice	Down to Earth		

Please Note:

The above lists are not intended to promote or discredit the product of any Company. It is provided to assist in ensuring the satisfactory on-going operation of your system.

SECTION B: HOW TO LOOK AFTER YOUR AUSTIN BLUEWATER ABS TREATMENT SYSTEM

Limited-use substances in large concentration will reduce or stop the treatment process. These same substances in smaller concentrations will have no harmful effect on the treatment process. You may use the following substances without harming your Austin Bluewater ABS Treatment System if you use the substance according to the manufacturer's directions, use the substances sparingly, and do not introduce concentrated doses to the system:

- Bio-degradable laundry powders
- Laundry bleach
- Detergents with bleach
- Household cleaners containing sodium bactericides such as
    - Pine oil (disinfectant used in the general purpose liquid cleaners)
    - N-alkyl dichlorobenzyl ammonium chloride (disinfectant used in detergents and spray cleaners)
    - Sodium hydroxide (lye chemical used in drain openers and cleaners)
    - Sodium dichlor-s-triazinetrione (powdered bleach used in scouring powders and automatic dishwasher detergents)
    - Ortho-phenylphenol (bactericide used in tub and toilet bowel cleaners)

Waste Food

Some food waste, whether or not it is run through a waste grinder will not be treated by the system, but will remain in solid form and fall to the bottom of the septic tank.
Therefore, you should consider not using a waste grinder system, or disposing of these food items through the Austin Bluewater ABS Treatment System:

- Animal bones
- Melon rinds
- Corn cobs
- Pips and seeds
- Eggshells
- Any other non-edible food waste

Acceptable Solutions

Substances that are considered to be typical domestic wastewater are human waste, bath and dish water and edible food waste.

The following substances may be used regularly without harming your Austin Bluewater ABS Treatment System:

- Laundry detergents without bleach
- Dishwashing detergents without bleach
- Toilet paper
- Household cleaners containing sodium bicarbonate, sodium carbonate and sodium borate.

NEVER DISPOSE OF ANY OF THE FOLLOWING ITEMS INTO THE SYSTEM:

- Automotive Oil
- Bleaches, disinfectants, whiteners
- Nappy liners, condoms, sanitary napkins

Automotive oil is not treatable by the bacteria; the disinfectants will take away all the bacteria's oxygen; the sanitary items are impregnated with anti-bacterial matter, so they will never break down. The results will be – bacteria will die. The tank will almost certainly need to be pumped out to remove the gross pollutants and the tank refilled and re-started.

Whatever the product, always ensure that it is marked as Bio-degradable and Safe to Use in Septic/Onsite Systems. Refer to the LANFAX LABORATORIES INDEPENDENT LAUNDRY PRODUCT RESEARCH website for more unbiased information. www.lanfaxlabs.com.au

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SECTION FOUR

SYSTEM MAINTENANCE, MONITORING AND SERVICING

The Austin Bluewater ABS Treatment System is available as a dosed pumped system. The owner should determine the status of the system, substances introduced into the system, and the frequency of required pump-out as determined by the service provider.

To maintain the Limited Warranty your Austin Bluewater ABS Treatment System should be furnished with a 6 month service policy to ensure proper operation of the system.

Primary and Secondary Chamber
Periodically, waste will need to be removed from both primary chambers using normal pump-out procedures.

Polylok PL525
The system is complete with a Polylok PL525 bacteriological filter which performs two primary functions in a septic tank installation. It retains the filters 75% of all suspended solids in the tank and treats the wastewater by lowering the BOD, more than 50%.

Dosed Pumping System
A dosed pumping system is used to give a proportioned controlled flow to the engineered designed disposal field, to allow for even distribution over the entire field. Submersible effluent pumps operate in harsh acidic conditions and should be checked on an annual basis for satisfactory operation.

System Capacity
The system is rated for a maximum of 8-10 persons or 1,600 litres/day continuous. As with any system it is important the system is not hydraulically overloaded as this will interfere with the organic breakdown of the treatment process.

Visual
Wastewater backup is characterised by wastewater flowing back into the house or slow movement of the wastewater in the drains. This may indicate a problem with your wastewater treatment system. Identify where the backup is occurring within your home's plumbing system. If no material is blocking the drain, contact your Service Technician or local supplier.

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Within the greater Canterbury area, Austin Bluewater Environmental Concepts offer a six month service and maintenance contract to ensure your system functions correctly. This also forms part of our two year Limited Warranty Validation.

Service procedure includes the following:

1. Visual inspection of system to ensure correct biological function of system.

2. Septic and secondary chamber checked and biological breakdown of sewage analysed for correct operation of system. Client notified of correct timing for septic pump-out.

3. Polylok bacteriological filter cleaned and repositioned as necessary.

4. If pump fitted, unit removed, screen removed, impeller checked and unit fully cleaned of debris/build-up.

5. Field Service Report presented to owner and Council verifying work carried out.

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SECTION FIVE

TROUBLE SHOOTING-PROCESS FAILURE

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
Audible alarm on control panel is ringing.	The pump has failed, or is blocked.	Remove pump from system and determine if inlet is blocked or complete pump failure has occurred.
Wastewater is backing up into the home sewer piping.	There is an obstruction in the home sewer piping.	Check the piping lead to the system visually or with drain cleaning equipment for an obstruction and correct.
	There is an obstruction in the discharge line from the system.	Check the effluent piping and lateral field piping visually or with drain cleaning equipment for an obstruction and correct.
	The lateral field pump has failed.	Check the operation of the lateral field pump per the manufacturer's specifications.
	The flow rate to the system is too high.	Check the maximum flow rate to the system to see that it is within normal limits.
	The tank requires cleaning and/or a pump out is required.	Check the sludge depth in both chambers of the tank to see if it is below required levels.
	Polylok filter is blocked.	Remove Polylok filter from system and clean as necessary.

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SECTION SIX

LIMITED WARRANTY

Austin Bluewater Environmental Concepts Limited warrants the Austin Bluewater ABS Treatment System to be free from defects in material and workmanship for a period as follows:

(a)	Concrete Structure	=	10 years
(b)	Electrical and Mechanical Componentry	=	3 years
(c)	Polylok Filter	=	Lifetime Warranty

From the date of sale to the ultimate consumer when properly registered with Austin Bluewater Environmental Concepts Limited sole obligation under this warranty is as follows:-

Austin Bluewater Environmental Concepts Limited shall fulfil this warranty by repairing or exchanging any component part, F.O.B. factory, that shows evidence of defects, provided said component part has been paid for, warrantee has notified Austin Bluewater Environmental Concepts Limited the defect complained of and the component is returned through an authorised Distributor, transportation paid. There is no informal dispute settlement available under this LIMITED WARRANTY.

The three year Limited Replacement Warranty on pumping units is based on the ultimate consumer engaging with Austin Bluewater Environmental Concepts Limited, or authorised Distributor, in a Service Agreement for twelve monthly maintenance (2 x 6 monthly services) of system. Failure to do this negates the pump warranty.

The warranty does not allow for labour or travel. The warranty does not cover Austin Bluewater Environmental Concepts Limited treatment plants and related components that have flooded, by external means, or that have been disassembled by unauthorised persons, improperly installed, subject to external damage, or damage due to altered or improper wiring or overload protection.
DO NOT cover service lids with soil.

Other than the mechanical and structural working of the plant itself, Austin Bluewater Environmental Concepts is not responsible for the in-field operation of a plant. The proper operation of this or any other individual wastewater plant depends upon proper organic and hydraulic loading of the plant. We cannot control the loading and thereby cannot control the amount of harmful substances that may be discharged into the plant. Only the users of a plant can control what enters the unit. Therefore, we provide a comprehensive user's manual that outlines substances that should be kept out of the plant.

This LIMITED WARRANTY extends to the ultimate consumer of the product. 'Ultimate Consumer' is defined as the purchaser who first had the plant installed, or in the case of a system designed for non-permanent installation, the purchaser who first uses the system. It is the purchaser's or any sub-vendee's obligation to make known to any other consumer, the terms and conditions of this warranty.

This warranty is a LIMITED WARRANTY and no claim of any nature shall be made against Austin Bluewater Environmental Concepts Limited unless and until the ultimate consumer, or his legal representative, notifies Austin Bluewater Environmental Concepts in writing of the defect complained of and delivers the product and/or defective part(s) freight prepaid, to Austin Bluewater Environmental Concepts Limited or an authorised service agent.

SECTION SEVEN

N2P | Controls
engineering innovative solutions

ABS CONTROL PANEL

ABS CONTROLLER DESIGN MANUAL

ABS CONTROLLER INSTALLATION GUIDE

Refer to attached wiring and circuit diagram when installing the controller. All electrical work must be carried out as per NZS 3000:2007 and NZECP2:1993. The controller is to be earthed at the distribution board and the supply to the controller should be protected by to a maximum of 16 Amps. Any questions during installation please contact N2P Controls on 09 570 1919.

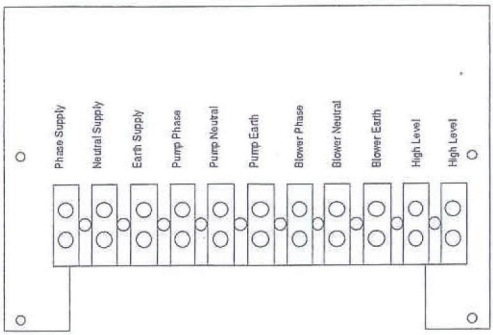
This controller is rated to lOA at 230V and has been designed for the ABS tank only.

1. Run the power supply cable through a cable gland (or similar water tight method) to the inside of the controller. Ensure this connection is high as practical above ground level to ensure the chance of water entering is as low as possible.

2. Remove the lid of the controller. This will expose the printed circuit board on the lid of the controller and the mounting plate. The mounting plate is shown to the right.

3. The inside of the turret will show two cables with plugs attached to them, and a cable for the high level alarm. The plugs supply power to the Pump and Blower respectively.

4. The pump and blower plugs each have a label identifying what is the plug for the pump and blower. Connect the pump and blower to their respective plugs



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AB2K CONTROLLER DESIGN MANUAL

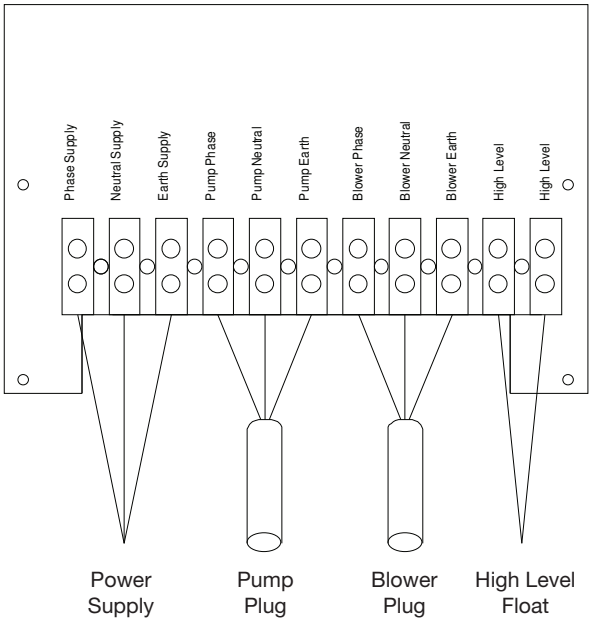
AB2K CONTROLLER INSTALLATION GUIDE

5. Once the power supply cable is inside the enclosure, wire the supply Earth, Neutral and Phase to the 3 terminals named *Phase Supply, Neutral Supply* and *Earth Supply.*

6. Wire the high level alarm float to the cable supplied. The wires of the float used are the Blue and Brown wire. The Green/Yellow wire is not used and can be cut but ensure it is sealed well so no moisture can track down the float cable. The float is to be wired Normally Open (NO). The level float circuit is extra low voltage. NB: This is typically done at the factory.

7. Once finished wiring, secure the Controller's lid back onto the controller and the lid onto the turret.

NOTE: The ON/OFF switch is on the side of the controller is to turn power on and off to the pump, blower and printed circuit board only.



Controller By
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ABS CONTROLLER DESIGN MANUAL

ABS CONTROLLER INSTALLATION GUIDE

8. Once installed commission by:
    - Plug the pump int o the plug socket labelled Pump.
    - Plug the blower into the plug socket labelled Blower.
    - Supply power to controller once safe to do so. The Green Power LED light should illuminate on front of controller.
    - The Blower should run continuously
    - Test pump by lifting the float attached to the pump.
    - Test high level alarm by lifting high level alarm float. The red High Water Fault LED should illuminate, the buzzer sound and alarm light flash.
    - Press the mute button and the buzzer should stop. The mute will disengage after 24 hours.

Any questions during the installation, please contact N2P Controls on +64 9 570 1919

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Alter-natives Wholesale Nursery www.alter-natives.co.nz 09 4321 333

Plants that are highly recommended. (Suitable for both sorts of effluent fields).

Grasses, Grass-like or Flaxes, Flax-like

Botanical name	Maori Name	Common Name	Typical height
Arthropodium cirratum	Rengarenga	Rock lily	20-40cm
Astelia grandis *		Swamp Astelia	1.5-2m
Carex dissita *			40-90cm
Carex flagellifera			50-70cm
Carex germinate			50cm-1m
Carex lessoniana			70cm-1.2m
Carex maorica *			50cm-1m
Carex secta	Purei, Pukio		70cm-1m
Carex tenuiculmis			50-70cm
Carex virgata			70cm-1m
Cortaderia fulvida	Toetoe, Kakaho	Cutty Grass	1-1.5m
Cortaderia toetoe	Toetoe, Kakaho	Cutty Grass	1.5-2m
Cyperus ustulatus *	Toetoe upokotangata	Giant umbrella sedge	60cm-1m
Dianella nigra	Turutu	NZ blue berry	30-60cm
Juncus gregiflorus *	Wiwi	Common rush	50cm-1.5m
Leptocarpus similis	Oioi	Jointed Rush	50-70cm
Machaerina sinclairi *	Pepepe, Toetoe tuhara		50cm-1m
Phormium tenax	Harakeke	Flax	1.5-2m
Phormium tenax purpurea		Purple Flax	1.5-2m
Uncinia unciniata *		Hook Grass	20-40cm

Spreading ground covers

Botanical name	Maori Name	Common Name	Typical height
Coprosma acerosa	Tataraheke	Sand Coprosma	30-40cm
Coprosma atropurpurea *			5-10cm
Coprosma 'Hawera'			10-20cm
Coprosma kirkii			30-50cm
Coprosma 'Poor Knights'			30-50cm
Coprosma prostrata			30-50cm
Coprosma 'Taiko'			20-30cm
Elatostema rugosum *	parataniwha		40-70cm
Fuchsia procumbins			10-20cm

Shrubs and small trees (typically less than 5m)

Botanical name	Maori Name	Common Name	Typical height
Brachyglottis repanda *	Rangiora		3-4m
Carpodetus serratus	Putaputaweta	Marble leaf	3-5m
Coprosma arborea *	Mamangi		3-4m
Coprosma areolate *		Thin-leaved coprosma	3-4m
Coprosma cultivars which are coloured (lots of options)			1-3m
Coprosma propinqua	Mingimingi		1-3m
Coprosma repens	Taupata	Mirror Plant	2-4m
Coprosma rhamnioides *			1-2m
Coprosma robusta	Karamu		2-4m
Clianthus puniceus	Kowhai ngutu-kaka	Kaka Beak	2-3m
Fuchsia excorticate *	Kotukutuku	Tree Fuchsia	3-5m
Geniostoma rupestre *	Hangehange		1-2m
Hebe Stricta	Koromiko		1-3m
Macropiper excelsus	Kawakawa		1-3m

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Trees (typically 5m or more)

Botanical name	Maori Name	Common Name	Typical height
Kunzea ericoides	Kanuka	White Tea-tree	6-10m
Cordyline australis	Ti kouka	Cabbage Tree	5-10m
Leptospermum scoparium	Manuka	Tea-tree	4-8m

Ferns

Botanical name	Maori Name	Common Name	Typical height
Blechnum novaezealandiae *	kiokio		1-2m
Dicksonia squarrose	wheki	tree fern	3-5m
Hypolepis dicksonioides *			1-1.5m

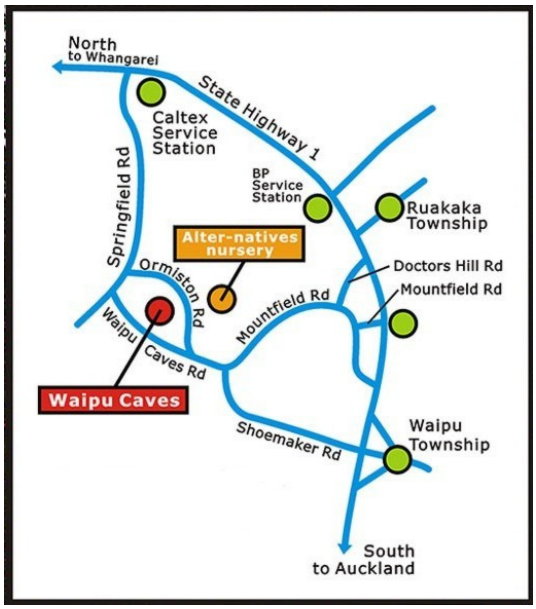
Large trees that are recommended for effluent fields using dripper lines; or only for on the fringe of underground systems (3m or more away from pipes because of the potential for the plant roots damaging your pipes).

Trees (typically 5m or more)

Botanical name	Maori Name	Common Name	Typical height
Laurelia novae-zealandiae	Pukatea		10-20m
Corynocarpus laevigata	Karaka		8-15m
Dacrycarpus dacrydioides	Kahikatea	White pine	20-30m
Pittosporum eugenoides	Tarata	Lemonwood	6-10m
Aristotelia serrata	Makomako	Wineberry	6-10m
Pittosporum tenuifolium	Kohuhu		5-8m
Plagianthus regius	Manatu	Ribbonwood	8-12m
Hoheria populnea	Houhere		6-8m
Melicytus ramiflorus	Mahoe	Whiteywood	4-6m
Rhopalostylis sapida	Nikau		6-12m
Pennantia corymbose *	Kaikomako		6-10m
Schflera digitata	Pate, Pata	Seven finger	4-6m
Vitex luscens	Puriri		10-20m

Note: Plants marked with a * can sometimes be hard to find in nurseries around Northland.

Good luck. From the team at Alter-Natives Nursery.



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SOUTHERN WOODS
PLANT NURSERY
Main South Road, Templeton, Christchurch 8441
P: 03 347 9221 or 0800 800 352 | Fax: 347 9223
info@southernwoods.co.nz | www.southernwoods.co.nz

Info 16: PLANTING FOR EFFLUENT RUNOFF

The following plants are suitable for the Canterbury area. Maximum heights and spreads are approximate only, and will differ in different situations, soils and aspects.

Botanical Name	Common Name	Max Height	Max Spread
Aristotelia serrata	Wineberry	6	3
Carex comans	Ornamental Grass	0.5	1
Carex secta	Large Green Sedge	1.5	1.5
Carex trifida	Ornamental Sedge	1	1
Carex virgata	True Wetland Sedge	1	1
Carpodetus serratus	Marble Leaf	7	4
Chionochloa conspicua	Snow Grass	1	1.5
Chionochloa rubra	Red Tussock	1	1.5
Coprosma propinqua	Mingimingi	5	2.5
Coprosma robusta	Karamu	5	4
Cordyline australis	Cabbage Tree	10	2
Cortaderia richardii	Toe Toe	2	2
Cyperus ustulatus	Giant Umbrella Sedge	1	0.6
Dacrycarpus dacrydioides	White Pine	50	5
Eucalyptus gregsoniana	Wolgan Snow Gum	6	4
E. lansdowneana ssp albopurpurea	Crimson Mallee	6	4
Eucalyptus lingustrina	Privit-leaved Stringybark	6	4
Eucalyptus moorei	Narrow-leaved Sally	4	3
Eucalyptus ovata	Swamp Gum	20	6
Griselinia littoralis	Broadleaf	5	2.5
Hebe spp			
Hoheria populnea	Lacebark	8	3
Leptospermum scoparium	Manuka	4	3
Melicytus ramiflorus	Whiteywood	8	2.5
Nothofagus fusca	Red Beech	30	5
Pennantia corymbosa	Bellbird Tree	8	3
Phormium spp	Flax		
Pittosporum colensoi	Black Mapou	5	3
Pittosporum tenuifolium	Kohuhu	6	3
Plagianthus divaricatus	Swamp Ribbonwood	2	2
Plagianthus regius	Ribbonwood	12	3
Pseudopanax arboreus	Fivefinger	6	3.5
Sophora microphylla	Kowhai	8	3
Uncinia uncinata 'Rubra'	Red-leaved Grass	0.3	0.3

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AUSTIN bluewater
WASTEWATER TREATMENT ENGINEERS

TEN COMMANDMENTS FOR YOUR SEPTIC TANK

I Thou shalt not pour greases, fats or oil into the system

II Thou shalt not attach a waste disposal unit to your system

III Thou shalt not dispose of paints and/or any household chemicals into the system. Use liquid cleaners/washing powders and biodegradable products where possible

IV Thou shalt not dispose of automotive fluids down any drain including petrol, oil, transmission or brake fluid, grease or antifreeze

V Thou shalt not rinse pesticides, herbicides or any other toxins down the system

VI Thou shalt not dispose of any non-biological item in your toilet e.g. disposable nappies, condoms or feminine products

VII Thou shalt not waste unnecessary amounts of water

VIII Thou shalt not run half loads in the dishwasher or washing machine. Where possible stagger laundry wash loads throughout the week

IX Thou shalt not use chemicals to "clean out" blocked drains

X Thou shalt not attach "clean water" sources such as sump pumps or storm water to your wastewater system

AUSTIN bluewater
WASTEWATER TREATMENT ENGINEERS

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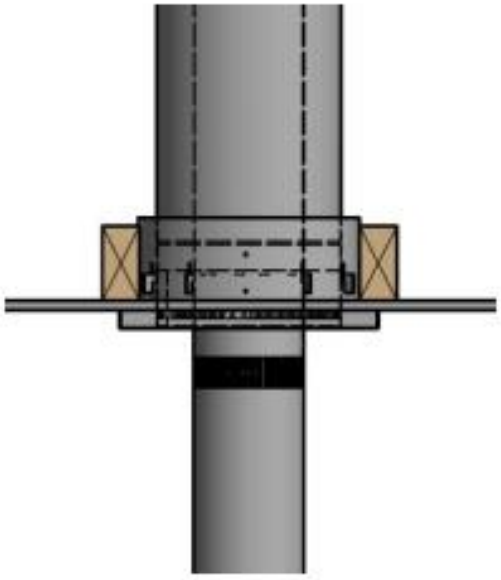
Issued: August 2020 V3.9

Heatsaver Flue Kit Installation Instructions For Solid Fuel Appliances

HeatSaver FLUE SYSTEM



The installation of any Woodsman solid fuel burner requires a Building Consent prior to installation commencing. We recommend the installation of a solid fuel burner or flue system be undertaken by the holder of a current SFAIT (Solid Fuel Appliance Technician) qualification issued by the NZHHA (New Zealand Home Heating Association) www.nzhha.co.nz

KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE

Proudly Manufactured By:

harris HOME FIRES

Harris Home Fires
41 Braddon St
Addington
Christchurch 8024
New Zealand
Email sales@hhf.co.nz

P O Box 4043
Christchurch 8140
New Zealand

Phone 03 366 1796
Freephone 0800 3661796
Fax 03 366 1795

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Installation Instructions

We recommend this appliance be installed by a trained and NZHHA qualified installer.

Warning: the appliance and flue system shall be installed in accordance with AS/NZS 2918 and the appropriate requirements of relevant building code/codes.

Caution: mixing of appliance or flue system components from different sources or modifying the dimensional specification of components may result in hazardous conditions. Where such action is considered, the manufacturer should be consulted in the first instance.

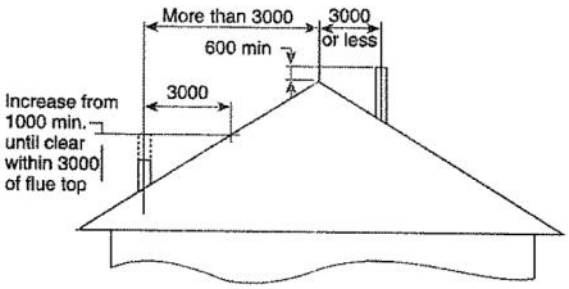
Minimum Flue Height

The top of the flue system should be at least 600mm above the highest point of the roof ridgeline, if the point of intersection of the flue system and the roofline is less than 3 metres from the ridgeline horizontally.

If the point of intersection of the flue system and the roofline is greater than 3 metres horizontally, the top of the flue system shall be at least 1 metre above the point of intersection with the roofline. (refer FIG 3)

FIG 3.

DIMENSIONS IN MILLIMETRES



MINIMUM HEIGHT OF FLUE SYSTEM EXIT

These are considered to be **minimum dimensions,** and depending on local conditions, **taller flue system heights may be required for satisfactory performance. The total flue height should be no less than 4.6m from the level of the hearth.**

Flue Installation Detail

Your Woodsman appliance should be installed with a HeatSaver Flue System.

A HeatSaver Flue System is available from all authorised Woodsman dealers throughout New Zealand.

The HeatSaver Flue System contains a complete installation drawing and correct clearances from the ceiling level up. Minimum clearances from the appliance to nearby combustible surfaces are given in FIGS 2 & 3.

Use of a flue system other than a genuine HeatSaver Flue System may affect the safety of the installation, and may affect your warranty.

Insist on a genuine HeatSaver Flue System.

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INSTALLATION INSTRUCTIONS

- This HeatSaver flue system is tested and certified to AS/NZS 2918:2001 Appendix F, which means it is approved for use on all solid fuel appliances with a flue diameter of 150mm.
- A copy of the Laboratory Test Certificate for this HeatSaver Flue System is included as part of these Installation Instructions, (refer to paperwork with flue kit).
- Installation of any solid fuel appliance should only be carried out by suitably trained and qualified personnel.
- Position the stove to the desired position, always ensuring that the manufacturer's minimum clearances to combustibles are complied with.
- Check that there are no roofline ridges or valleys in the way, or if they cannot be avoided, that the installer knows how to weatherproof the penetration and reinstate the full strength of the structure.
- At the ceiling level, construct a square frame of 300mm x 300mm internal dimensions and cut away the ceiling materials from the inside of this frame.
- Lower the 300mm flue pipe casing into this frame and nail in place when the bottom edge is 25mm below the ceiling level and the 8 nail holes provided are touching the timber frame. Ensure that the spacer brackets are at the top of the casing as shown in the diagram.
- Check all 4 locating brackets are correctly fitted into the 300 X 150mm short casing and lower the 250mm diameter lower casing into place. The swage will naturally settle onto the 4 brackets supporting the casing.
- Make roof penetration, assemble and fit required flue length and install with upper casing. Secure all joins with at least 3 stainless steel rivets or self tapping screws.
- Frame and brace upper installation as required and flash the roof to shield penetration.
- Fit ceiling plate to ceiling.
- When trimming the stainless steel flue length, remember to allow for expansion when flue is hot.
- Fix HeatSaver Columbia Cowl in place using 3 screws.
- Secure the flue to the fire, drill through flue neck on fire and secure with 2 to 3 s/s screws or rivets.
- All flue joints should be sealed using a flue cement.
- Ensure a 25mm clearance from the 250mm diameter casing to any combustible material.

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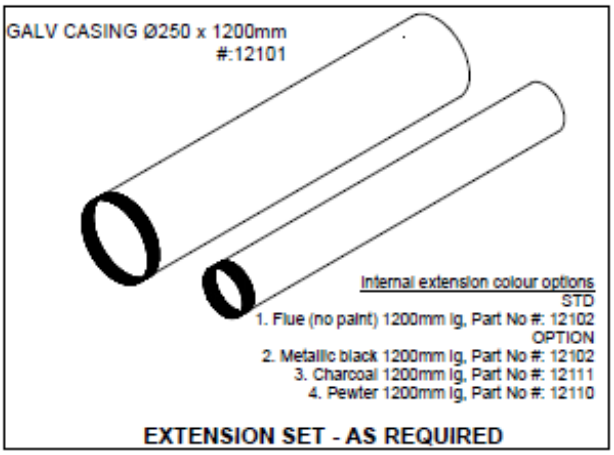
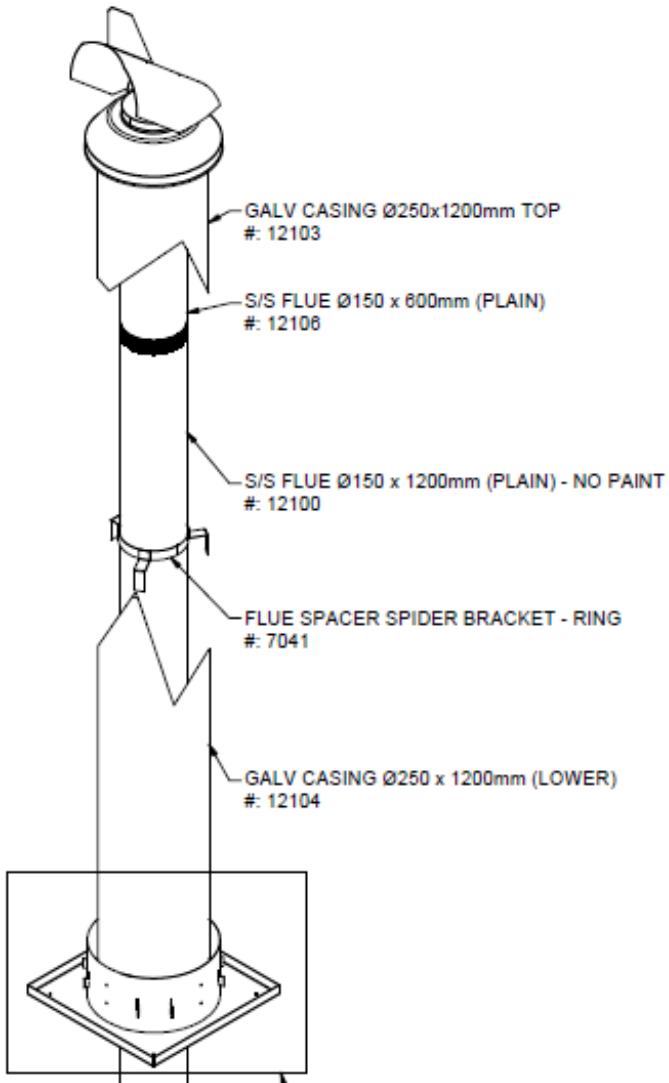
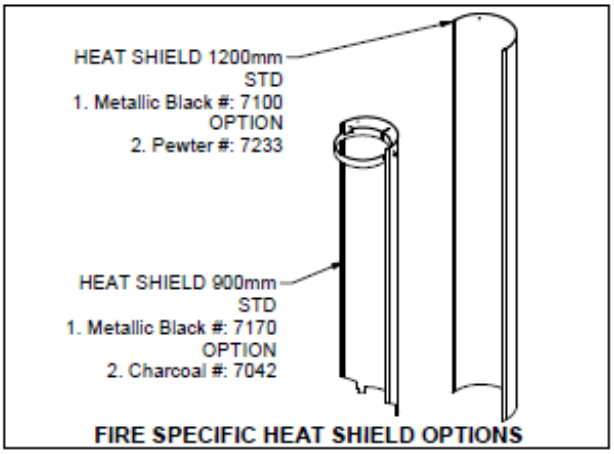
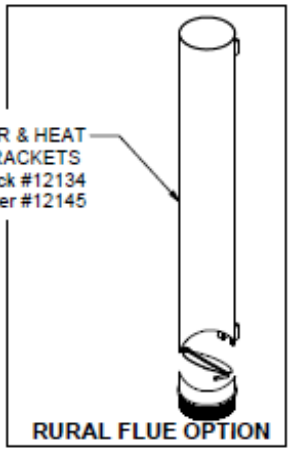
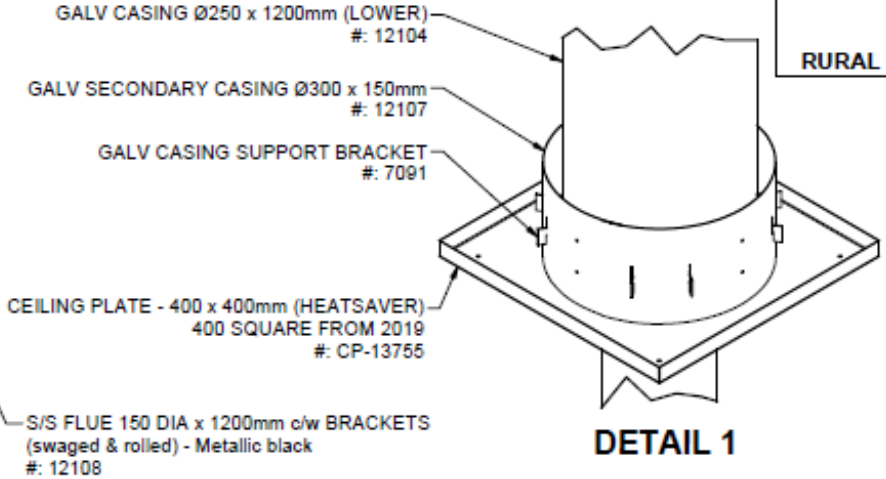
HEAT SAVER II FLUE KIT











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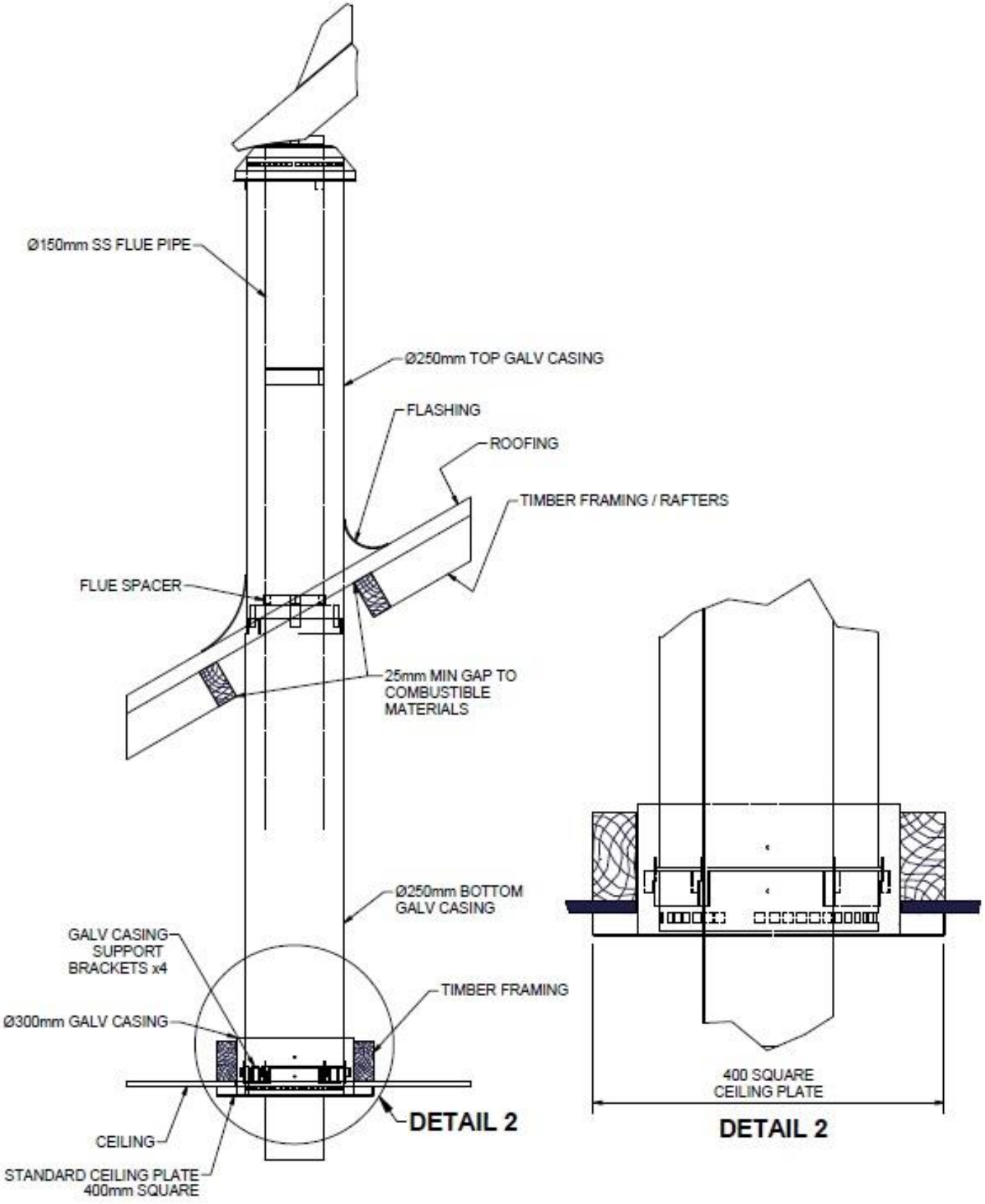
Standard Ceiling



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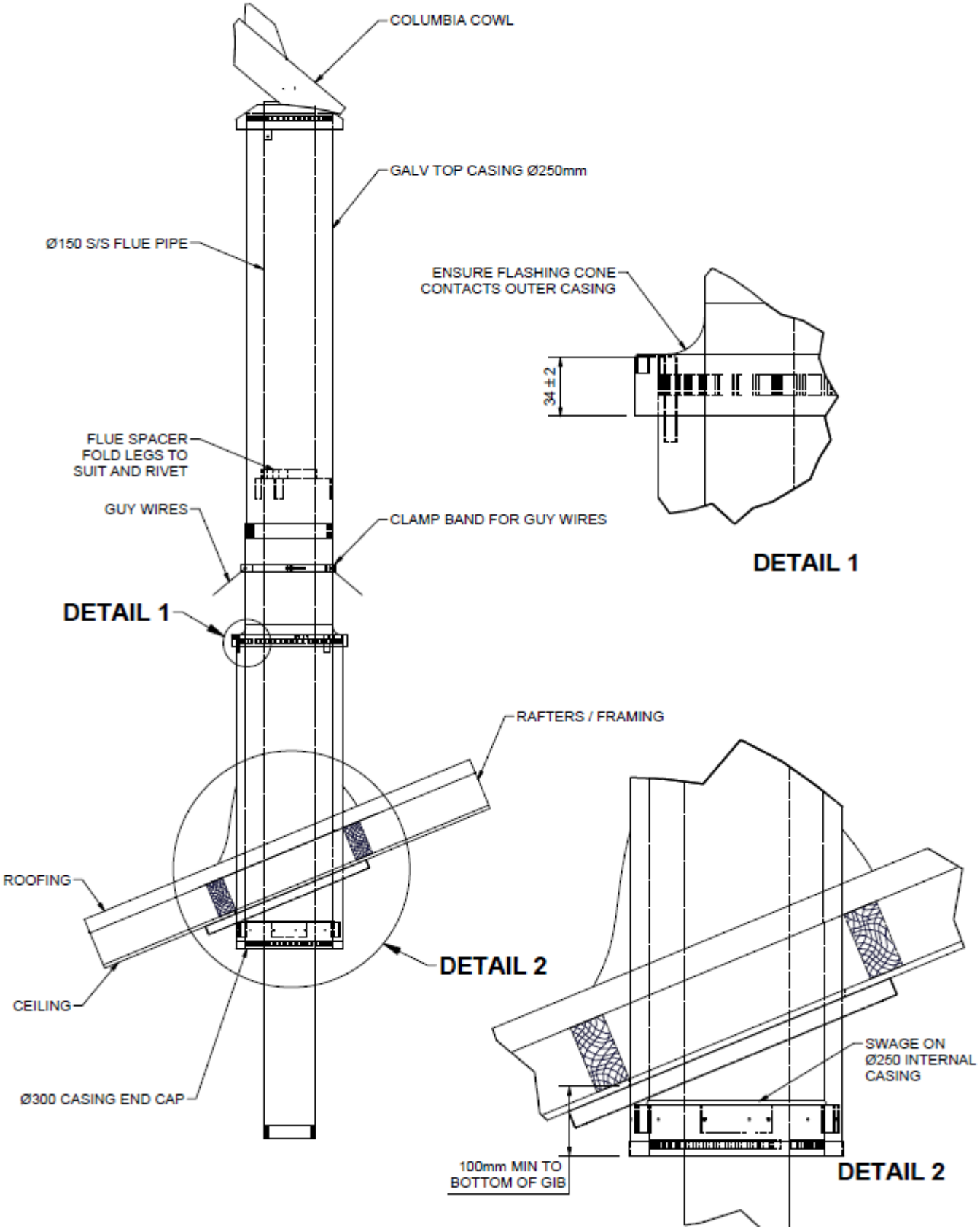
HeatSaver Flue Kit Installation
With Sloping Ceiling Kit

No Cavity
(Requires Sloping Ceiling Kit)



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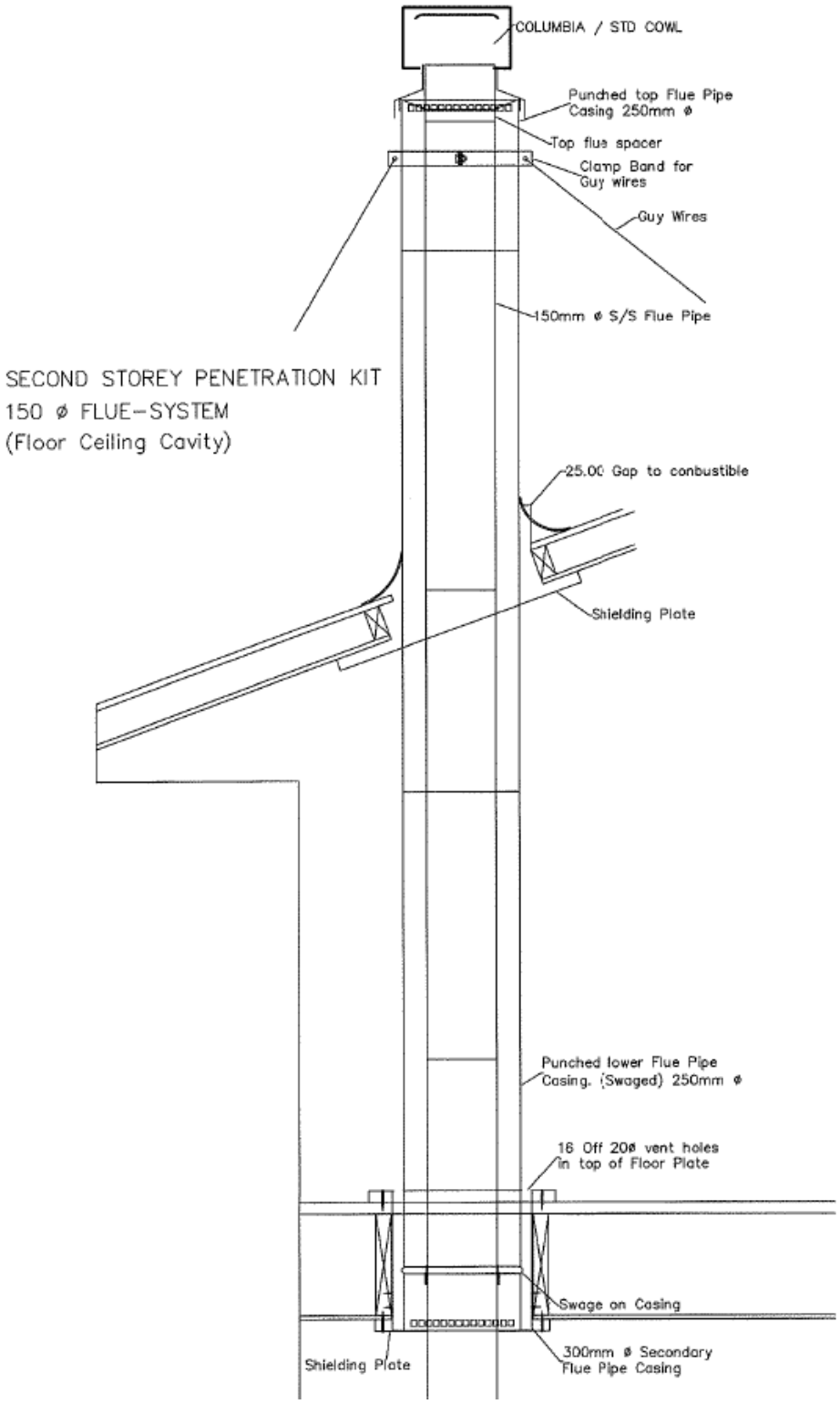
HeatSaver Flue Kit Installation
Two Story Penetration Kit



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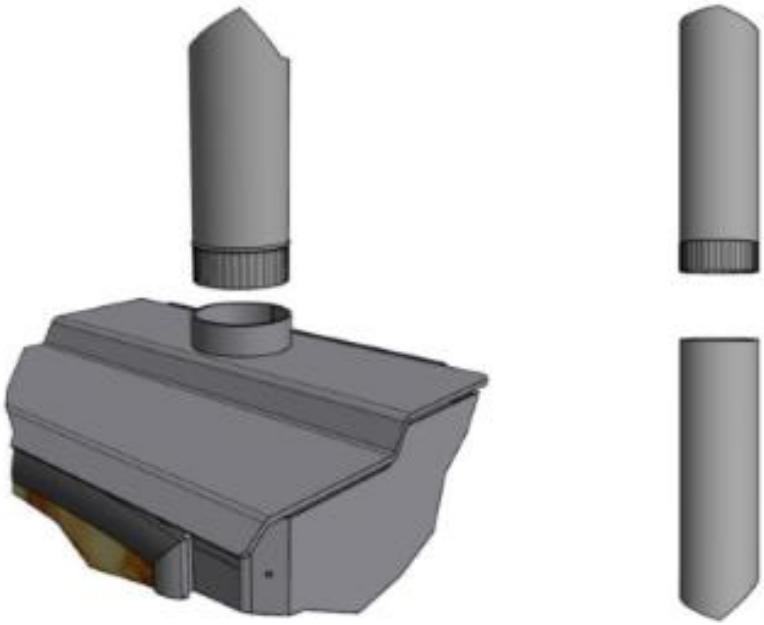
IMPORTANT
All Flue Joints Are Required To Be Sealed Using Flue Cement

It is extremely important that ALL flue joins are sealed at the time of installation using flue cement or a suitable exhaust cement.
Woodsman fires are designed and tested with all flue joins sealed.

If flue joins are not sealed properly, it can lead to performance issues with the fire such as;

- Lower heat output of the fire, due to decreased performance
- Blocked flue
- Smoke coming out the door when open, due to decreased suction
- Hard to light

The formation of soot and creosote will not seal the flues, especially on the lower lengths, as the high temperatures inhibit its formation.



Note:
Any issues that arise as a result of the flues not being sealed, are not covered by the warranty and are not the responsibility of the manufacturer. It is the installer's responsibility that this is done at the time of installation.

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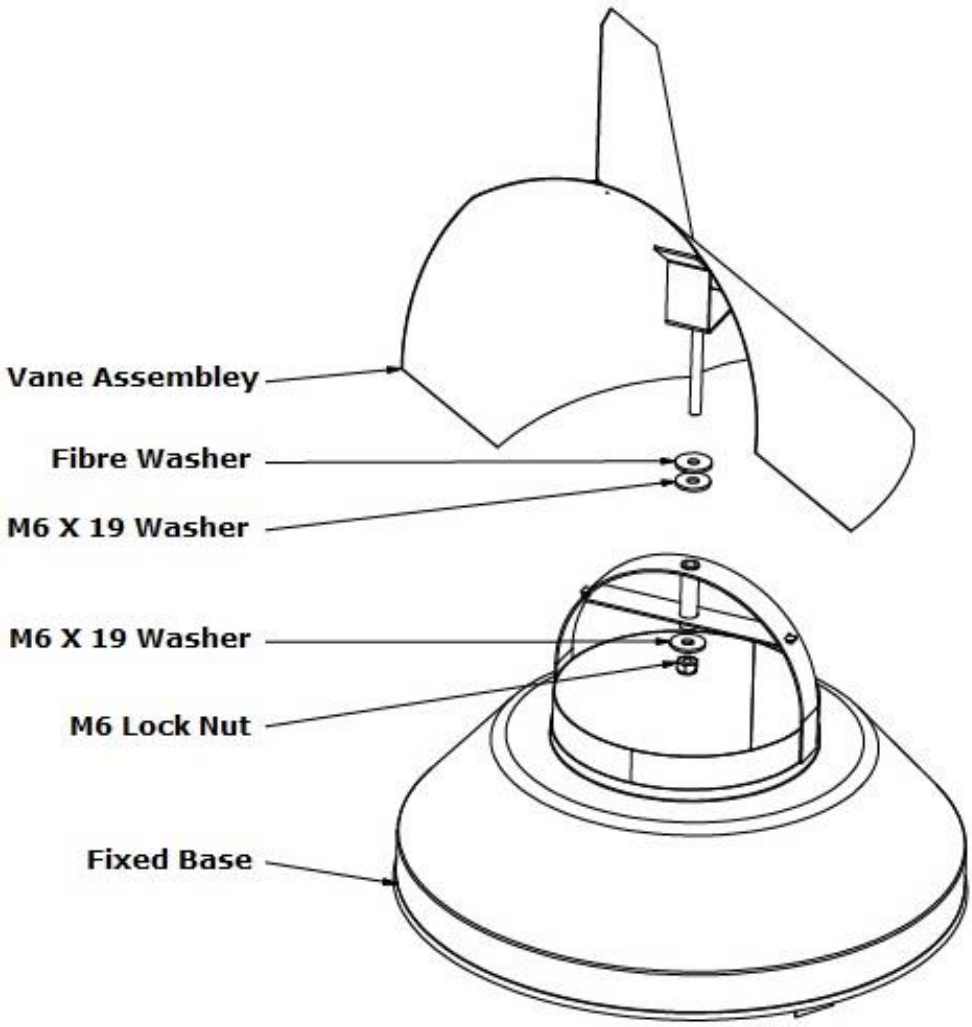
Columbia Cowl

Your Columbia Cowl should be assembled as below. Please note the position of the fibre washer. Tighten the lock nut up so that there is the minimum amount of vertical play (around 1mm), but the cowl still rotates freely.



Maintenance

Your Columbia Cowl should have routine maintenance carried out yearly. Disassemble the cowl and clean away any built up soot or creosote. Check the fibre washer for wear and replace if necessary. Apply fresh high temperature grease to the shaft and reassemble.

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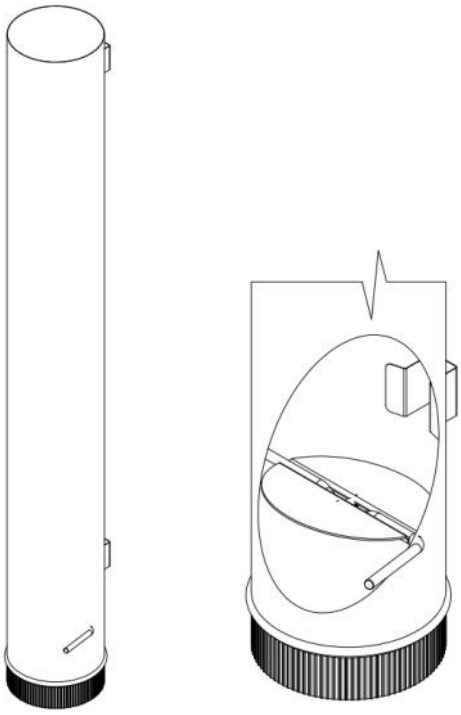
Rural Flue Option

If you are on a property of 2 Ha or more or local regulations permit, you have the choice of installing the Rural Option for the Standard heat Saver Flue system. This is simply the standard Heat Saver Flue system with the optional piece of 150 X 1200 mm stainless flue length with butterfly damper supplied as standard. This piece is fitted directly into the spigot of the fire in place of the standard flue pipe. The factory shield is fitted as normal.
Alternatively you can purchase the optional piece of 150 X 1200 mm stainless flue length with butterfly damper fitted separately, and fit it to an existing Woodsman Wood Burner if local regulations permit.



Rural Flue Damper operating suggestions:

1) Your Woodsman fire must always be started with the flue damper fully open.
2) Once the fire has been burning for some time, and the home has been fully warmed, the damper may be used for long holding operation. This is useful for leaving the home for a few hours or overnight burning.
3) Turn the handle so that it sits 45 degrees to the top of the fire for a slow burn and turn to vertical (open) for maximum performance and heat output. It is not recommended to close the damper past 45 degrees particularly in a newer air tight home.
4) To ensure efficient burning it is advised to leave the damper open for 10mins after each new load of wood is added.

Caution:

1) Always ensure the damper is open before opening the fire door.
2) Using the fire with the damper turned down too often, will cause the flue system to block quickly and will require cleaning regularly.
3) When the fire is operating, the damper handle should never be touched with bare hands as it will be very hot. Use an oven mitt or tool.
4) Operating the flue damper before the fire is not fully warmed up will prevent the fire from reaching correct operating temperature resulting in low heat output and possibly other performance issues.

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Fitting Factory Flue Shields

Your HeatSaver Flue System comes standard with a factory flue shield of one of 2 types;

900mm high, contains 1x painted metal strap. This is used for the Woodsman ECR, Blaze, Boston, Manhattan, RMF and Milford.
1200mm high, this is suitable for the Woodsman Brunner, Tasman, Aspen, Tarras, Serene, ECR NoVo. Strongman and other branded fires which can use the 1200 high single heat shields.

Fitting the 900mm High Flue Shield

1) The heat shield has 2 'tabs' at the bottom which corresponds to 2 slots on the fire behind the flue neck. Insert the tabs.
2) Take the metal strap and fold the two ends around the flue until they meet at the back of the flue at about the height of the top of the heat shield.
3) Hold both ends together and push the tabs through the single slot at the back of the heat shield and fold out the tabs to secure in place.

Fitting the 1200mm High Flue Shield

Your lower length of painted flue already has 2 location brackets attached.
1) Ensure these brackets are facing towards the back wall and centralized.
2) Secure the flue shield in place with screws.

1200mm Flue Shield

900mm Flue Shield

__IMPORTANT__ - Flue shields should be no further than 10mm off the top of the firebox

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APPLIED RESEARCH SERVICES LIMITED

P.O. Box 687, Nelson,
New Zealand

Phone (03) 547 7347
Fax (03) 547 2909
Email: info@appliedresearch.co.nz
Web: www.appliedresearch.co.nz

Customer: **W.H. Harris Ltd.**
41 Braddon St.
P.O. Box 4043
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P701/1

Accreditation Laboratory Registration Number 395

This laboratory is accredited by International Accreditation New Zealand (IANZ). The tests reported herein have been performed in accordance with the terms of our accreditation. This accreditation does not extend to any opinions or any interpretations of test results contained in this report.

IANZ has a Mutual Recognition Arrangement (MRA) with the National Association of Testing Authorities (NATA), Australia, such that both organizations recognize accreditations by IANZ and NATA as being equivalent. Users of test reports are recommended to accept test reports in the name of either accrediting body.

Compliance Certificate

Appliance: HeatSaver 150 mm Diameter Flue Kit

Test Standard: AS/NZS2918:2001 Appendix F

Full Report: 02/749R

(The full report contains the information on the test methods, details of the appliance tested and the results of the test)

This report:

Prepared by: W. S. Webley

Approved by: W. S. Webley

Release Date: 2/3/09

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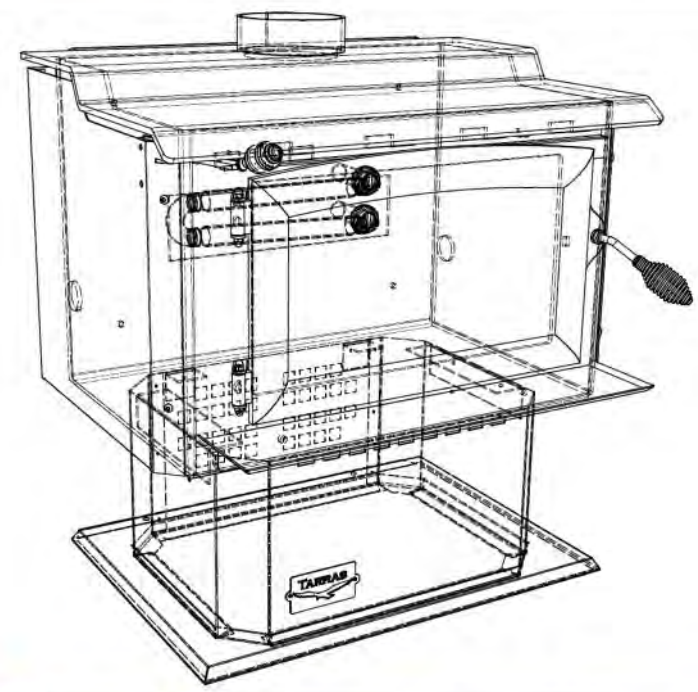
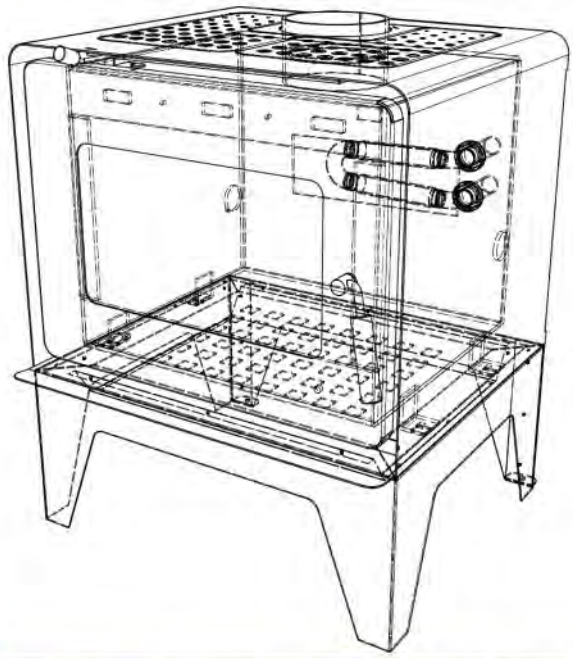
Issued: Nov 2019 V2.8

WOODSMAN

Warming kiwi homes since 1887.

Specifications and Installation Instructions for Woodsman Solid Fuel Burners





The installation of any Woodsman solid fuel burner requires a Building Consent prior to installation commencing. We recommend the installation of a Woodsman solid fuel burner or flue system be undertaken by the holder of a current SFAIT (Solid Fuel Appliance Installation Technician) qualification issued by the NZHHA (NZ Home Heating Association Inc.). www.nzhha.co.nz

Proudly Manufactured By:

harris HOME FIRES

Harris Home Fires
41 Braddon St
Addington
Christchurch 8024
New Zealand
Email sales@hhf.co.nz

P O Box 4043
Christchurch 8140
New Zealand

Phone 03 366 1796
Freephone 0800 3661796
Fax 03 366 1795

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Testing and Certification

MODEL	AS/NZS 2918:2001, APP B	AS/NZ 2918:2001, APP E	AS/NZS 4012:1999	AS/NZS 4013:1999	ECan Cert Number
ECR NoVo	Complies	N/A	67%	0.9g/kg	153733
ECR NoVo Wet	Complies	N/A	65%	0.9g/kg	155148
Totara	Complies	Complies	67%	0.9g/kg	110220
Matai ECR MkIII	Complies	N/A	71%	0.7g/kg	102148
Matai ECR MkV	Complies	N/A	65%	0.7g/kg	102454
IMF	Complies	Complies	N/A	3.9g/kg	N/A
Flare - Wood	Complies	N/A	68%	0.97g/kg	134775
Flare - Wood WB	Complies	N/A	65%	0.89g/kg	135021
Flare - Multi	Complies	N/A	N/A	N/A	N/A
RMF	Complies	N/A	83%	3.9g/kg	N/A
Strongman	Complies	N/A	N/A	N/A	N/A
Aspen	Complies	N/A	71%	0.5g/kg	111306
Aspen WB	Complies	N/A	65%	0.5g/kg	111307
Brunner MKII	Complies	N/A	71%	0.5g/kg	142896
Brunner MKII WB	Complies	N/A	65%	0.5g/kg	142897
Tasman MKII	Complies	N/A	71%	0.5g/kg	142898
Tasman MKII WB	Complies	N/A	65%	0.5g/kg	142899
Tarras MKIII	Complies	N/A	69%	0.37g/kg	143492
Tarras MKIII WB	Complies	N/A	65%	0.5g/kg	143494

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Minimum Safe Installation Clearances to COMBUSTIBLE Materials

	BRUNNER MKII & TASMAN MKII	BRUNNER MKII & TASMAN MKII With Rear Deflector Fitted (see Page 7)	FLARE-WOOD	TARRAS MKIII	TARRAS MKIII With Rear Deflector Fitted (see Page 7)
A	200	120	100	230	160
B	450	450	320	480	460
C	300	300	300	300	300
D	118	118	110	67	67
E	230	240	120	250	220
F	345	265	281	372	302
G	758	758	635	863	843
H	535	545	449	611	581
J	850	850	850	898	898
K	1025	945	933	1052	982
L	1437	1451	1287	1544	1500
M	1220	1230	1122	1304	1274
N	680	680	652	680	680
O	615	615	600	600	600
Flue Shield Requirements (See Page 6)	1200 With flue shield deflector fitted	1200 With flue shield deflector fitted	1200 With flue shield deflector fitted	1200 With flue shield deflector fitted	1200 With flue shield deflector fitted

	ECR MkIII, MkIV, MkV	ECR NoVo With Rear Deflector Fitted (see Page 7)	ASPEN	RMF	FLARE-MULTI	STRONGMAN
A	100	110	255	125	100	300
B	400	490	435	500	350	875*
C	300	300	300	300	300	GRAPH 1
D	150	115	118	150	110	150
E	200	200	230	180	150	380
F	251	265	404	276	281	441
G	690	800	743	790	665	1233**
H	512	517	521	492	479	711
J	880	850	850	880	850	1015
K	807	792	1084	832	933	1364
L	1280	1259	1417	1252	1329	1928
M	1110	1049	1219	1060	1152	1616
N	556	527	680	556	652	923
O	580	450	615	580	600	715
Flue Shield Requirements (See Page 6)	900	1200	1200	900	1200 With flue shield deflector fitted	1200

Notes:

Dimensions A, B & E are taken from the combustible wall to the closest point of the appliance including panels.

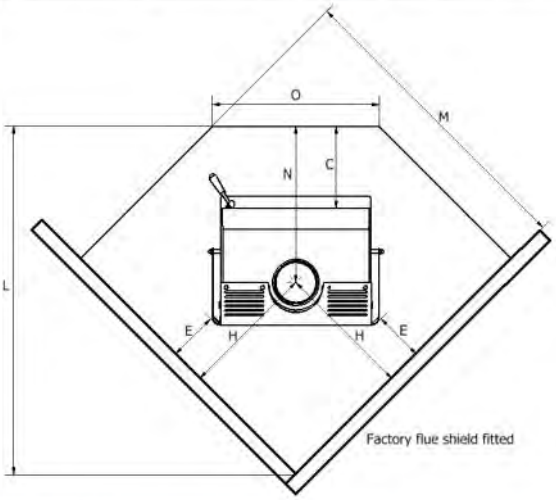
Dimension C is measured from the edge of the hearth to the closest point of the firebox door frame as in AS/NZS 2918:2001 3.3.2

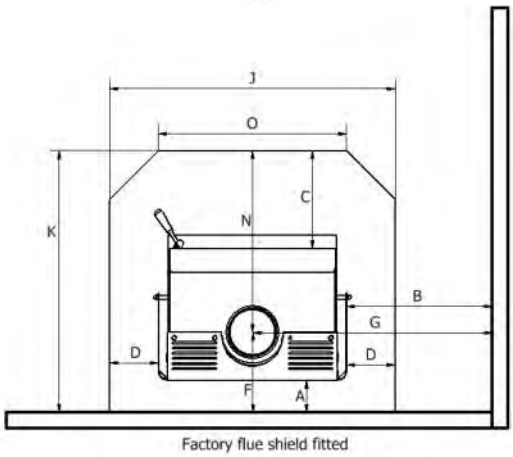
Dimensions F, G & H are not clearances that need to be adhered to. They are measurements for the purpose of locating the flue centre when the appliance is installed with the minimum safe clearances.

*610mm with firebox side panels fitted.

**968mm with firebox side panels fitted.

All dimensions are given in millimetres (mm).





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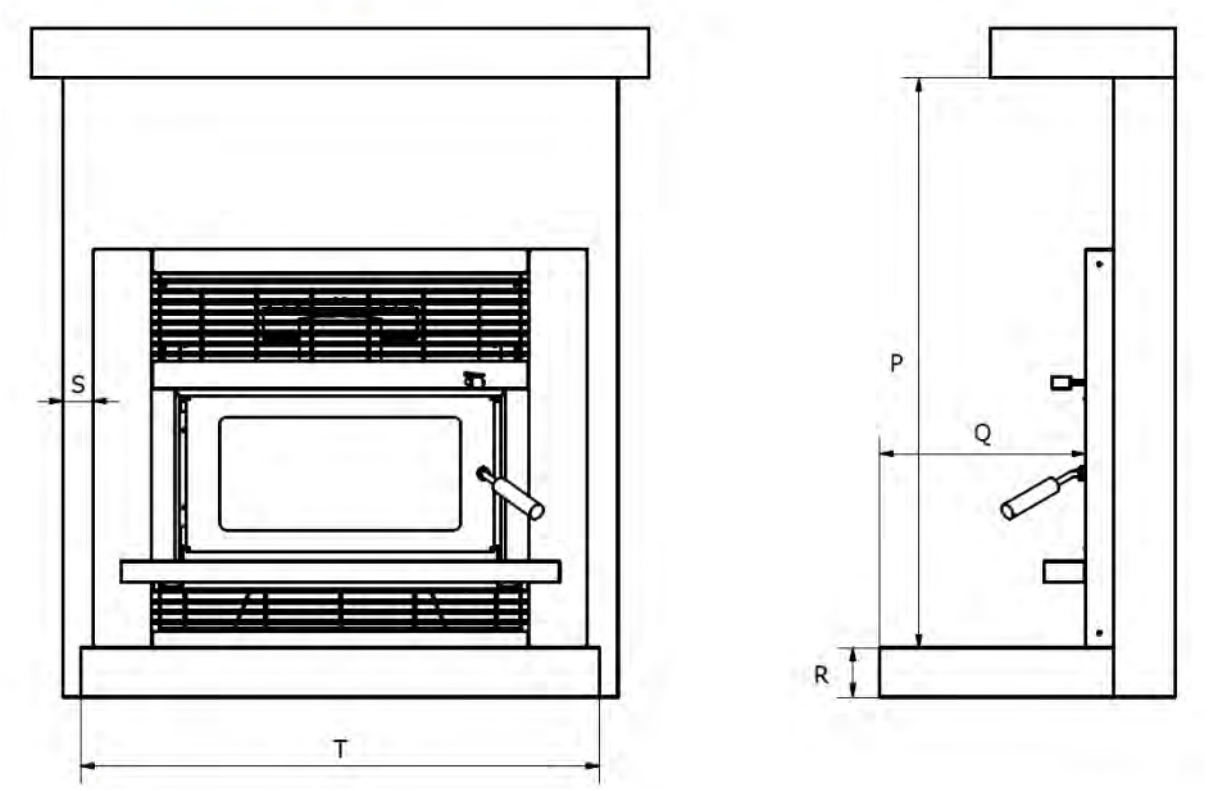
Minimum Safe Installation Clearances to COMBUSTIBLE Materials



	IMF	Totara
P	980	1060*
Q	Graph 1	Graph 1
R	Graph 1	Graph 1
S	50	50
T	840	840

* Dimension P can be 920mm with a factory supplied heat deflector fitted

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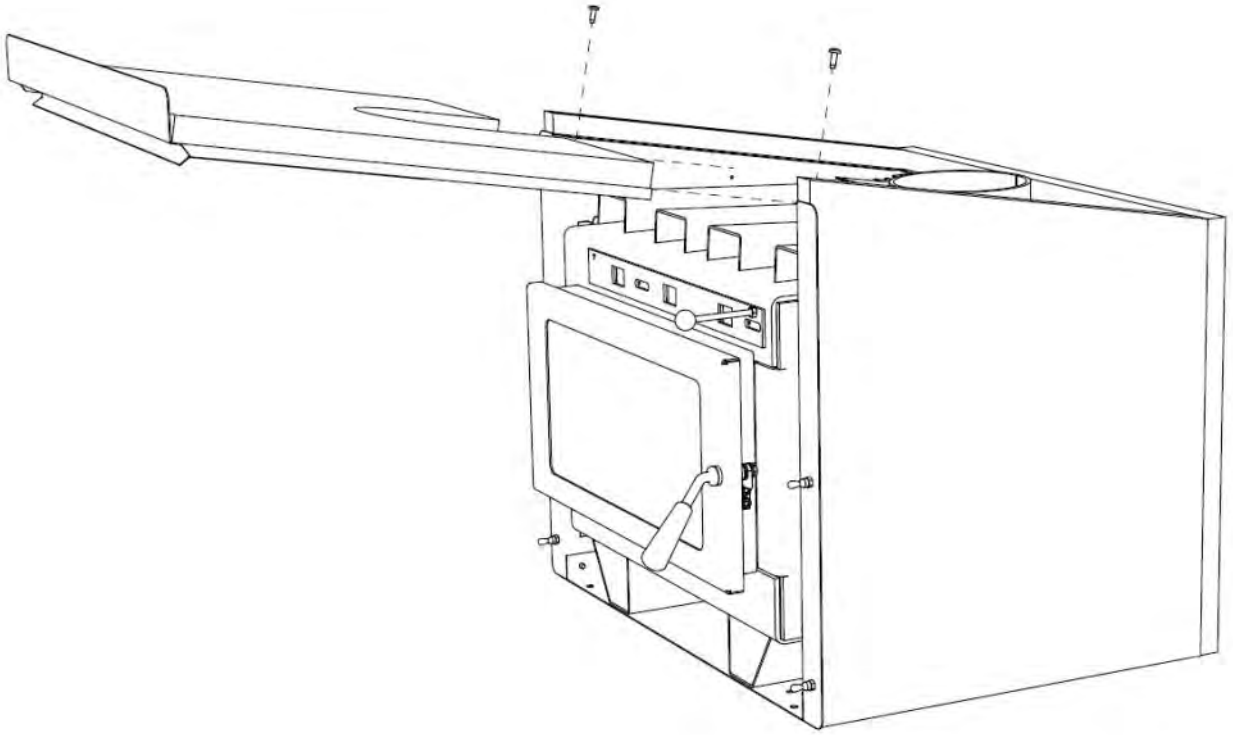
Totara Insert Installation

When installing the Totara into a masonry situation, it is important to ensure that the flue is sealed and secured into the flue spigot.
In some tight situations, it may be very difficult to get access. In those cases, the top section of the cabinet is able to be removed by removing 2 screws and sliding it forward (as shown below). You then have access to the flue spigot to perform the task. Once completed, ensure that the top section of the cabinet is properly put back in its correct position, otherwise heat will escape into the cavity.



Additional Insulation in Cavity

In some installations, the cavity size leaves large open spaces around the insert cabinet. Even though the fascia may cover the opening, it is not air tight and there can be significant heat loss up the chimney.
This can reduce the effectiveness of the appliance and is likely to cause problems for the owner.

It is recommended that additional non-combustible insulation be used to pack around the cavity between the fire and the masonry to reduce (but not completely eliminate) air flow up the chimney and heat loss.

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Ceiling Heights

All Woodsman free standing fires have been tested and approved to ASNZ 2918:2001 App B with a ceiling height of 2.4m and with the factory flue shield fitted in the below configurations. In some cases, the top of the flue shield terminates within 600mm of the ceiling height (refer to ASNZ 2918:2001 4.5.2) but all ceiling temperatures did not exceed the allowable limit in these cases and are therefore able to be installed. Reports are available on request for Councils.

If the ceiling height is less than 2.4m, then heat shielding is required as per AS/NZ 2918:2001 Table 3.2

Factory Flue Shields

Standard 900mm high flue shield:
ECR MKIII, ECR MKV & RMF

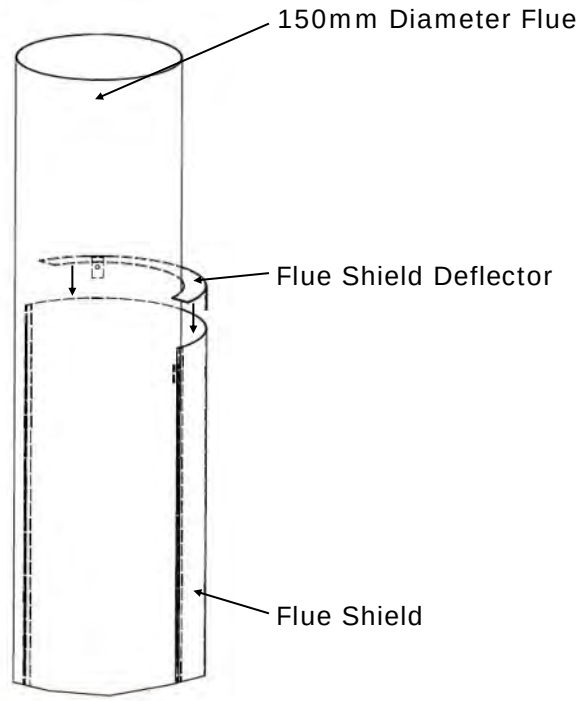
Standard 1200mm high flue shield:
Brunner, Tasman, Aspen, ECR NoVo & Strongman, Serene

1200mm high flue shield with flue shield deflector (REQUIRED)
Tarras MKII, Tarras MKIII, Brunner/Tasman MKII & Flare (All Variants) - See Below

IMPORTANT - Flue shields should be no further than 10mm off the top of the fire box

Fitting the Flue Shield Deflector

for Tarras MKII, Tarras MKIII, Brunner/Tasman MKII and Flare (All Variants)



To fit the heat shield deflector:

- Place the deflector on top of the heat shield and ensure no large gaps
- Fix in place by securing the tabs with rivets to the heat shield

WARNING

This part is required to be installed on the listed models with ALL types of flue kits. Failure to do so, may cause the ceiling to over heat. The part is located in the fire itself and not the flue kit packaging.

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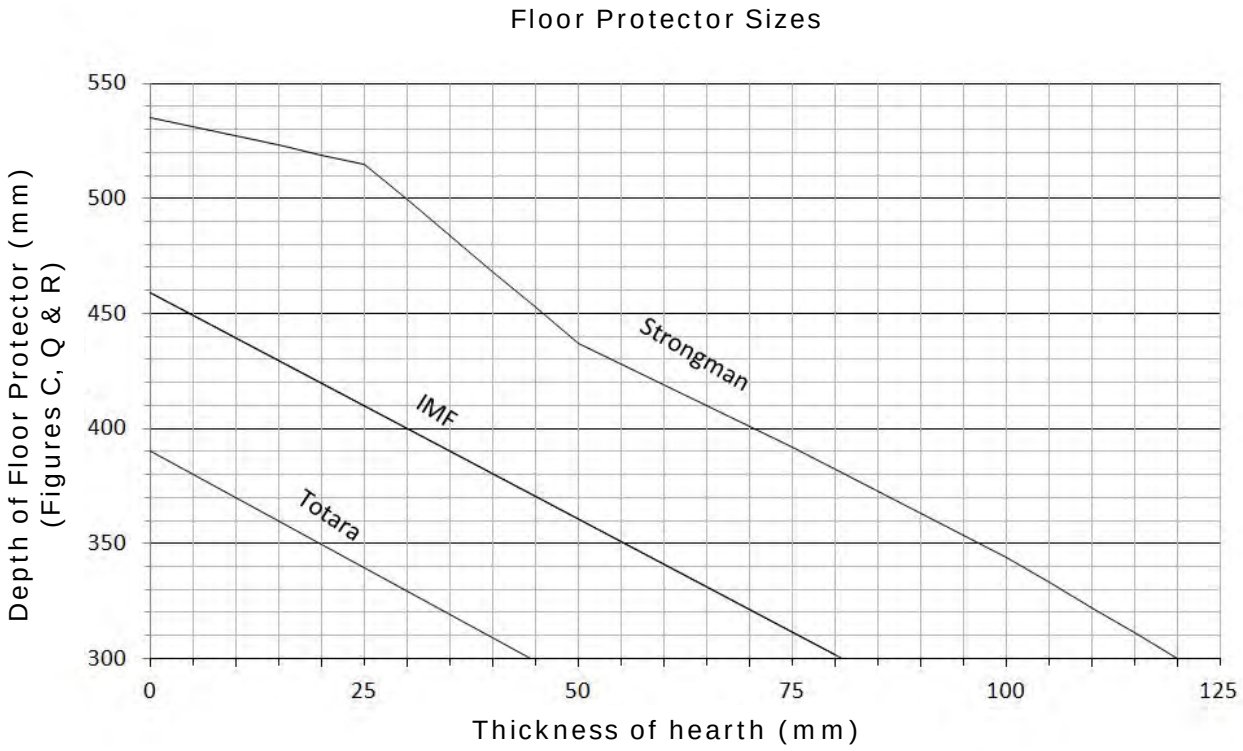
Floor Protector Graph

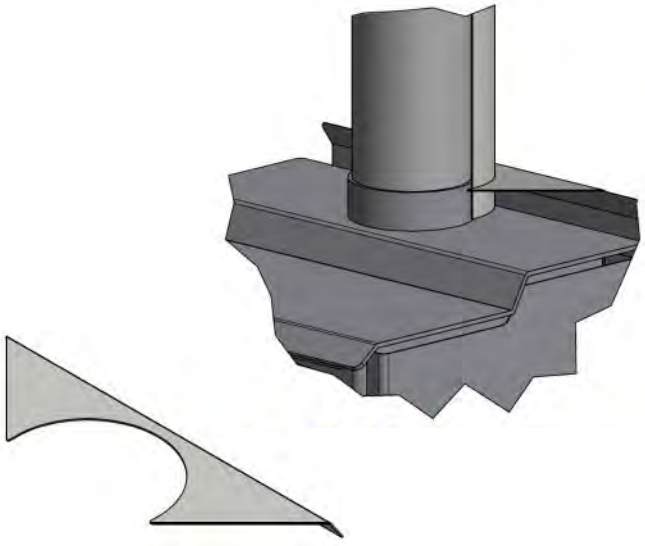
Graph 1



This graph refers to Page 4 dimension C and Page 5 dimension Q & R.

The floor protector distance out in front of the fire (taken from the door), is dependent on the thickness of the floor protector. The thicker the floor protector is above the surrounding combustible floor, the less this distance is out in front of the fire.

Rear Deflector



The rear deflector is used for reducing rear clearances for applicable fires (see page 4 for details). It is located loose in the firebox.

To fit the rear deflector, simply attach it to the rear shield of the fire using 2 rivets in the predrilled holes.

The rear deflector should be positioned tight up against the flue shield as shown.

Available for:
Brunner MKII, Tasman MKII, ECR NoVo & Tarras MKIII

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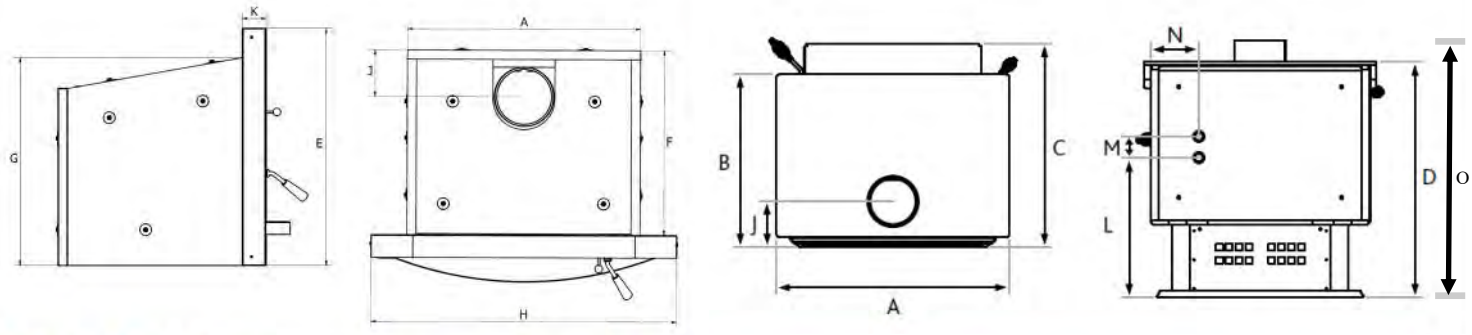
Dimensions



	All Dimensions In MM	TOTARA	ECR MKIII, V	ECR NoVo	BRUNNER MKII & TASMAN MKII	ASPEN	TARRAS MKIII	FLARE WOOD	RMF	STRONG-MAN	IMF Deluxe
A	Overall Stove Width	642	580	620	615	615	765	630	580	715	590
B	Stove Depth Door Frame to Rear		390	382	525	520	522	540	390	521	
C	Overall Stove Depth Ledge to rear		450	466	630	633	640	602	450	590	
D	Floor to Stove Top Plate		620	651	758	725	774	768 (Ped) 764 (Box & Leg)	593	697	
E	Insert Fascia Height	650									740
F	Insert Depth	506									480
G	Insert Maximum Height	570									590
H	Insert Fascia Width	840									850
J	Flue Centre to Back of Unit	136	150	155	145	149	142	181	150	141	115
K	Insert Fascia Depth	62									120/65
L	Wetback Height		283	414	478	450	479	502			
M	Wetback Centres		130	65	65	65	65	65			
N	Wetback Position		290	108	107	106	180	133			
O	Overall Stove Height		640	701	808	775	824	780	643	747	

Disclaimer;
While every attempt is made to ensure this information is as accurate as possible, a tolerance of +/- 5mm should be allowed for in these dimensions

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Reducing Clearances

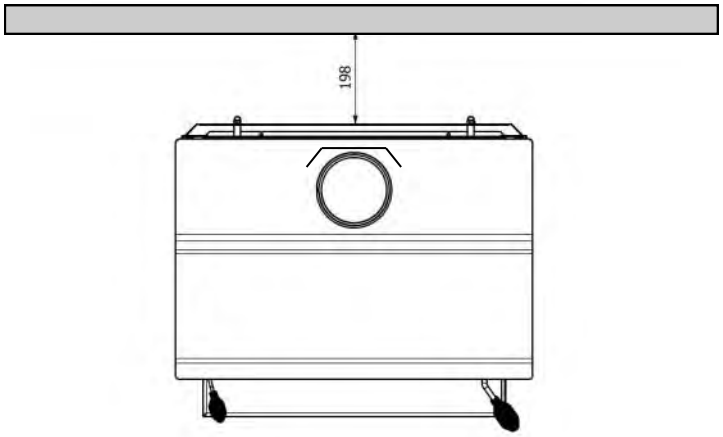
The clearances that are provided on page 4 are to combustible materials. You can safely reduce those clearances by following the instructions located in AS/NZS 2918:2001 table 3.1 and 3.2

You can reduce the clearances by placing a non-combustible heat shield, with an air gap behind it and vented top and bottom, between the fire and the combustible wall. Masonry may be used as a heat shield material. The heat shield must extend a minimum of 450mm beyond the top of the appliance and must be of appropriate width to ensure that the unshielded rear clearance is adhered to beyond the sides of the heat shield. See example below.

Clearance factors for heat shields which are within 45 degrees of the vertical

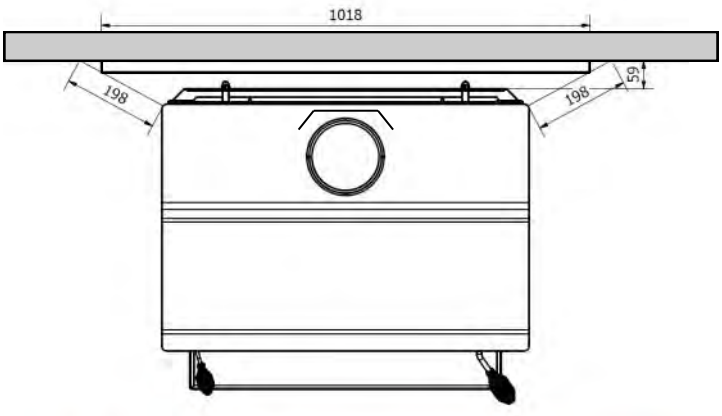
Heat Shield Construction	Minimum Air Gap Dimension	Clearance Factor
Single layer of continuous material	12mm	0.4
Single layer of continuous material	25mm	0.3
Two spaced layers of continuous material	12mm + 12mm	0.2

A non-combustible material in direct contact with a combustible material, with no air gap, is NOT considered a heat shield (unless the material has been tested in accordance with AS/NZS 2918:2001 Appendix A).
All clearance dimensions are taken from the combustible material to the appliance, ignoring the non-combustible in-between.



Unshielded Dimension for Woodsman Tarras MKII

Rear Clearance - 198mm (combustible to stove)



Heat shield with 25mm air gap with Woodsman Tarras MKII

Heat Shield - Single layer of continuous material with 25mm air gap.
Size 1018mm wide x 1222mm high

Reduced Rear Clearance - 59mm (combustible to stove)
Calculation: 198mm x 0.3 = 59mm

WARNING - This is only an example, you must refer to the full AS/NZS 2918:2001 document for more details and consult your local building inspector. Where heat shields are used to reduce appliance dimensions, additional flue shielding may be required (refer 4.5.2).

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Installation Instructions

It is recommended this appliance should be installed by a trained and NZHHA qualified installer.

Warning: the appliance and flue system shall be installed in accordance with AS/NZS 2918 and the appropriate requirements of relevant building code/codes.

Warning: appliances installed in accordance with this standard shall comply with the requirements of AS/NZS 4013 where required by the regulatory authority, i.e. the appliance shall be identifiable by a compliance plate with the marking "Tested to AS/NZS 4013".

Any modification of the appliance that has not been approved in writing by the testing authority is considered to be in breach of the approval granted for compliance with AS/NZS 4013.

Caution: mixing of appliance or flue system components from different sources or modifying the dimensional specification of components may result in hazardous conditions. Where such action is considered, the manufacturer should be consulted in the first instance.

Caution: cracked and broken components e.g. glass panels or ceramic tiles, may render the installation unsafe.

- Maintain a clearance of at least 1 metre between front of the appliance and building structure or any other substantial immovable object.
- If the appliance is installed on a heat sensitive floor, the floor should be protected with a floor protector, which shall extend entirely beneath the heater. For the correct floor protector sizes, refer to dimensions on page 4. For the minimum required material, see table below.
- Your appliance shall be seismically restrained, including the floor protector using the provided holes or brackets. The restraints should be sufficient enough to resist a seismic loading equal to 0.4 times the mass of the appliance. We recommend a minimum of 8mm dynabolts on concrete floors and 8mm coach screws for wooden floors of appropriate length.
- Ventilation - Where an appliance is installed in an enclosed location the area shall be ventilated to permit unrestricted operation of the flue. NOTE: For installations in well sealed buildings, the minimum recommended ventilation area is one-half the cross-sectional area of the flue. Where exhaust fans or additional combustion appliances are installed in the sealed enclosure, additional ventilation may be required.

Minimum Material Specifications For Floor Protectors on a Floor of Combustible Material

MODEL	SPECIFICATION
ASPEN	9mm Eterpan LD + 8mm ceramic tiles (or equivalent)
ECR (MkIII, IV, V) RMF TOTARA*	8mm ceramic tiles only (or equivalent)
STRONGMAN	24mm Eterpan LD (or equivalent)
BRUNNER MKII TASMAN MKII TARRAS MKIII FLARE (All Variants) ECR NoVo SERENE	Ash Floor Protector. Any non-combustible material of any thickness

*The Totara is also approved with 1mm sheet steel with a 10mm spacing above combustible material. For use when extending hearths.

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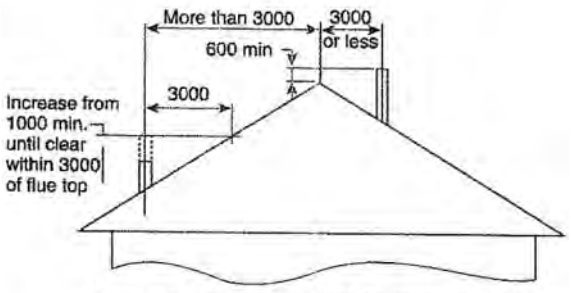
Minimum Flue Height

The top of the flue system should be at least 600mm above the highest point of the roof ridgeline, if the point of intersection of the flue system and the roof-line is less than 3 metres from the ridgeline horizontally.

If the point of intersection of the flue system and the roofline is greater than 3 metres horizontally, the top of the flue system shall be at least 1 metre above the point of inter-section with the roofline. (refer FIG 3)

FIG 3.

DIMENSIONS IN MILLIMETRES



MINIMUM HEIGHT OF FLUE SYSTEM EXIT

The total flue height should be no less than 4.6m from the level of the hearth.

These are considered to be minimum dimensions, and depending on local conditions, taller flue system heights may be required for satisfactory performance.

Flue Installation Detail

Your Woodsman appliance should be installed with a HeatSaver Flue System.

A HeatSaver Flue System is available from all authorised Woodsman dealers throughout New Zea-land.

The HeatSaver Flue System contains a complete installation drawing and correct clearances from the ceiling level up. Minimum clearances from the appliance to nearby combustible surfaces are given in FIGS 1 & 2.

Use of a flue system other than a genuine HeatSaver Flue System may affect the safety of the in-stallation, and may affect your Woodsman warranty.

Insist on a genuine HeatSaver Flue System.

Installation requirements for Woodsman fireplace inserts and flue system where timber framing is less than 50mm from the chimney structure.

Installation should be carried out by a qualified installer who will ensure:

- That the minimum clearances determined by tests in accordance with AS/NZS 2918:2001 are complied with to prevent overheating of nearby combustibles.
- That the minimum opening size of 600mm wide x 600mm high x 500mm deep is availa-ble when firebricks are removed, and that extra provision also be made for plumbing where a hot water booster is fitted (where permitted).
- That any flue requirements specific to the model being installed are met in full - refer HeatSaver Flue System Instructions.
- Where the fireplace opening is in a heat sensitive wall, a non-metallic heat resistant material shall extend not less than 50mm beyond each side of the appliance and 150mm beyond the top of the appliance.
- Clearance of at least 1 metre between the front of the appliance and building structure, or any other substantial material object.
- That the insulating floor protector of non-combustible material is provided, extending not less than the dimensions shown in the chart. (Refer Table 2)
- A fireplace appliance shall not be connected to a flue common with an open fireplace.

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Sealing Flue Joints

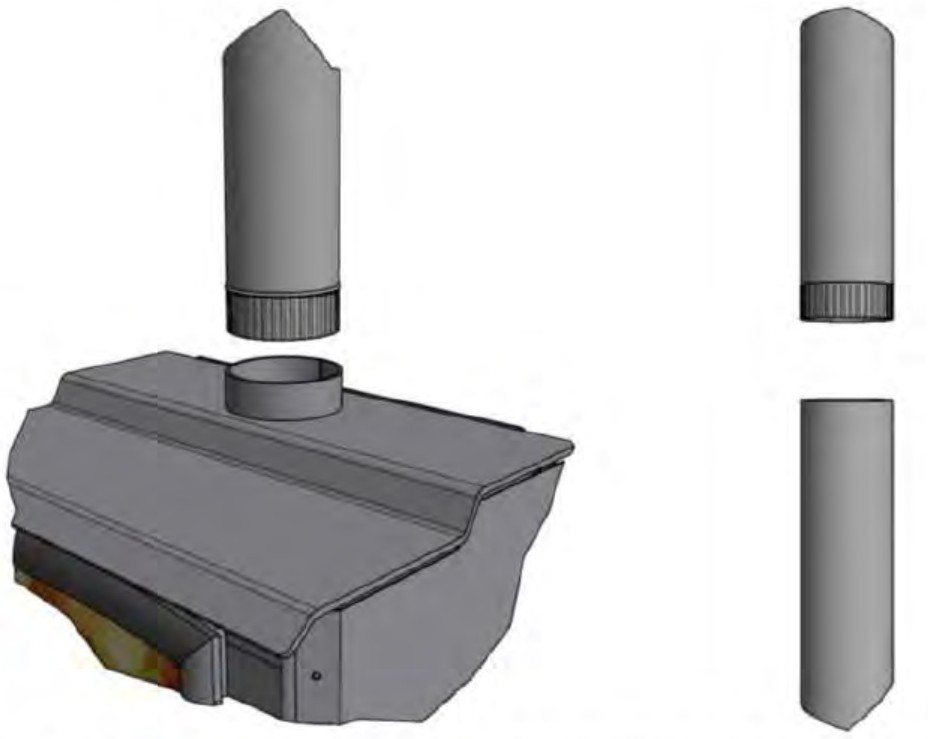
IMPORTANT

All Flue Joints Are Required To Be Sealed Using Flue Cement

It is extremely important that ALL flue joints are sealed at the time of installation using flue cement or a suitable exhaust cement.
If flue joints are not sealed properly, it can lead to performance issues with the fire such as;

- Lower heat output of the fire, due to decreased performance
- Blocked flue
- Smoke coming out the door when open, due to decreased suction
- Hard to light

The formation of soot and creosote will not seal the flues, especially on the lower lengths, as the high temperatures inhibit its formation.



Any issues that arise as a result of the flues not being sealed, are not covered by the warranty and are not the responsibility of the manufacturer.
It is the installers responsibility to ensure that this is done at the time of installation.

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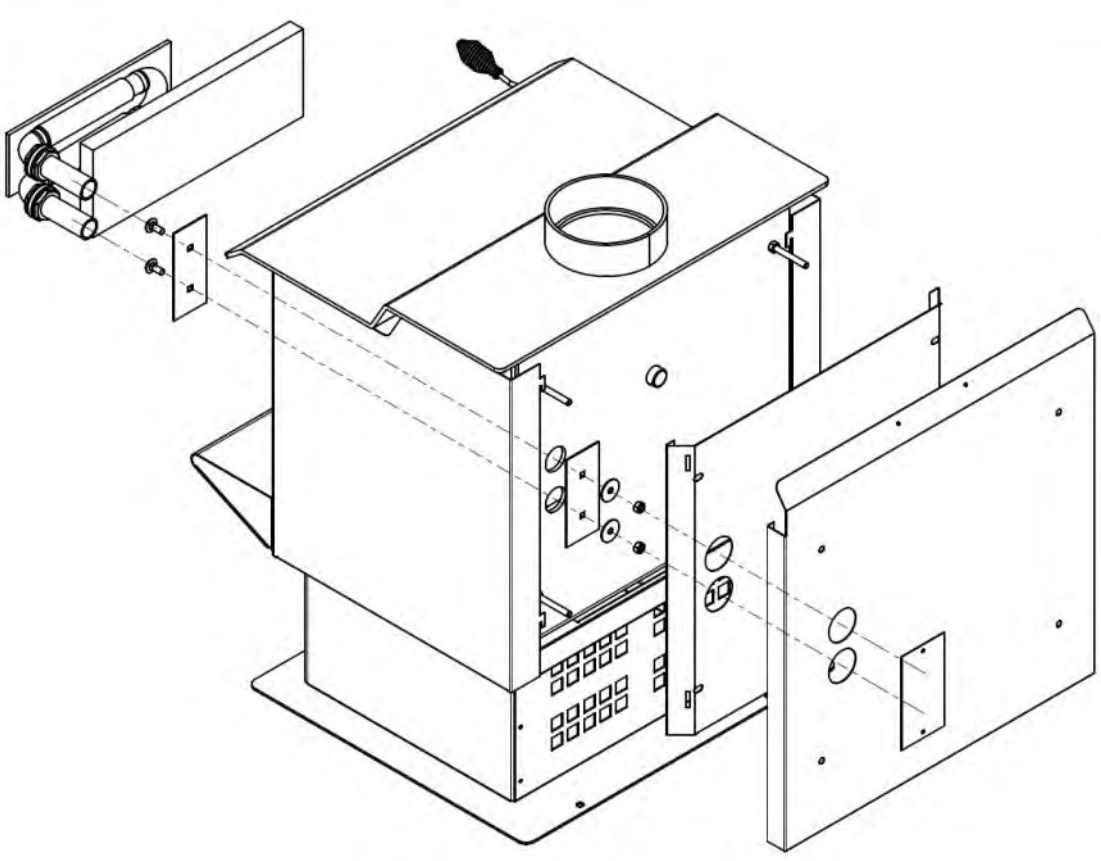
Fitting the Wetback To The Firebox

Instructions for fitting a loose wetback to the firebox where the fire has been pre-punched with wetback holes.

- Remove knock-outs and cover plates in the rear panels
- Remove top rear firebrick
- Undo coach bolts on firebox plug to expose wetback holes
- Cut rear firebrick with a saw only enough to expose the wetback holes on the inside and to allow for the placement of the wetback in front of the brick
- Remove 1 nut off each wetback tube
- Place wetback into fire with firebrick behind it
- Replace nuts onto the rear of the wetback. Ensure the wetback is level before tightening using a 40mm tube socket

This task should be completed before the fire is positioned in place.



Note: Rear panels do not need to be removed if a tube socket is used for tightening

WETBACK WARNINGS:

- Do not connect to an unvented hot water system.
- NEVER burn the appliance without the wetback connected to the water system. This will immediately damage the wetback and void the warranty.
- AS/NZS 2918:2001 states; "all water connections to an appliance shall be in accordance with the appropriate requirements of AS 3500.4.1 or NZS 4603 and the regulatory authority, as appropriate".

HURUNUI DISTRICT COUNCIL
P.O. Box 13 | Amberley | 7441 | 66 Carters Road | Amberley | 7410
Phone 03 314-0006 | Fax 03 314-9181 | Email info@hurunui.govt.nz
Web hurunui.govt.nz | facebook.com/HurunuiDistrictCouncil
Skype hdc_customer_services | twitter.com/hurunuidc

21 October 2021

A Hyde
C/- Survus Consultants
PO Box 5558
Papanui
Christchurch 8542

Attn: K Logan

Dear Kim

Resource consent application – Further information request

Consent Number:	RC210163
Applicant:	A Hyde
Site Address:	122 Racecourse Road, Amberley
Proposed activity:	Six lot subdivision

Having reviewed the application and the information provided, the Council requires the following additional information to be supplied pursuant to section 92 of the Resource Management Act 1991 (RMA) in order to better understand your proposal, including its effects on the environment and the ways any adverse effects might be mitigated.

1) The water modelling letter (WS21059-WS21063) provided by the Council's Three Waters Team dated 7 October 2021, notes that the point of supply to the existing tank 1862 (located on proposed Lot 9) should be relocated to a restrictor on Racecourse Road and the existing connection disconnected and abandoned. I note that this work would require earthworks to be undertaken on proposed Lot 9 which contains a verified HAIL activity. As you are aware the site is in Canterbury Regional Council's Listed Land Use Register ('LLUR') due to the presence of the scrap yard on 5.3 hectares of the site (Site number: 8516). In addition, the site also contains the remains of the tyre fire.

   Therefore, you would need to demonstrate that any earthworks associated with the relocation of the water line to tank 1862 is a permitted activity in terms of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS) or alternatively apply for a resource consent under the NES-CS for these earthworks to be undertaken.

   Another alternative would be to leave the existing line to tank 1862 in place and relocate the restrictor to Innes Road. This would require an easement to be created over the existing line where it traverses proposed Lot 10. In addition, the line would be a private line from the restrictor to the tank and any maintenance would become the responsibility of the tank/ lot owner.

   Therefore, you are required to either provide confirmation that any earthworks required to install the new water line to tank 1862 is a permitted activity under the NES-CS (form attached), or apply for resource consent under the NES-CS, or provide an amended scheme

plan indicating that the existing water line will be covered by an easement and confirming that the water restrictor for this tank will be moved to Innes Road.

2) Further to the above, Council considers that affected parties approval is required from the following parties:
   - Amberley Gun Club
   - McKean Estates Waipara

The processing of your application has therefore been put on hold from **21 October 2021**.

Responding to this request:
Within 15 working days from the receipt of this letter you must either:

- provide the requested information; or
- provide written confirmation that you cannot provide the requested information within the timeframe, but do intend to provide it; or
- provide written confirmation that you do not agree to provide the requested information.

If you cannot provide the requested information within this time frame, but do intend to provide it, then please provide:

- written confirmation that you can provide it;
- the likely date that you will be able to provide it by; and
- any constraints that you may have on not being able to provide it within the set time frame.

The Council will then set a revised time frame for the information to be provided.

Restarting the processing of your application:
The processing of your application will restart:

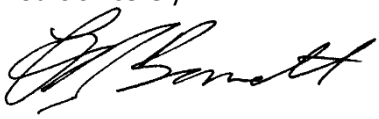
- when all of the above requested information is received (if received within 15 working days from the date of this letter); or
- from the revised date for the requested information to be provided, if you have provided written confirmation that you are unable; or
- from the date that you have provided written confirmation that you do not agree to providing the requested information; or
- 15 working days from the date of this letter (if you have not provided the requested information or written confirmation).

Once the processing of the application restarts:
If you have not provided the requested information, then your application will continue to be processed and determined on the basis of the information that you have provided with the application. The Council may decline the application on the basis of insufficient information.

If you have provided all the requested information, then we will consider its adequacy and make a decision on whether your application requires notification or limited notification, or, whether any parties are considered adversely affected from whom you will need to obtain written approval in order for the proposal to be considered on a non-notified basis.

Please do not hesitate to contact me if you have any questions or concerns regarding the above request or the further processing of the application.

Yours sincerely



Helga Bennett
Senior Planner

Mobile 0274 1800 1025
Email helga.bennett@hurunui.govt.nz