





BC 150134

BUILDING CONSENT REVISED ISSUE

The Council has no record of any services in the vicinity of of the proposed work. Take care.

APPROVED BY  
PLANNING - Stacey Swanson  
24/03/2015

02 APR 2015



**BOUNDARY LINES**  
The Owner/Builder is responsible for clearly defining the site boundary lines and pegs. This may require a survey.  
NOTE: established fences are not necessarily on the site boundary.

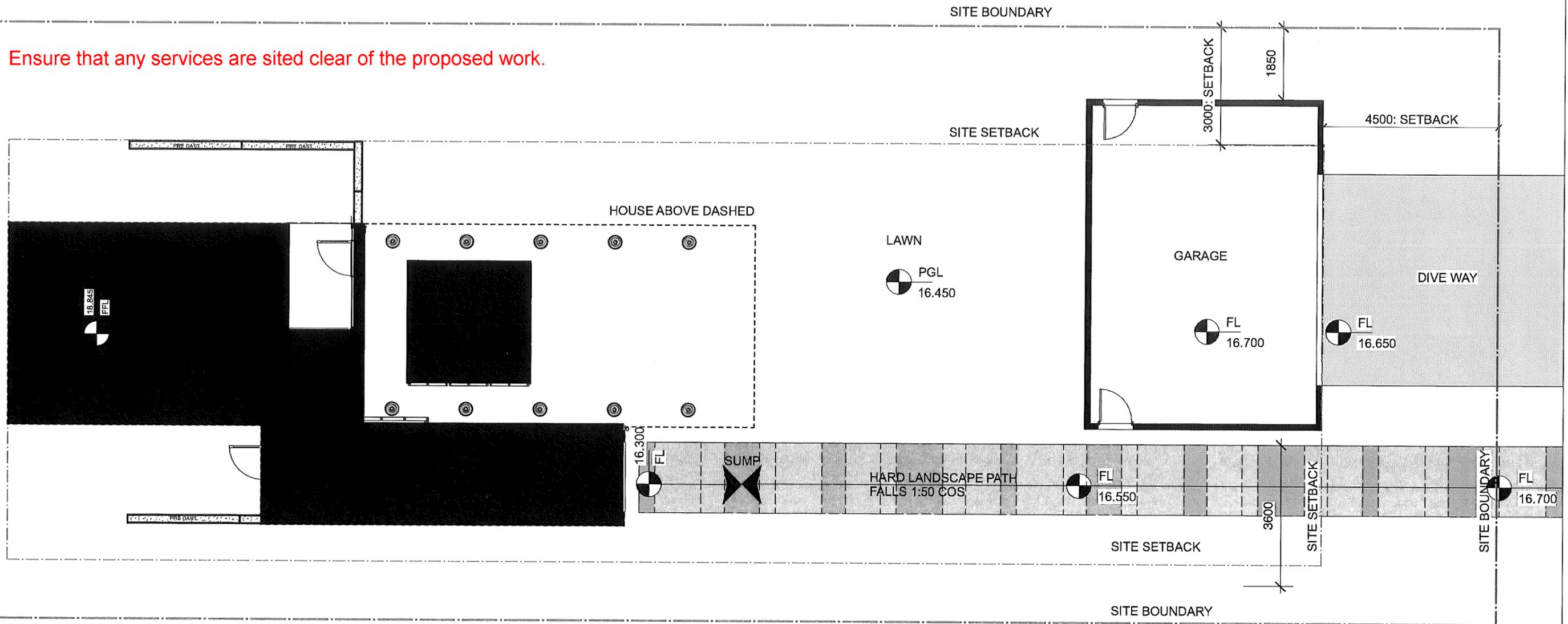
REVISED INFORMATION  
2/4/15

within coastal corrosion zone

APPROVED BY  
BUILDING OFFICER  
Jeremyl  
7/04/2015

NUMBER	DRAWING NAME	CURRENT REVISION	THIS ISSUE
90.00	GARAGE - SITE PLAN	B	B
90.01	GARAGE - LEGEND	B	B
91.00	GARAGE - GENERAL ARRANGEMENT	B	B
91.01	GARAGE - ROOFING	B	B
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94.00	GARAGE - SECTIONS	B	B
94.10	GARAGE - DATA SHEETS	B	B
95.00	GARAGE - DETAILS	B	B
95.01	GARAGE - DETAILS	B	B
95.02	GARAGE - DETAILS	B	B
95.03	GARAGE - DETAILS	B	B

Ensure that any services are sited clear of the proposed work.



1307

O'Brien Garage  
7 Tutere St Waikanae  
Jill & Shane O'Brien

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ASSEMBLY ARCHITECTS LIMITED  
PO BOX 192 ARROWTOWN 9351  
Justin Wright 021 565 363

B 2/4/15 BUILDING CONSENT RFI REVISIONS  
A 4/11/14 Building Consent - Client issue

ASSEMBLY  
ARCHITECTS  
LIMITED

GARAGE - SITE PLAN 90.00 B

DRAWING NUMBER REV

1307\_Garage\_R0\_03\_BC\_RFI\_v0x

# 10 Preliminary & General

## BUILDING DATA

10 Preliminary & General  
 BUILDING DATA  
 Building classification: Accessory  
 Floor live load: 1.5 kPa  
 (to NZS 3604, table 1.2 Basic live loads for floors and stairs)

## MANUFACTURER INSTALLATION REQ

10 Preliminary & General  
 CONTRACTOR TO COMPILE ON SITE CURRENT  
 MANUFACTURERS TRADE LITERATURE FOR  
 INSTALLATION OF ALL SELECTED PRODUCTS.

# 21 Excavation

## GROUND PREP

### DPM

22 Ground Works 221 Ground  
 Polyethylene (Polythene) sheet DPM  
 To NZS:3604 7.5.6  
 To BRANZ 462 (2004)

MIN 0.25mm thickness.  
 Sealed Joints.

### FIRM GROUND

22 Ground Works 221 Ground  
 The base of all excavations are to be Firm Original Ground,  
 to meet NZS 4431, with an ultimate bearing strength >  
 300kPa. Report any soft spots to the engineer, follow  
 instruction to fix.

### GRANULAR BASE

22 Ground Works 221 Ground  
 Compacted granular fill to NZS:3604: 7.5.3  
 Lay and Compact Compliant Granular Fill Material in  
 layers 150mm max thickness.

Total Compacted Base thickness: MIN 75mm, MAX  
 600mm

### SAND BLINDING

22 Ground Works 221 Ground  
 To NZS:3604: 7.5.6.2  
 Place a sand blinding surface over granular fill to protect  
 the DPM.  
 Min thickness 5mm, Max Thickness 25mm

## 23 FOUNDATIONS

### REINFORCE: FOOT

231 FOUNDATIONS  
 REINFORCING STEEL  
 Reinforcing to Concrete slab footings.  
 NZS3604, section 7.5, as modified by NZBC B1 2011,  
 section 3.1

Reinforced footing, as per NZS3604, Figure 7.13 b, for 2  
 storeys.

All Reinforcing Steel: Ductility Class E, in accordance with  
 NZS 4671.

Refer to Details for Sizing and Placement.  
 Refer to SLAB notes

### MESH: DUCTILE E

231 FOUNDATIONS  
 WELDED REINFORCING MESH  
 As per NZS3604, section 7.5, as modified by NZBC B1  
 2011, section 3.1.  
 Reinforced footing design, as per NZS3604, Figure 7.13 b,  
 for 2 storeys.

All Reinforcing Steel: Ductility Class E, in accordance with  
 NZS 4671.

Slab Reinforcing Mesh: shall consist of min 2.27 kg/m2  
 welded reinforcing mesh sheets, lapped at sheet joints by  
 225mm, or in accordance with manufacturers requirements  
 Refer to Details for Placement  
 Refer to SLAB notes

# 32 Concrete Work

## CONCRETE TRADE

### 125 CONCRETE SLAB

32 Concrete Work 32 CONCRETE  
 REINFORCED EXTERNAL CONCRETE SLAB  
 125mm Slab thickness.  
 Refer to NZS 3604.  
 Min 25MPa for Exposure Zone D.

Sawcut shrinkage control, as per NZS 3604 7.5.8.6. Sawcuts  
 @ max 6m CTR. Cuts 25mm depth, completed less than 24hr  
 after slab setting.

# 40 Carpentry

## TIMBER FRAMING

### DPC

40 Carpentry 402A Timber Framing  
 DAMP PROOF COURSE  
 01. Install between all timber framing and concrete slabs and  
 foundations.  
 02. Install Between timber Post/Piles & Bearer members when  
 less than 600mm above ground.

Supercourse 500  
 To BRANZ 329 (2005)

### HYJOIST [SIZE]

40 Carpentry 402a Timber Framing  
 TIMBER ROOF/FLOOR FRAMING  
 CHH HyJoist  
 Blocking as required.  
 Size, Spacing: as per Framing Plans.

### LINTEL GARAGE

40 Carpentry 402A Timber Framing  
 TIMBER FRAMING - HySpan Garage lintel  
 Refer Framing Plan for Size.  
 Lintels Sized to CHH Design IT.  
 Refer CHH Design IT certificate.

90mm thick members may be substituted with built up  
 members sized and nailed in accordance with NZS 3604,  
 2.4.4.7.

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### STUD [VARIES]

40 Carpentry 402a Timber Framing  
 TIMBER FRAMING - CHH LASERFRAME  
 Pinus Radiata SG8 to NZS 3604 Requirements.  
 Size: REFER PLANS  
 Spacing: 600mm ctrs max.  
 Treatment: H1.2  
 Nogs: Refer cladding Manufacturer Requirements  
 Provide all dwangs nogs and trimmers as required  
 Nogs at max 800 ctrs  
 Refer CHH Design IT certificate.

## ENCLOSURE

### RAB 7MM

40 Carpentry 405 Wrap  
 RIGID AIR BARRIER:  
 Install Ecoply Barrier Air Barrier in accordance with  
 Manufacturers Requirements to meet E2/AS1 Section  
 9.1.5 and B2 Durability.  
 7mm H3.2 CCA Treated Plwood Barrier.

Install to best trade practice such that any moisture the  
 touches the wall underlay is prevented from any  
 contact with the framing it protects.

### FLEXIBLE FLASHING TAPE

40 Carpentry 405 Wrap Tape  
 WINDOW SEALING SYSTEM  
 ProClima Tescon Extoseal Sill Tape Window  
 Sealing System.  
 Flexible Flashing Tape.  
 Install in accordance with BRANZ Appraisal No.  
 815 [2013] to meet E2/AS1 and B2 Durability.

INSTALL: Flashing Tape Continuous around  
 Entire Opening. 50mm min cover to wall.

## CLADDING

### PLY 12

40 Carpentry 406 Timber Cladding  
 CHH SHADOWCLAD PLYWOOD SHEET CLADDING.  
 Manufacturer Tested to E2/AS1/M1 & NZS 4284.  
 SHEET CLADDING ON Drained Cavity.  
 Install to Manufacturers Requirements, to E2/AM1  
 compliance testing.

Species: Pine  
 Treatment: H3.1 LOSP  
 Finish: Pre-primed and Painted.  
 Cavity: Refer Cavity.  
 Fixing: Stainless Steel.  
 Ensure All Cut ends are spot treated with Holdfast  
 Metalex prior to Installation.

### CAVITY: HORIZONTAL

40 Carpentry 406 X  
 Install Drained Cavity to meet Requirements of E2 for  
 Drained and vented cavities.  
 Horizontal Vented and Drained Cavity. Nominal 45mm  
 cavity depth.  
 Structural Castellated Cavity Battens H3.2 Treated.  
 FIXING: 14g x 100 Stainless steel screw.  
 Refer Drawings for cavity details.

Install horizontal Castellated cavity battens to form  
 ventilated and free draining nominal cavity behind  
 cladding. Nominal 45mm cavity thickness.  
 Vertical Battens at all corners.

### PLY:17 [ROOF SUB]

40 Carpentry 401a Timber Roofing  
 ECOPLY PLYWOOD SUBSTRATE TO MEMBRANE-ROOFING.

Install to Plywood manufacturer instructions and Roofing  
 Membrane Manufacturer requirements.

ROOF Thickness: 17mm MIN.  
 Treatment: TREATED H3.2 CCA  
 Grade: C grade Smooth finish suitable for Membrane Install.

L AID:  
 Staggered Pattern, Right Angle to Supports.  
 Tongue and Groove Edge support.

Fixing: edge blocking note removed.  
 316 STAINLESS STEEL COUNTERSUNK SCREW FIXED WITH  
 Adhesive.  
 10 Gauge Screws, Min length 3 x thickness of Ply.  
 TAPED JOINTS: to manufacturers requirements.  
 Fixing Ctrs: 150mm at edges, 200mm within the sheet.

All Edges fitted with Fillets min 20x20, or if external corner Min  
 5mm Radius to edge.

## DECORATIVE FINISHES

### ALUMINIUM PANEL

40 Carpentry 408 Decorative  
 ALUMINIUM PANEL  
 3mm Marine Grade Aluminium Sheet Panel.  
 Powder coat finish: Dulux Duratec

PANEL FIXING  
 Stainless Steel Square Drive Screw.  
 Confirm Fixing Row Setouts with architect.

Check and Confirm all sizes on site.  
 Pre drill all holes.  
 Powdercoat all sides and edges.  
 Panels to lap 35mm over Timber Boards at bases.

### MACROCARPA RAINSCREEN

40 Carpentry 408 Decorative  
 WEATHERGROOVED TIMBER BOARDS  
 Mill certified heart Macrocarpa 20 x 100mm Boards  
 with MIN 6x6mm weathergrooves in accordance  
 ES2.A1 Figure 119.  
 Fixed to cladding as decorative rainscreen.

FIXING: Countersunk sqr drive Stainless Steel Screws  
 2/60 x 3 @ 600 ctrs

## CEILING

### GIB 13

40 Carpentry 531 Ceiling  
 GIB PLASTERBOARD CEILING DIAPHRAGM  
 13mm Gib. l  
 INSTALLED as per GIB EZYBRACE requirements.  
 Installed and plastered to Level 4 finish ready for  
 application of selected paint finish. Refer 6 FINISHES.  
 Fixed to Gib Rondo battens.

### RONDO 308

40 Carpentry 531 Lining  
 GIB RONDO Metal Batten System 308.  
 Install in accordance with Manufacturers installation  
 instructions.  
 Diaphragm ceiling application.  
 Direct fixed to framing.  
 No clips.

# 43 Metal Window Door

## ALUMINIUM WINDOW DOOR

### ALUMINIUM FLASH

43 Metal Windows & Doors 432  
 WINDOW FLASHINGS: Corrosion Zone D.  
 MATERIAL: in accordance with E2/AS1, 4.3  
 Aluminium: min 1mm thick, 5000 series  
 POWDER COATED to match windows.

### POWDERCOAT: DURATEC

43 Metal Windows & Doors 432  
 DURATEC POWDERCOATING TO ALL EXTERNAL  
 ALUMINIUM WINDOWS AND ASSOCIATED FLASHINGS  
 IN SEA SPRAY CORROSION ZONE.  
 15 Year Warranty.

### DOOR ALUM

43 Metal Windows & Doors 432  
 ALUMINIUM WINDOWS AND DOORS  
 SELECTED PROFILES.  
 MATERIAL: Aluminium  
 Finish: Dulux Duratec Powdercoat to suit Zone D.  
 GLAZING: Single Glaze. Grade A safety glass to  
 NZS4223, part 3.

Install Windows to manufacturers recommendations and  
 WANZ Details. Window manufacturer to supply WANZ  
 support bar as required.

# 45 Roofing

## MEMBRANE ROOFING

### MEMBRANE

45 Roofing 451 MEMBRANES  
 BITUFLAME MEMBRANE ROOFING  
 Install to meet requirements of E2/AS1 for Membrane  
 Roofs and Decks, and BRANZ Appraisal 404 [2008] for  
 bituflame touch-on membrane roofing.

Installation by trained and qualified applicator.  
 refer to drawings for further details.

Substrate: 17mm H3.2 CCA Treated Plywood.  
 WPS Recommendation of 2 layer bituflame touch-on  
 System over plywood substrates.

## RAINWATER DISPOSAL

### DP 100

45 Roofing 455  
 80mm ROUND DOWN PIPE  
 Material to Match Roofing.  
 Provide warranty.

refer to roofing plan for rainwater calculations  
 Install to manufacturers requirements

### GUTTER: 125 BOX

45 Roofing 455  
 RAIN WATER SPOUTING  
 125 Box.  
 Colour to match alum joinery  
 Provide warranty.

Refer to Roofing Plan for Rainwater Calculations.  
 Install to manufacturers requirements

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	PROJECT	NOT FOR CONSTRUCTION	ISS DATE NOTE

ASSEMBLY  
 ARCHITECTS  
 LIMITED

GARAGE - LEGEND

90.01

B

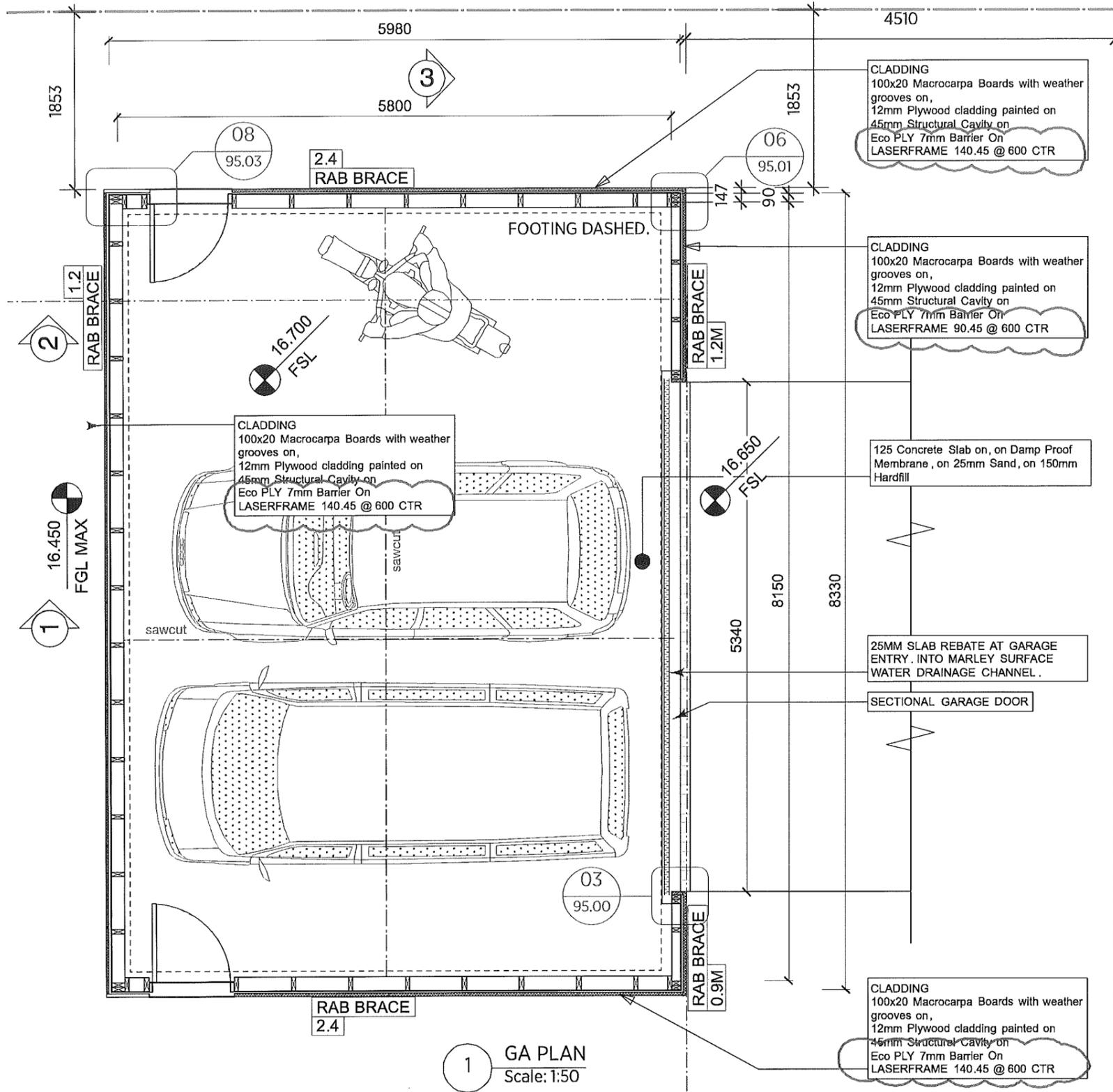
DRAWING NUMBER REV

1307\_Garage\_R0\_01\_BC\_RFI\_V02

BUILDING COMPLIES WITH KCDC DISTRICT PLAN  
REQUIREMENTS FOR ACCESSORY BUILDING SETBACKS

REVISIONS  
01/04/2015  
FRAMING SIZE AND CTRS REVISED AS PER CHH DESIGN-IT SPECIFICATION

02 APR 2015



BC 150134

REVISED INFORMATION  
2/4/15

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GARAGE - GENERAL ARRANGEMENT **91.00** **B**

DRAWING NUMBER REV

1307\_Garage\_RD\_01\_BC\_RFI\_V02

BC 150134

Overflow from the water storage tank is to be run to a suitably sized soakpit.

APPROVED BY  
PLUMBING AND DRAINAGE  
Simon C  
20/3/2015

REVISED INFORMATION  
2/4/15

02 APR 2015

RAFTERS: HYJOIST 240.63 @ 400 CTRS.  
REFER CHH HYJOIST MANUAL FOR INSTALLATION DETAILS.

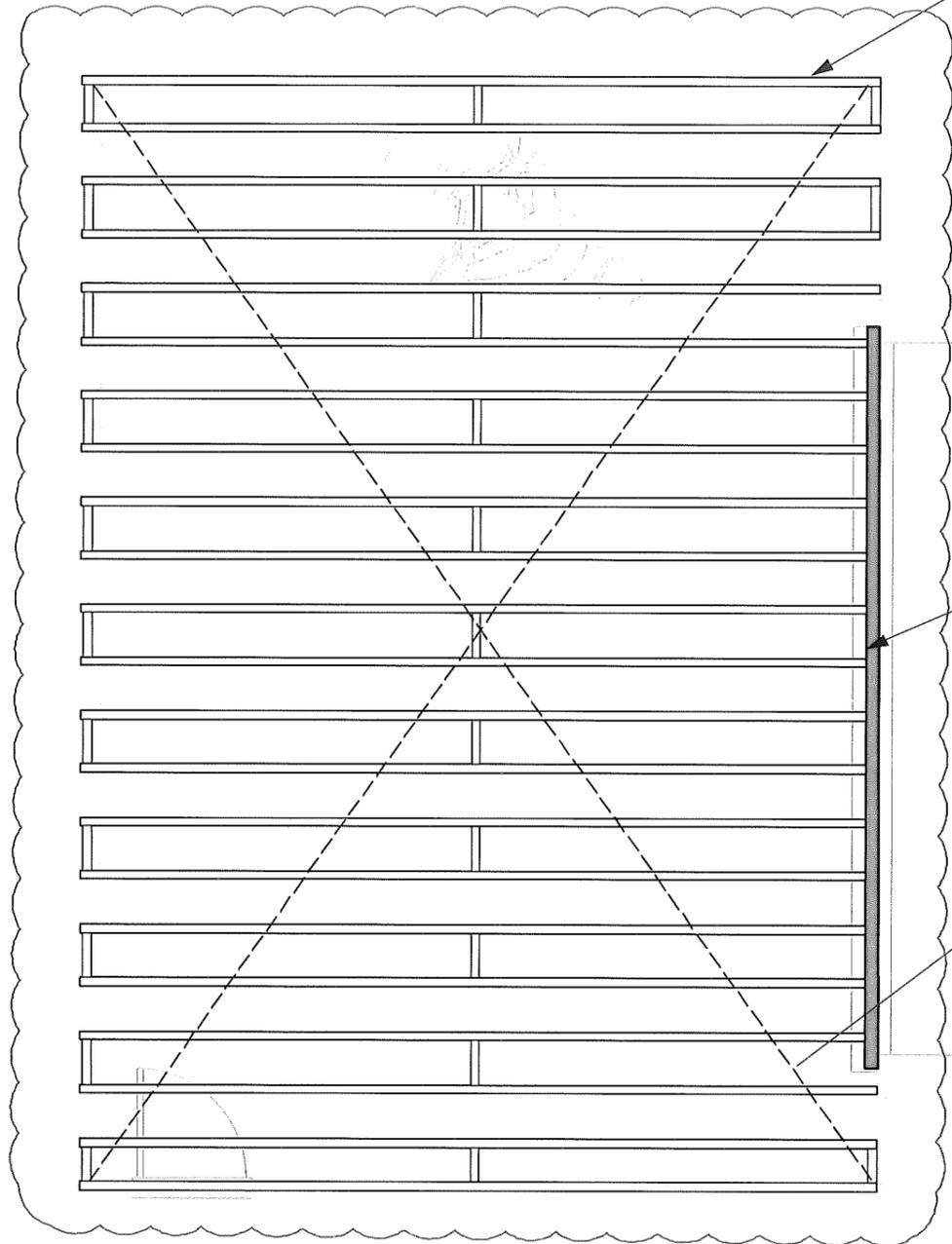
LATERAL RESTRAINT AT MID SPAN .DETAIL R17 & R18 SUPPORT & TIE DOWN .DETAILS R10,R11,R13. (2/35\*3.15 FH NAILS PER END).  
DETAIL R14 (4/35\*3.15 FH NAILS PER MULTGRIP TAB).  
SUPPORT MEMBER J5 OR BETTER.

TIE DOWN: LOOPED STEEL STRAP . 27\*0.55, LOOPED OVER AND NAILED TO SUPPORTS WITH 2/35\*3.15 FH NAILS EACH END).

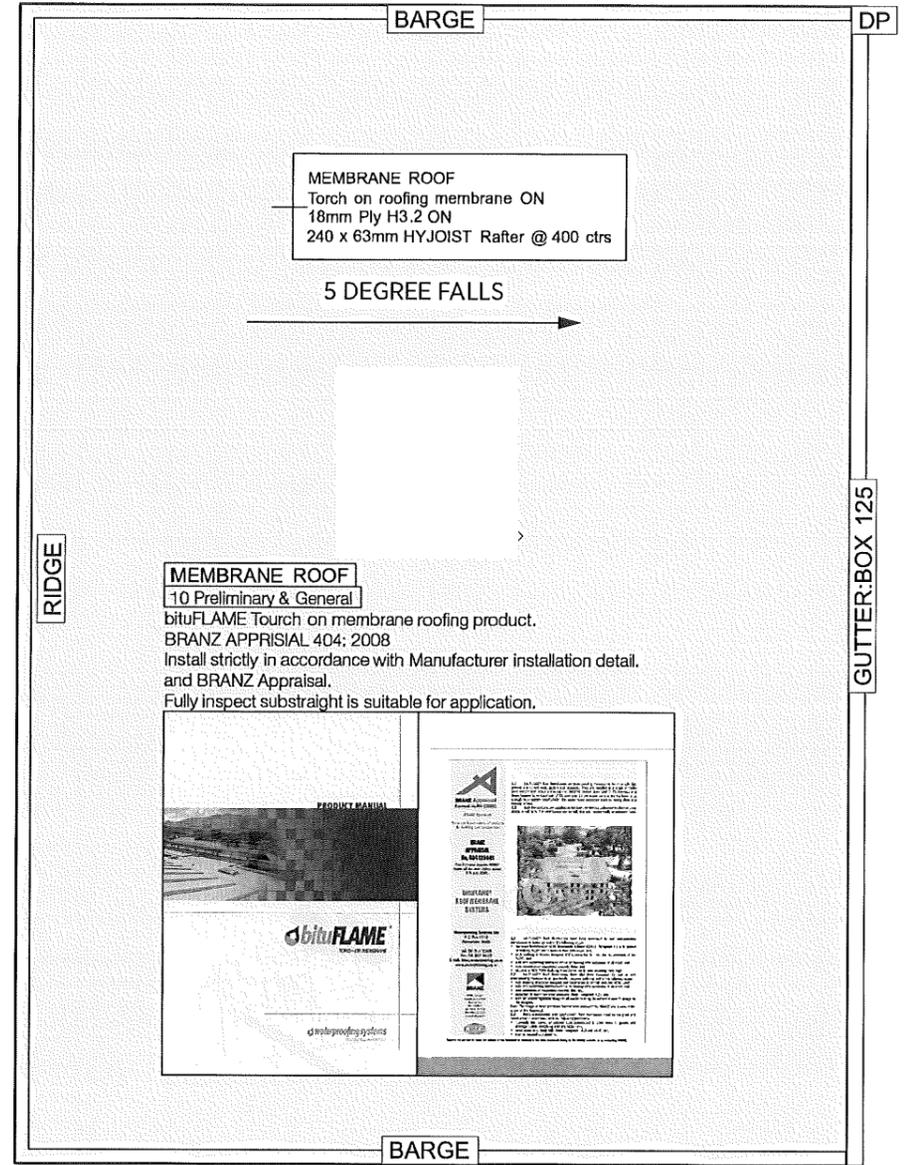
LINTEL  
400\*63 HYSpan .  
SPAN 5.5M

Revision 2/04/15  
Ceiling Diaphragm , as per NZS 3604.  
GIB 13 Ceiling Diaphragm on Rondo 308 @ 600 ctrs  
Rondo Direct screw fixed to rafters. No Clips.  
Rondo perimeter channel (142) direct fixed to top plate.  
Install as per GIB Manufacturers recommendations and Bracing Guide.

NIWA RAINFALL INTENSITY:  
80 MM/HR  
CATCHMENT AREA < 60 M2  
  
BOX 125 GUTTER AND 80MM DIA DOWNPIPE SUITABLE .  
DESIGNED TO E1/AS1 SECTION 5.  
  
CONNECTION TO SITE RAINWATER COLLECTION TANK.



1 ROOF FRAMING  
Scale: 1:50



LAP MEMBRANE DOWN WALL  
Lap roofing membrane down all walls 150mm.

2 ROOFING PLAN  
Scale: 1:50

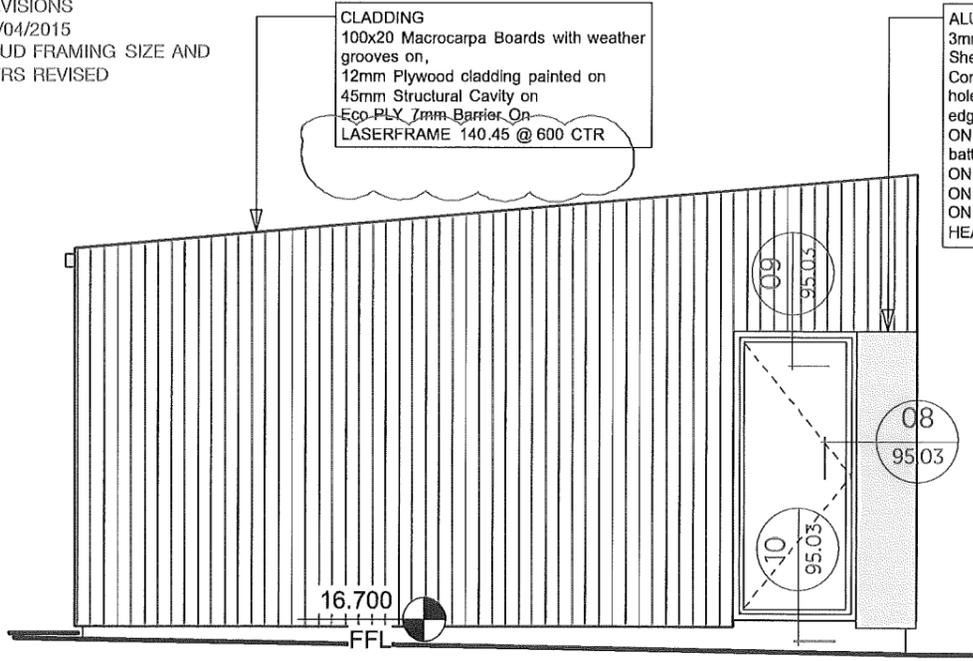
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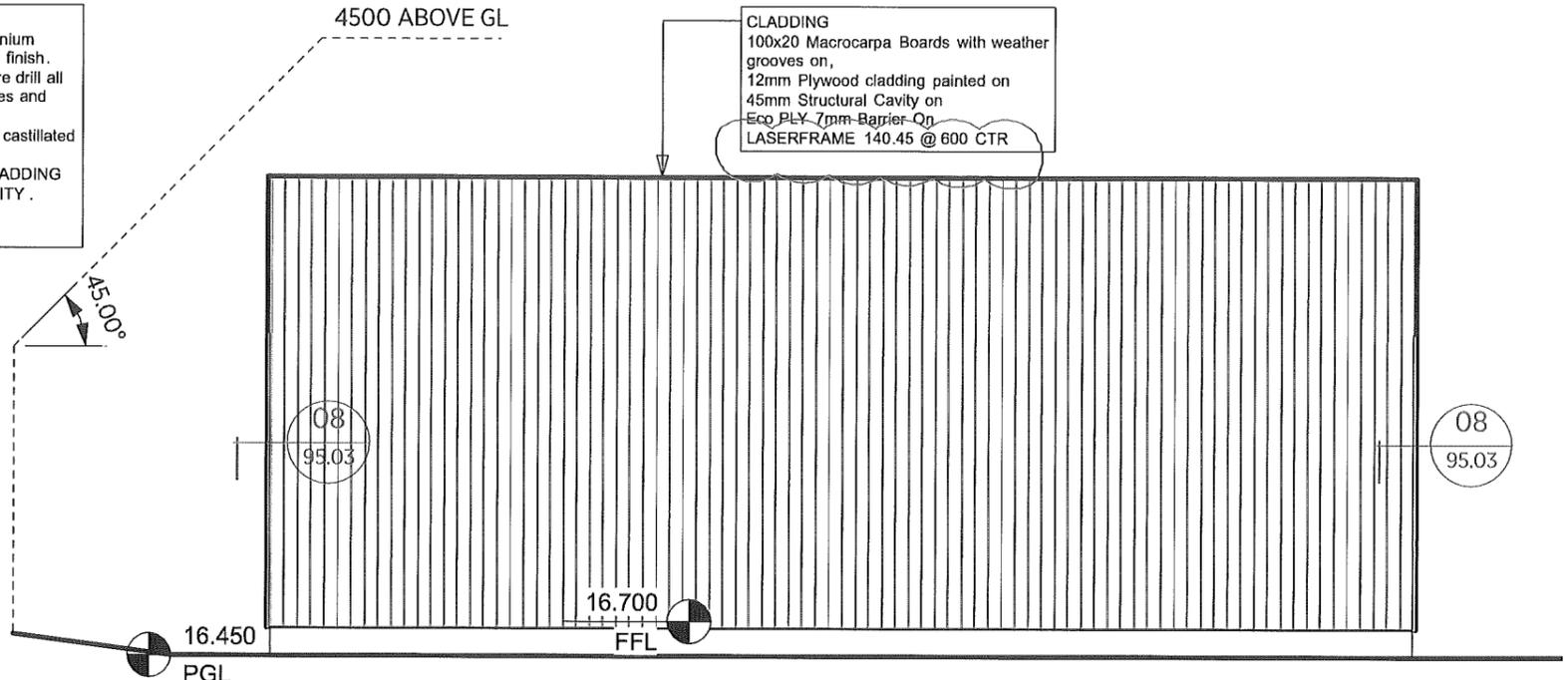
GARAGE - ROOFING		91.01	B
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1307\_Garage\_WD\_01\_BC\_RFI\_V02

REVISIONS  
01/04/2015  
STUD FRAMING SIZE AND  
CTRS REVISED



3 NORTHEAST  
Scale: 1:50

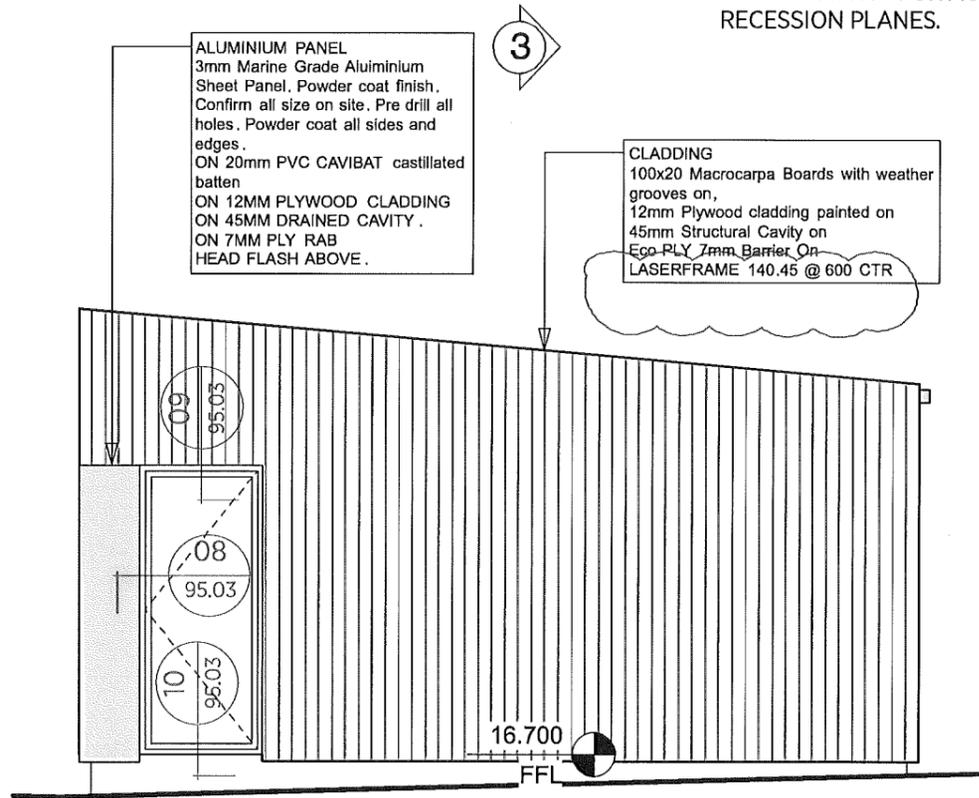


4 NORTHWEST  
Scale: 1:50

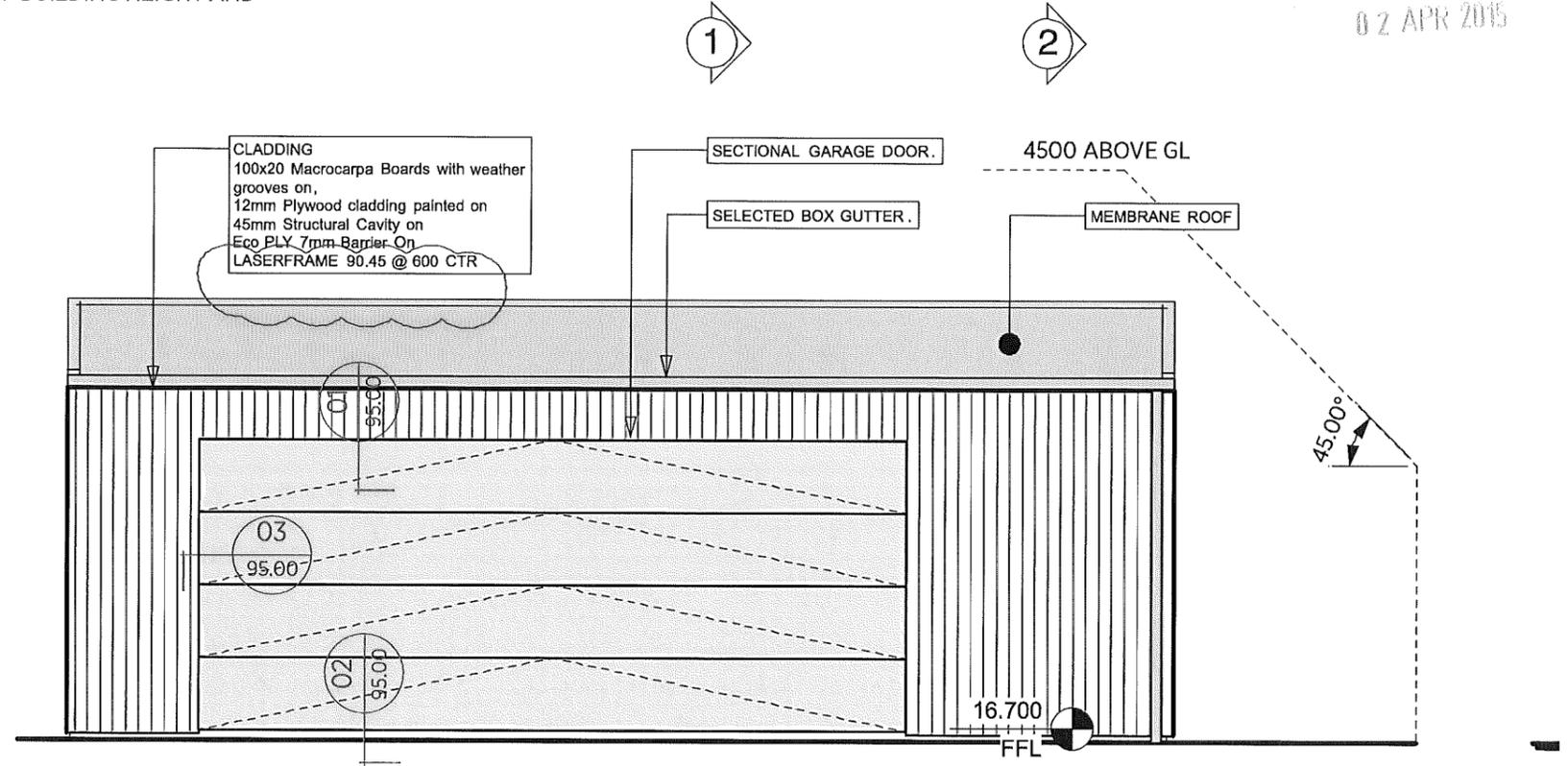
BUILDING HEIGHT COMPLIES WITH KCDC DISTRICT PLAN  
REQUIREMENTS FOR ACCESSORY BUILDING HEIGHT AND  
RECESSION PLANES.

REVISED INFORMATION  
2/4/15

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1 SOUTHWEST  
Scale: 1:50



2 SOUTHEAST  
Scale: 1:50

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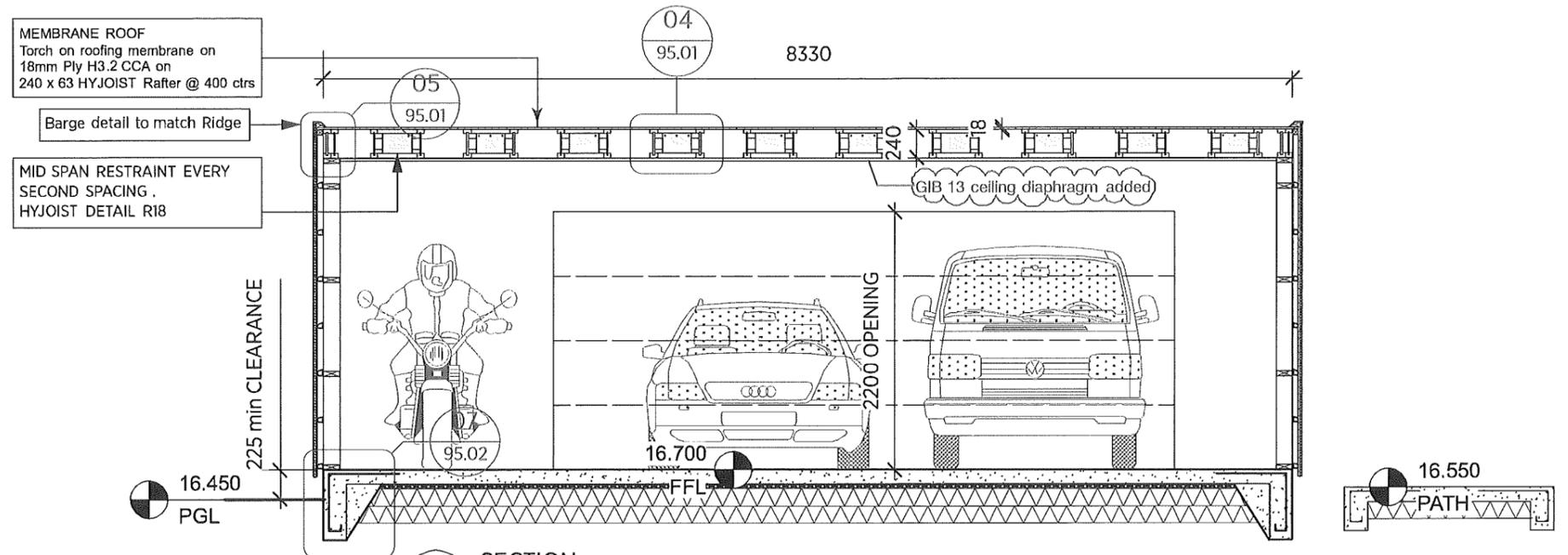
GARAGE - ELEVATIONS		93.00	B
DRAWING	NUMBER	REV	

BUILDING HEIGHT COMPLIES WITH KCDC DISTRICT PLAN REQUIREMENTS FOR ACCESSORY BUILDING HEIGHT AND RECESSION PLANES.

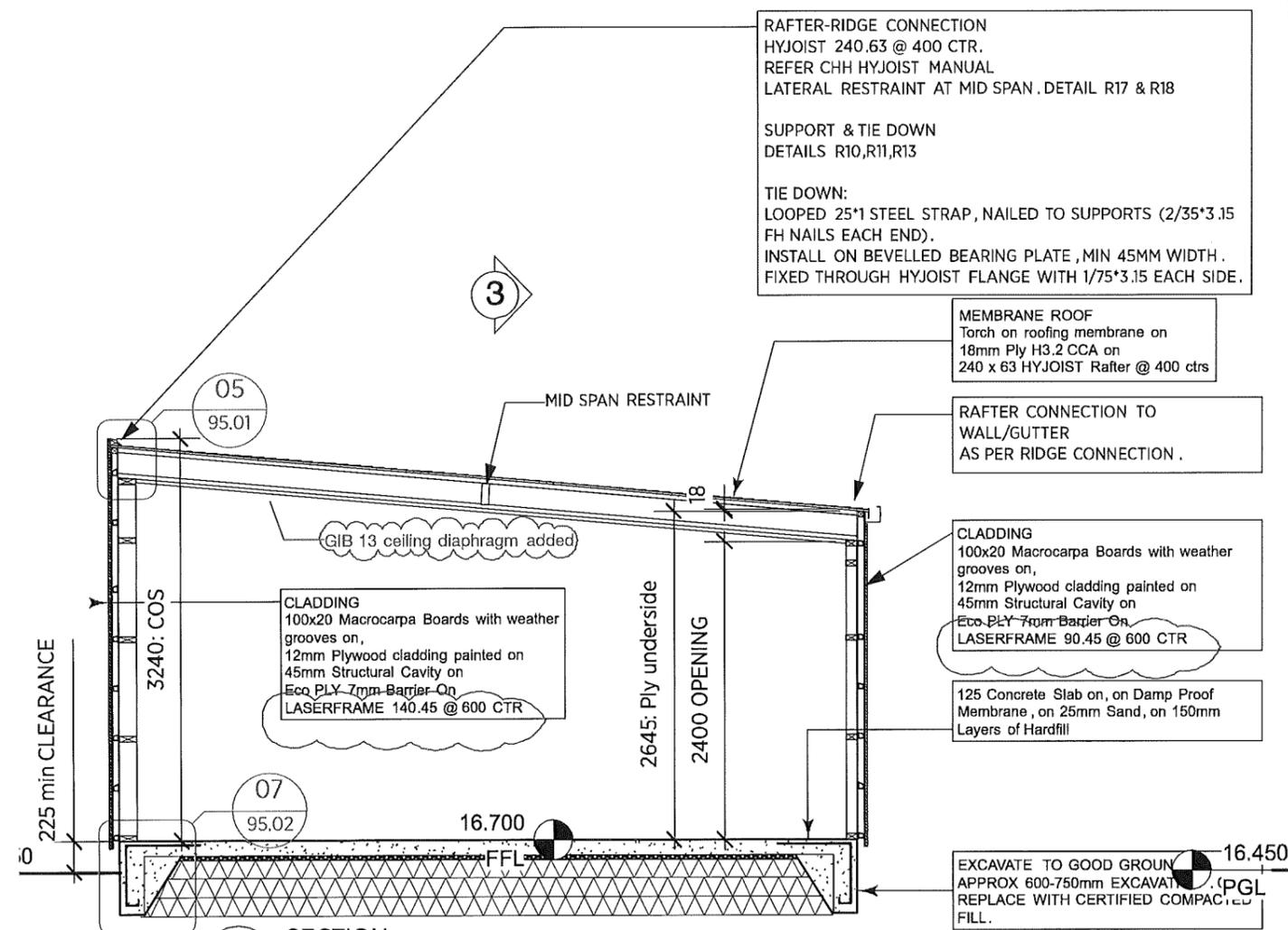
REVISIONS  
01/04/2015  
FRAMING SIZE AND CTRS REVISED  
ENGINEER NOTE REMOVED

BC 150134

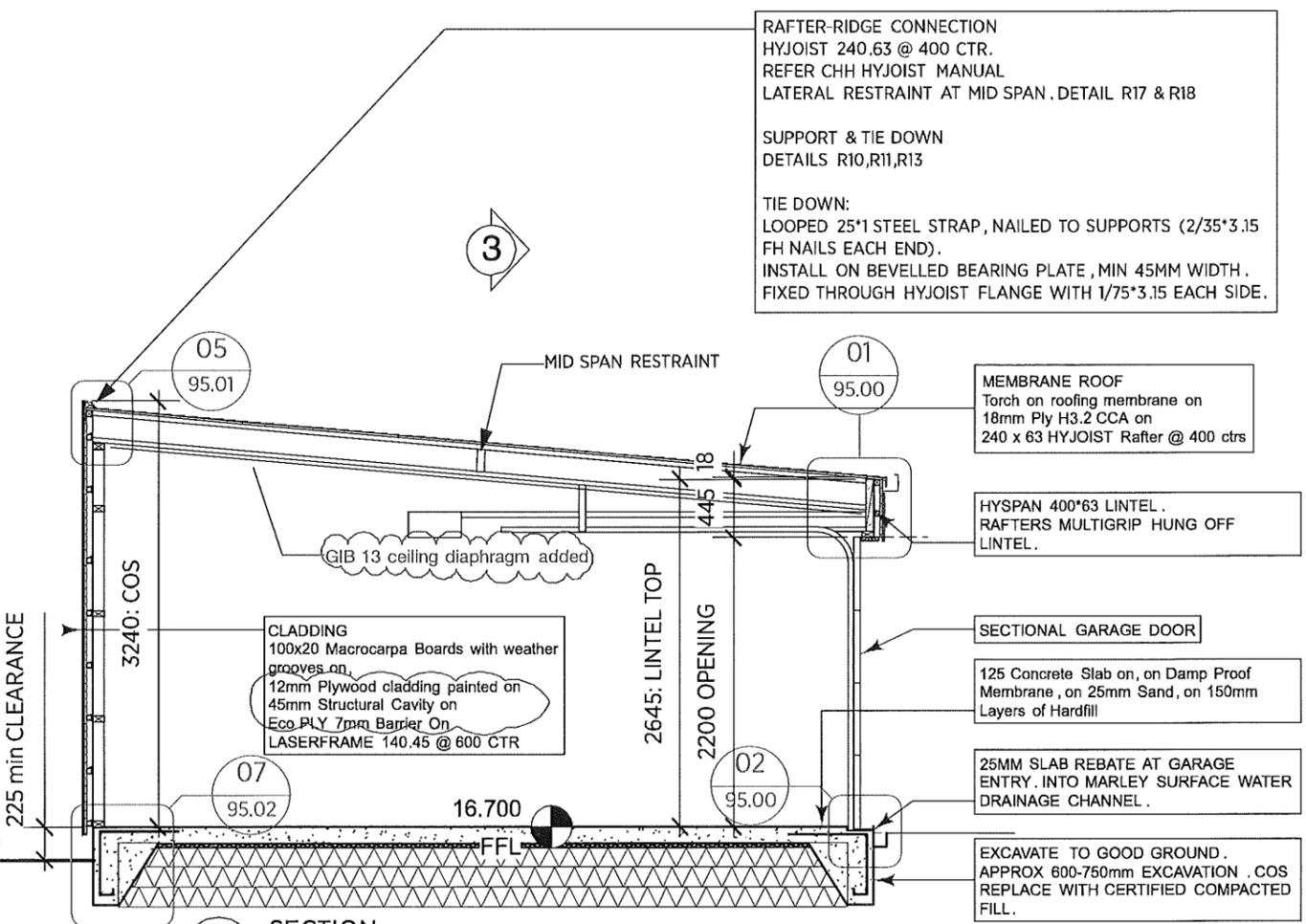
REVISED INFORMATION  
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3 SECTION  
Scale: 1:50



2 SECTION  
Scale: 1:50



1 SECTION  
Scale: 1:50

REV: ENGINEER NOTE REMOVED

REV: ENGINEER NOTE REMOVED

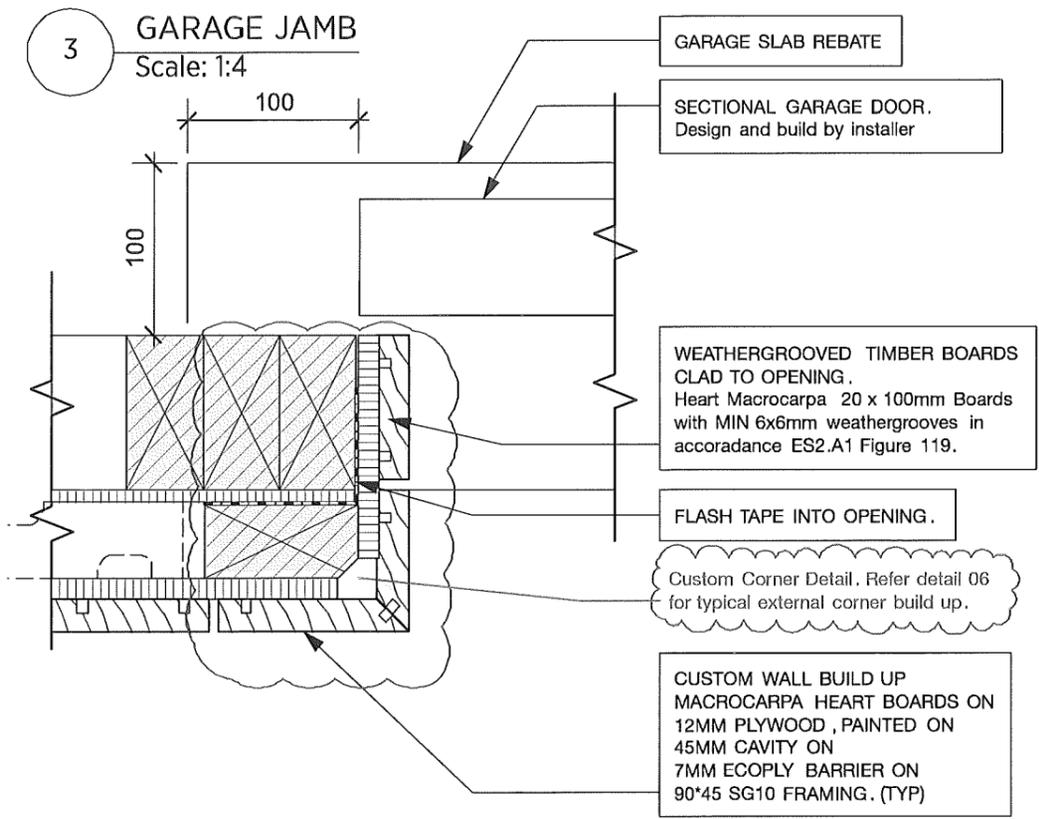
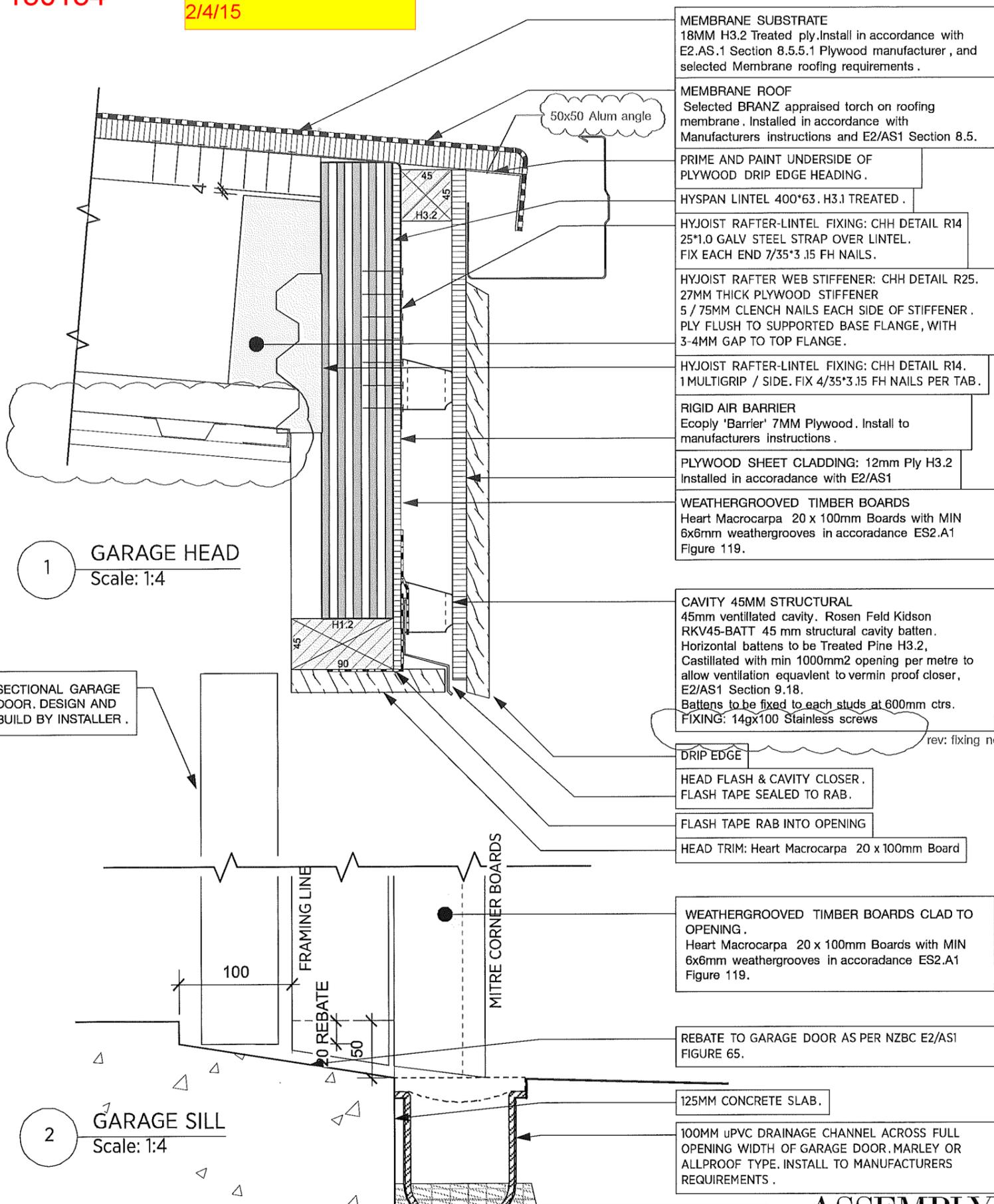
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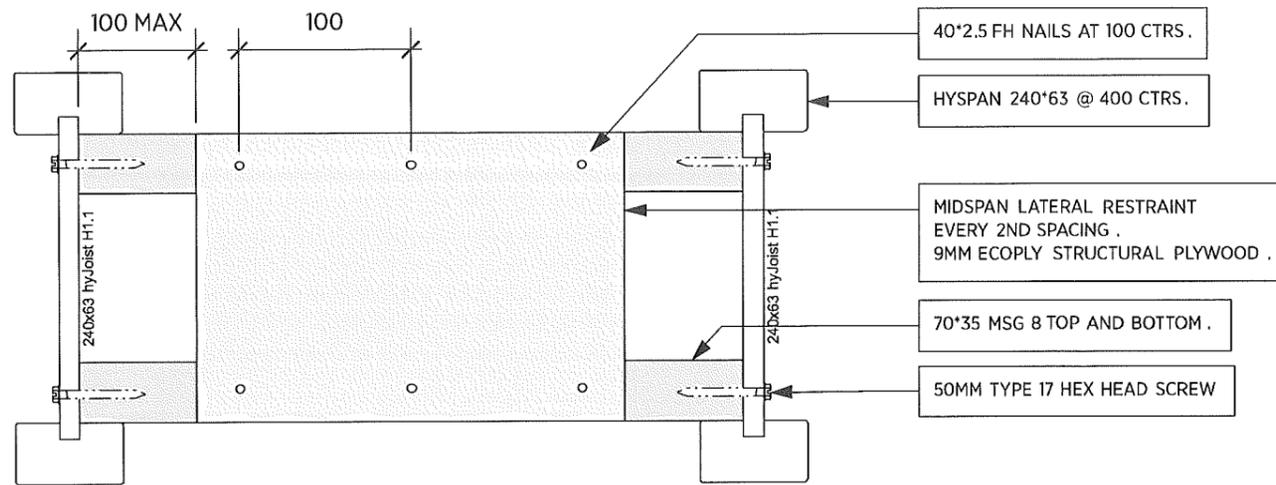
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GARAGE - SECTIONS		94.00	B
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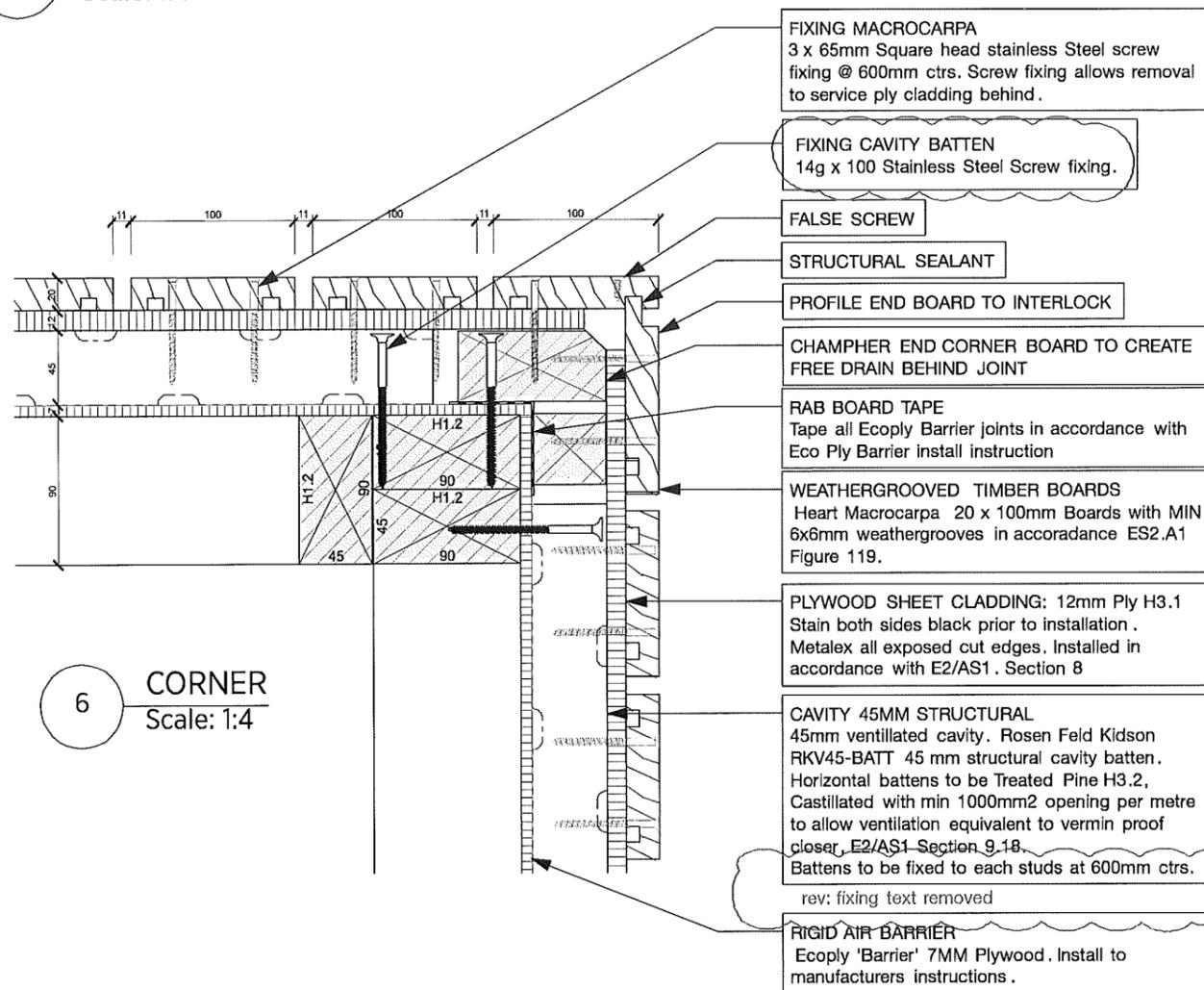
1307\_Garage\_RD\_01\_BC\_RFI\_v04







4 MIDSPAN BLOCK  
Scale: 1:4



6 CORNER  
Scale: 1:4

MEMBRANE SUBSTRATE 18MM H3.2 Treated ply. Install in accordance with E2.AS.1 Section 8.5.5.1 Plywood manufacturer , and selected Membrane roofing requirements .

MEMBRANE ROOF. Selected BRANZ appraised torch on roofing membrane . Installed in accordance with Manufacturers instructions and E2/AS1 Section 8.5.

Bituflame mineral chip finish to continue into void and down .

Bituflame bitumen sealant installed from a higher point in the external cap flashing falling down to the mineral chip finish as water shedding away from the infilled cavity .

CAPPING TO BOARDS Ulrich UA 1573 25 x 25 x 1.4mm Aluminium Capping . Powder coat to match window joinery .

cavity closer batten

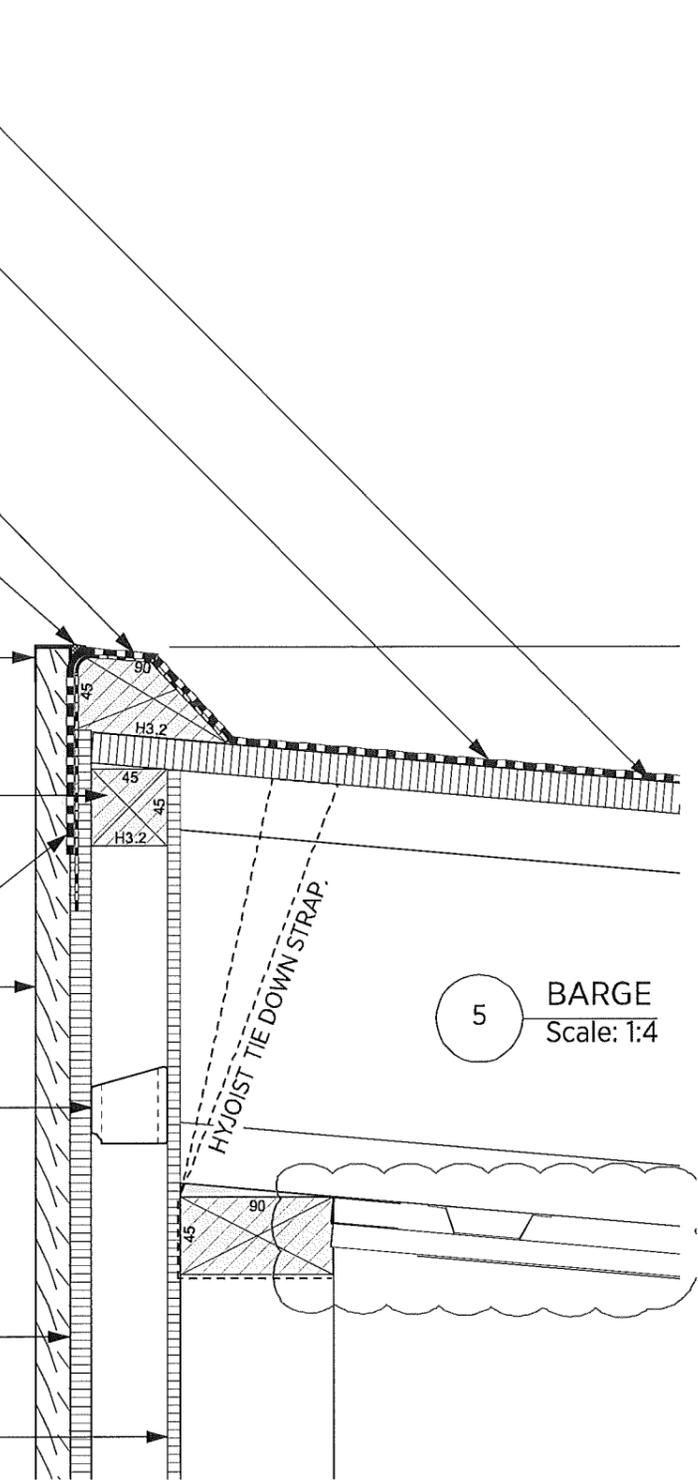
LAP MEMBRANE DOWN WALL Lap roofing membrane down wall 150mm . Rebate out of ply cladding . Metalex exposed face .

WEATHERGROOVED TIMBER BOARDS Heart Macrocarpa 20 x 100mm Boards with MIN 6x6mm weathergrooves in accordance ES2.A1 Figure 119.

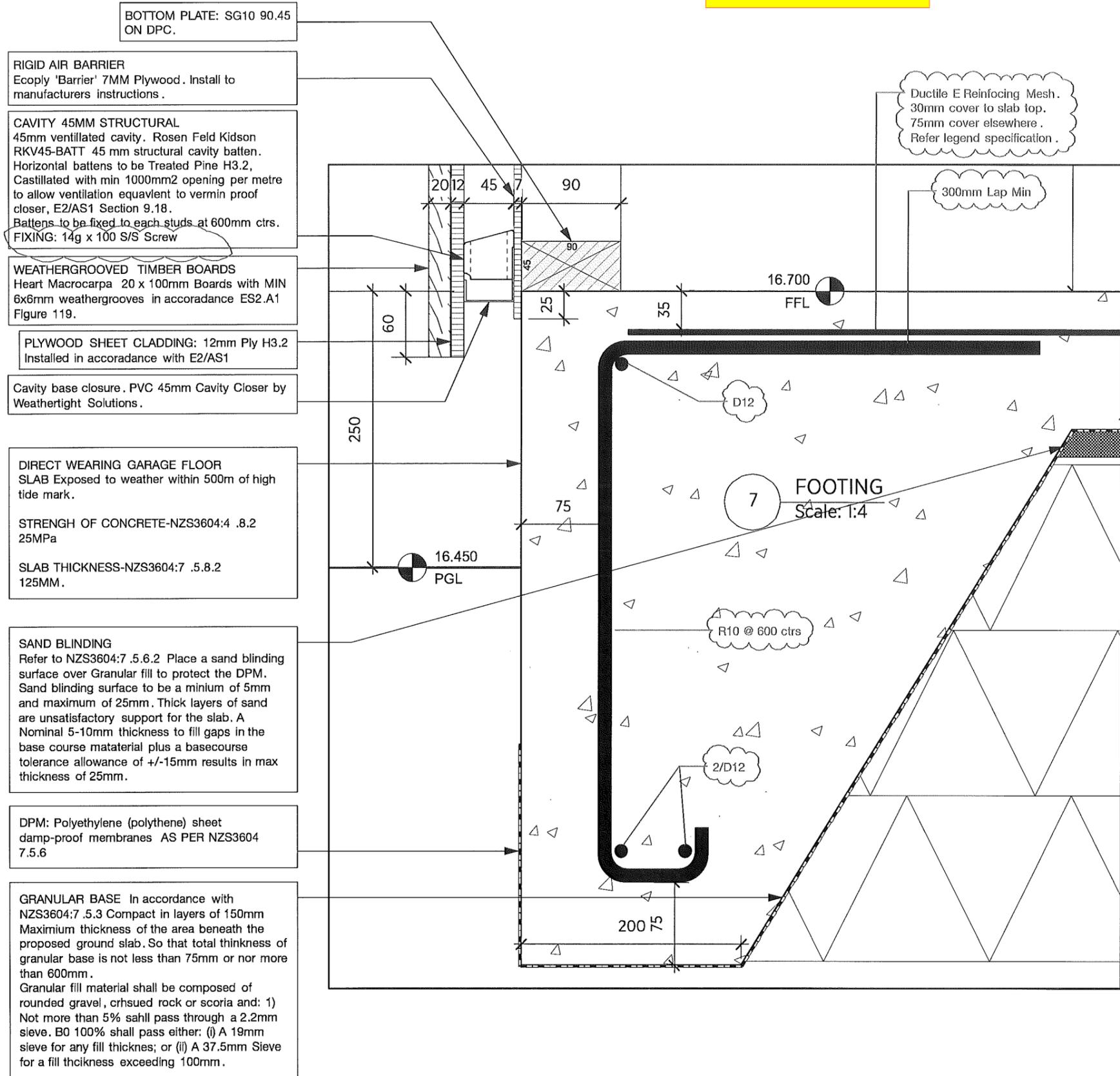
CAVITY 45MM STRUCTURAL 45mm ventilated cavity. Rosen Feld Kidson RKV45-BATT 45 mm structural cavity batten. Horizontal battens to be Treated Pine H3.2, Castillated with min 1000mm2 opening per metre to allow ventilation equivalent to vermin proof closer, E2/AS1 Section 9.18. Battens to be fixed to each studs at 600mm ctrs. FIXING: 14g x 100 S/S Screws

PLYWOOD SHEET CLADDING: 12mm Ply H3.2 Installed in accordance with E2/AS1

RIGID AIR BARRIER Ecoply 'Barrier' 7MM Plywood. Install to manufacturers instructions .



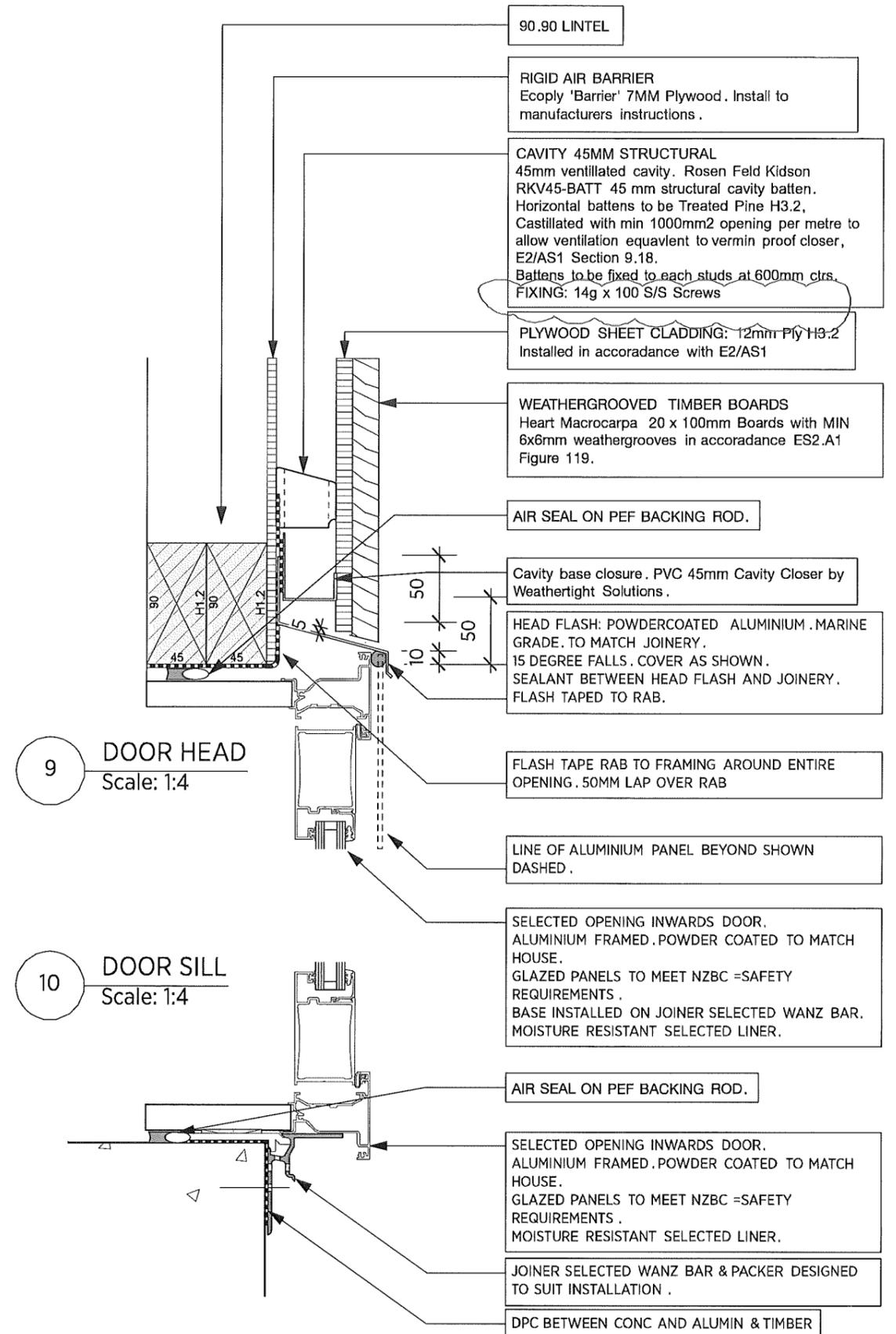
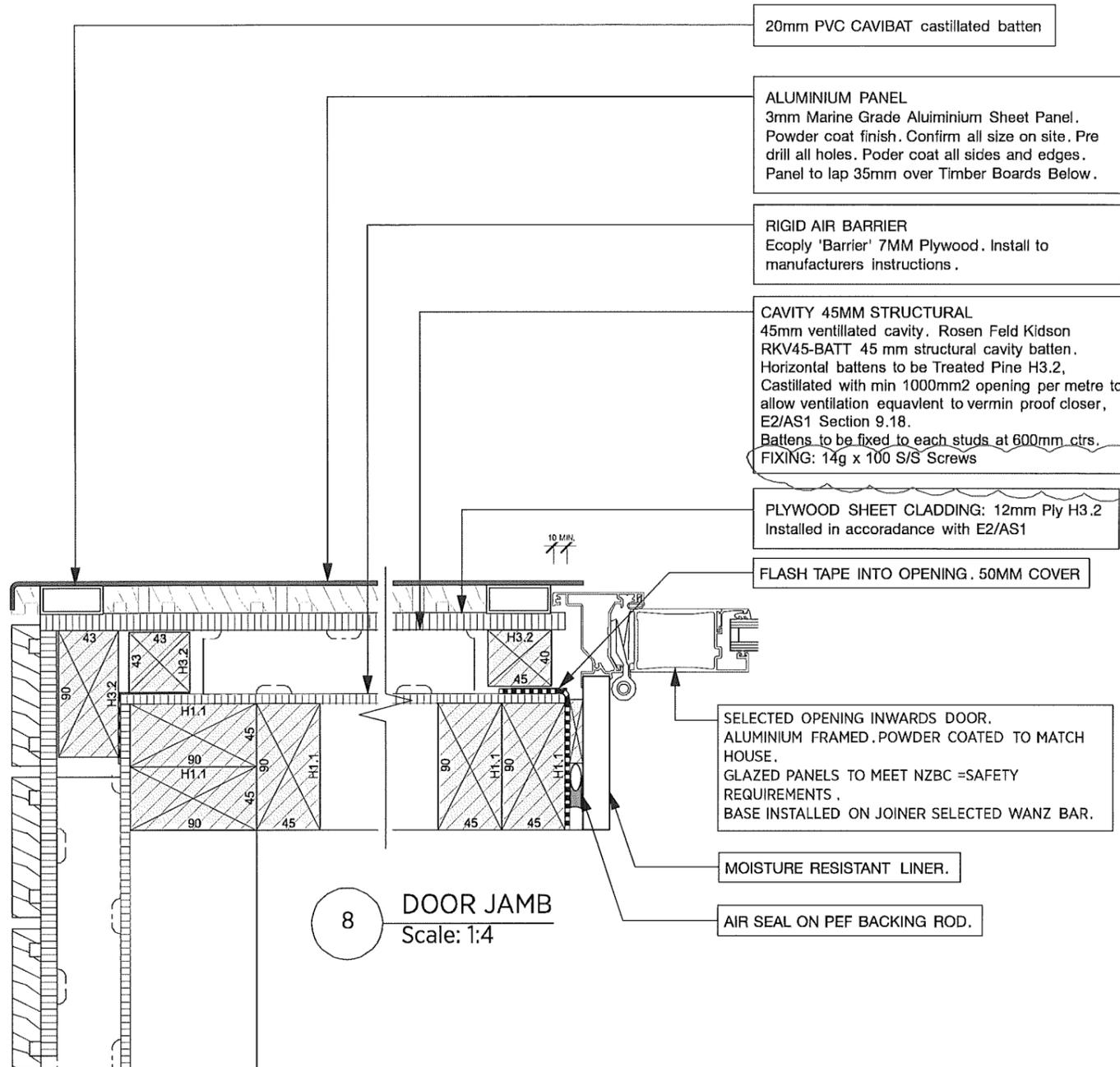
5 BARGE  
Scale: 1:4



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GARAGE - DETAILS		95.02	B
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GARAGE - DETAILS		95.03	B
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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 (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, 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.

#### References:

NZS 3603:1993 Timber Structures Standard. AS/NZS 1170:2002 Structural design actions, Parts 0 and 1.  
 NZS 3604:2011 Timber-framed buildings. AS/NZS 1170:2011 Structural design actions, Part 2: Wind actions.  
 AS 1720.1 – 2010 Timber structures. Part 1: Design methods. AS/NZS 1170:2003 Structural design actions, Part 3: Snow and ice actions.  
 AS 1684.1 – 1999 Residential timber framed construction. Part 1: Design criteria.

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 February 2015

For further information or advice please contact: Carter Holt Harvey Woodproducts New Zealand  
 173 Captain Springs Road, Onehunga. Auckland  
 Telephone 0800 808 131  
 Facsimile 0800 808 132  
 Email: designit@chhwoodproducts.co.nz

#### Specifier details:

<b>Specifier:</b>	Assembly-James Norman	
<b>Business name:</b>	Assembly Architects Limited	
<b>Address:</b>	6 Arrow Lane, Arrowtown	
<b>Email:</b>	james@assembly.co.nz	
<b>Phone:</b>	<b>Mobile:</b> 027 2308279	<b>Facsimile:</b>

#### Project & Site details:

<b>Project:</b>	Waikanae Garage	<b>Ref. no.:</b> -
<b>At (address):</b>	7 Tutere Street, Waikanae	
<b>For (owner/s):</b>	Jill and Shane O'Brien	
<b>Wind zone:</b>	Very high	
<b>Snow loading</b>	Snow Region: N1, Altitude: 20 m (sub-alpine), Ground snow load, S <sub>g</sub> = 0.0 kPa	

## MEMBER DESIGN DETAILS

### Member 1

- 1) **Member code and description** S1 - Studs - In single or upper storey load bearing walls
- 2) **Date prepared** 1/04/2015
- 3) **Serviceability criteria** AS 1720.1-2010 and AS 1684.1-1999
- 4) **Design inputs**
  - Stud height 2400 mm
  - Stud spacing 600 mm
  - Roof type and mass Light roof & ceiling - 40 kg/m<sup>2</sup>
  - Roof load width 'RLW' 3.0 m
  - Rafter or truss spacing 400 mm

### 5) Member specification

Size, stress grade/product  
Material type  
Assumed design density

Use 90 x 45 SG8 Laserframe  
Dry softwood, machine stress graded and verified (NZS 3622)  
< 480 kg/m<sup>3</sup>

**6) Serviceability**

Load case	Limit <sup>3</sup> on average deflection <sup>2</sup>	Estimated average deflection <sup>2</sup>	Rigidity ratio <sup>4</sup>
Wind load - W <sub>S</sub> *	16.0 mm	5.5 mm	$\frac{16.0}{5.5} = 2.90$

\*Critical serviceability load case

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

**7) Reactions**

Load case	k <sub>1</sub> <sup>1</sup>	Limit states design reaction <sup>2,3</sup>	
		End <sup>4</sup> kN	Horizontal kN
1.35G	0.60	-1.0	
1.2G + 1.5Q	0.80	-1.5	
1.2G + W <sub>U</sub> + Ψ <sub>C</sub> Q	1.00	-2.4	1.1
0.9G + W <sub>U</sub>	1.00	1.7	0.9

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

**8) Installation requirements**

Wall studs to be nogged at maximum 1350 mm  
Notching of wall stud not to exceed 20 mm

**Member 2**

**1) Member code and description** S2 - Studs - In single or upper storey load bearing walls

**2) Date prepared** 1/04/2015

**3) Serviceability criteria** AS 1720.1-2010 and AS 1684.1-1999

**4) Design inputs**

Stud height 3000 mm  
Stud spacing 600 mm  
Roof type and mass Light roof & ceiling - 40 kg/m<sup>2</sup>  
Roof load width 'RLW' 3.0 m  
Rafters or truss spacing 400 mm

**5) Member specification**

Size, stress grade/product Use 140 x 45 SG8 Laserframe  
Material type Dry softwood, machine stress graded and verified (NZS 3622)  
Assumed design density < 480 kg/m<sup>3</sup>

**6) Serviceability**

Load case	Limit <sup>3</sup> on average deflection <sup>2</sup>	Estimated average deflection <sup>2</sup>	Rigidity ratio <sup>4</sup>
Wind load - W <sub>S</sub> *	20.0 mm	6.1 mm	$\frac{20.0}{6.1} = 3.31$

\*Critical serviceability load case

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

**7) Reactions**

Load case	k <sub>1</sub> <sup>1</sup>	Limit states design reaction <sup>2,3</sup>	
		End <sup>4</sup> kN	Horizontal kN
1.35G	0.60	-1.0	
1.2G + 1.5Q	0.80	-1.5	
1.2G + W <sub>U</sub> + Ψ <sub>C</sub> Q	1.00	-2.4	1.4
0.9G + W <sub>U</sub>	1.00	1.7	1.1

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

- 8) Installation requirements                      Wall studs to be nogged at maximum 1350 mm  
Notching of wall studs is not permitted.

**Member 3**

- 1) Member code and description                      R1 - Common rafters
- 2) Date prepared    1/04/2015
- 3) Serviceability criteria                                      AS 1720.1-2010 and AS 1684.1-1999
- 4) Design inputs
- Span    6.0 m - single
- Maximum rafter spacing                                      400 mm
- Roof mass    30 kg/m<sup>2</sup>

- 5) Member specification
- Size, stress grade/product                                      Use HJ240 63 hyJOIST

6) Serviceability

Load case	Limit <sup>3</sup> on average deflection <sup>2</sup>	Estimated average deflection <sup>2</sup>	Rigidity ratio <sup>4</sup>
Long term load - G+Ψ <sub>L</sub> Q *	20.0 mm	9.2 mm (long term)	$\frac{20.0}{9.2} = 2.17$

\*Critical serviceability load case

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

7) Reactions

Load case	k <sub>1</sub> <sup>1</sup>	Limit states design reaction <sup>2,3</sup>	
		End <sup>4</sup> kN	
1.35G	0.60	-0.7	
1.2G + 1.5Q	0.80	-2.3	
1.2G + W <sub>U</sub> + Ψ <sub>C</sub> Q	1.00	-1.6	
0.9G + W <sub>U</sub>	1.00	1.6	

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

- 8) Installation requirements                      Support and tie-down - Details R10, R11, R13 (2/35 x 3.15 FH nails per end)  
& R14 (4/35x3.15 FH nails/multigrip tab), supporting member J5 or better.  
Provide lateral restraint at mid-span - Detail R17 & R18.

**Member 4**

1) Member code and description L1 - Lintels - In single or upper storey load bearing walls

2) Date prepared 1/04/2015

3) Serviceability criteria AS 1720.1-2010 and AS 1684.1-1999

## 4) Design inputs

Span 5.5 m  
Roof load width 'RLW' 3.0 m  
Roof type and mass Light roof & ceiling - 40 kg/m<sup>2</sup>

## 5) Member specification

Size, stress grade/product Use 400 x 63 hySPAN  
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

## 6) Serviceability

Load case	Limit <sup>3</sup> on average deflection <sup>2</sup>	Estimated average deflection <sup>2</sup>	Rigidity ratio <sup>4</sup>
Long term load - $G + \psi_L Q$ *	10.0 mm	7.3 mm (long term)	$\frac{10.0}{7.3} = 1.36$

\*Critical serviceability load case

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

## 7) Reactions

Load case	$k_1$ <sup>1</sup>	Limit states design reaction <sup>2,3</sup>
		End <sup>4</sup> kN
1.35G	0.60	-5.0
1.2G + 1.5Q	0.80	-7.5
1.2G + $W_U + \psi_C Q$	1.00	-11.3
0.9G + $W_U$	1.00	10.2

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

8) Installation requirements Provide at least 30 mm bearing at end supports

## Notes for interpretation of serviceability data

- "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/NZS 1170, AS 1684.1 and AS 1720. Deflections calculated using this methodology cannot therefore be usefully compared with deflections calculated using other methods, eg GLTAA design methodology.
- 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/NZS 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!
- The limits referred are those specified in AS 1684.1 for the stated load case.
- 'Rigidity ratio' expresses the rigidity of the specified beam relative to the rigidity of a notional beam just meeting the serviceability requirements of AS 1684.1

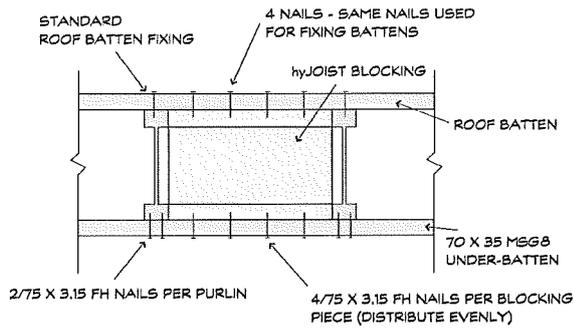
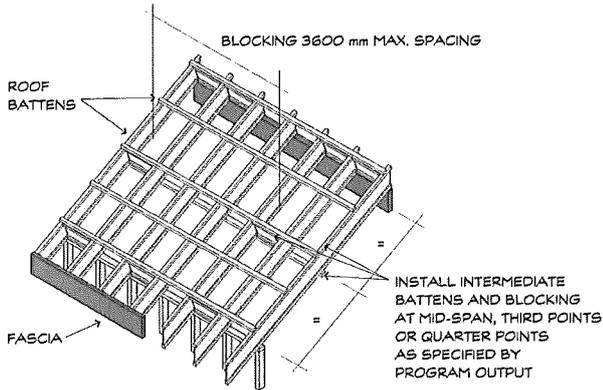
## Notes for interpretation of reaction data

- Duration of load factor ' $k_1$ ' for strength as per NZ 3603:1993

2. Negative (-) reactions relate to the 'gravity' or 'downwards' force on the support
3. Positive reactions relate to the 'upwards' forces or 'tie-down' requirement on the support
4. End reaction includes allowance for overhang/cantilever where one has been designed

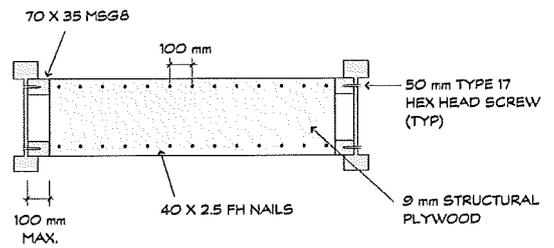
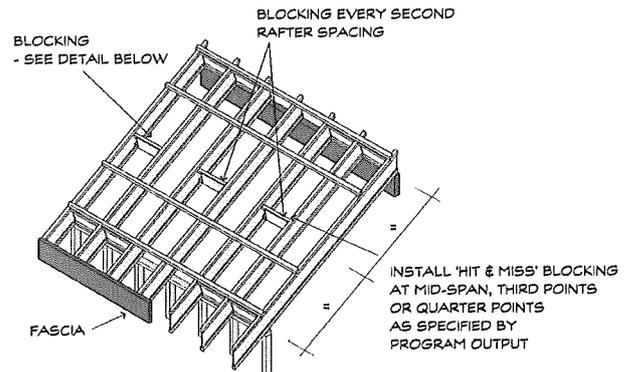
02 APR 2015

Intermediate lateral restraint for rafters  
- using battens and blocking



DETAIL R17

Lateral restraint for rafters  
- using 'hit and miss' blocking



DETAIL R18

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FILE: 1307  
7 Tutere St, Waikanae-

02 APR 2015

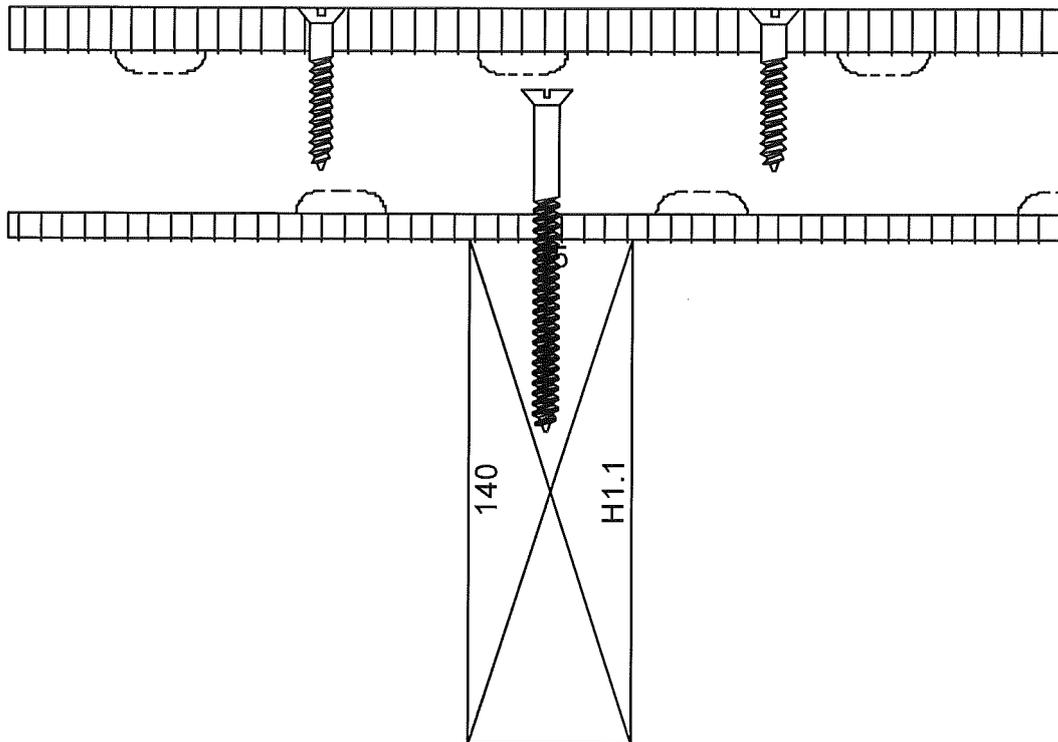
Tuesday, 10 December 2013

## E2 / AS1 Alternative solution.

The proposed cladding system is an alternative solution cladding system to E2/AS1.

E2/AS1 9.1.8.2 Requires a vertical cavity batten. This alternative solution uses a 45mm Horizontal Cavity batten. The propose solution provides a equal if not better performing cladding system in comparison to E2/AS1. The proposed cavity system uses a Structural Castillated Batten to form a 45mm ventilated cavity.

A structural cavity has a clear advantage over the E2/AS1 solution in that the cladding fixings do not penetrate the rigid air barrier or structural timber framing. There is NO direct path of water from the weather exposed face to the structural frame. The structural cavity batten is a product supplied as part of the Rosen Feld Cedar Screen Cladding System.



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LIMITED

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The plywood cladding it self is installed as per E2/AS1 in compliance with all flashings covers.. The flashing thickness in general exceeds the min thickness requirements.

**SPECIFIC DESIGN FLASHING SYSTEM**

A custom double flashing system has been designed to provide improved protection to the head and jamb weather seals by means of rebating the windows into the wall. The inner layer flashing system is compliant with E2/AS1 Fig 72A direct fix requirements. The secondary layer complies with all minim cladding flashing junction requirements. The extend head flashing will provide the greatest level of protection by preventing any face loaded water coming in contact with the window head junction.

**DURABILITY B2**

The site is subject to wind driven salt and sand spray.

A third layer of protection is provided by a 20mm thick layer of Macrocarpa boards over the top of the plywood. This provide increased protection to the ply wood & stain from exposure to sunlight and salt spray. The application of weather grooved boards is as per E2/AS1 Fig 119.

This specific Design Cladding System thus complies with the performance requirements of the New Zealand Building Code.

Yours sincerely

**Justin Wright**  
**Registered Architect**

021 565 363 [justin@assembly.co.nz](mailto:justin@assembly.co.nz)

BC 150134

02 APR 2015

**WALL / FLOOR FRAMING:**  
Refer to GA Drawings and Sections for Framing Details .

**FLEXIBLE FLASHING TAPE**  
BRANZ Appraised & Ecoply Approved . Install to manufacturers instructions . Install to Vertical Sheet Joints of RAB Board .

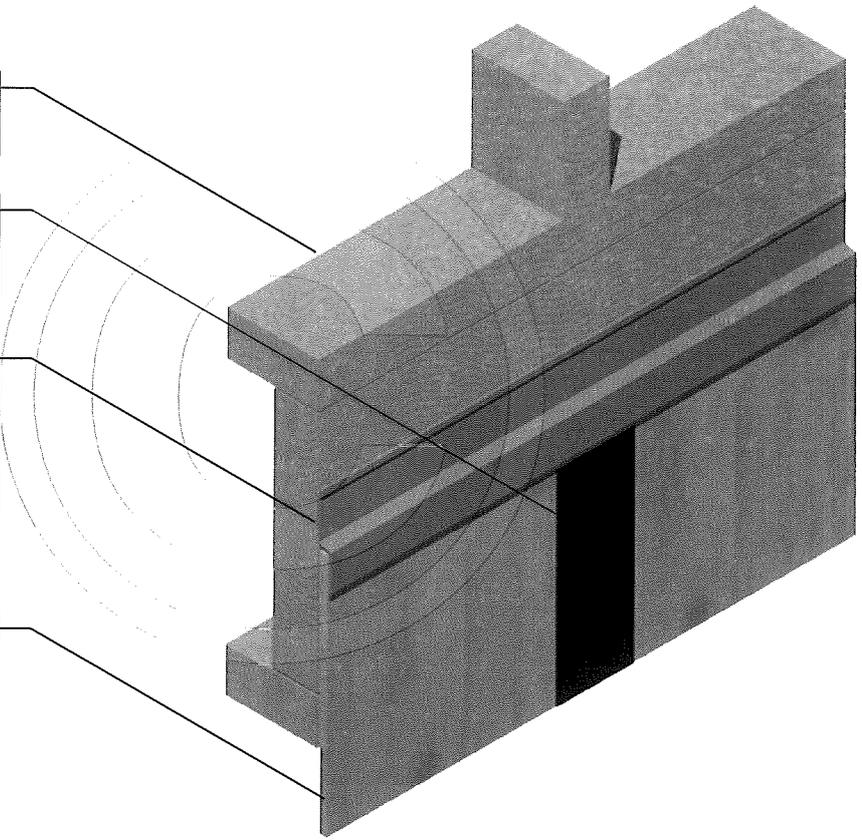
**Z FLASHING:**  
Ecoply Barrier Horizontal Z Flashing . uPVC .  
Install to Manufacturers Requirements .  
  
35mm Min Cover to RAB above and below .  
  
Maintain 15mm expansion gap between Plywood sheet joints .

**RIGID AIR BARRIER**  
Compliant with requirements of NZBC E2, 9.1.7.2.  
Ecoply Barrier , Structural Plywood Rigid Air Barrier ,  
meets the NZ Building Code rigid sheathing  
performance requirements as outlined in Section  
9.1.4 and Table 23 of E2/AS1 , when installed as  
per manufacturers requirements .

**SHEET JOINTS:**  
Vertical joint: 2mm Gap . Sealed with Ecoply Barrier  
Sealing Tape .  
Horizontal Joints: 15mm Gap . Use EcoBarrier PVC  
Z Flashing

**CUT SHEETS:**  
Where a sheet end is cut, place the cut end to the  
top. Always have a sealed sheet end at the bottom  
to avoid potential moisture ingress into the panel .  
All other cuts and penetrations must be covered by  
a suitable flexible flashing tape and installed as per  
Ecoply Barrier literature . (If brush on preservative  
treatment used, use Holdfast Metalex end seal) .

**FIXINGS:**  
As Per Manufacturer Requirements . Stainless Steel  
Annular grooved Nails in Sea Spray Environments .  
Power Driven: 50 x 2.8.  
Hand Driven: 40 x 2.5.

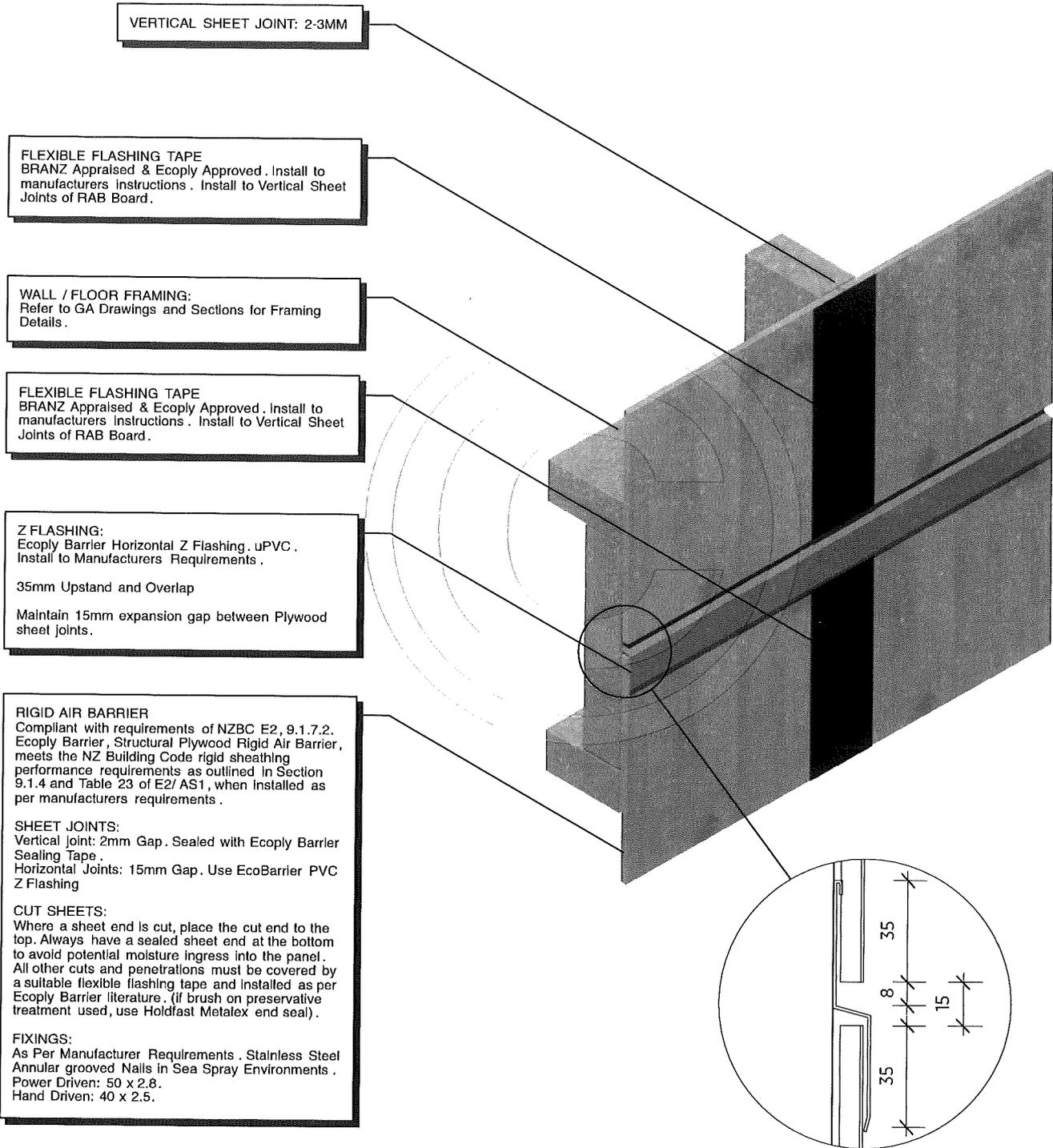


TYPICAL RAINDSCREEN DETAIL RAB INSTALL  
REVISION A 3D DETAIL 10  
04 / 12 / 2013

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FLASH OPENING

RAB JOINT

TYPICAL RAINSCREEN DETAIL

REVISION A 3D DETAIL 11  
04 / 12 / 2013

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**VERTICAL CAVITY BATTEN**  
45 x 45 Cavity Battens, forming nominal 45mm Cavity.  
Vertical at Sheet Cladding Vertical Joints, over Stud.

Forms drained and ventilated Cavity meeting requirements of NZBC E2, 9.1.8.

H3.2 Treated to meet requirements for 50 year durability as per B2/AS1 TABLE 1.

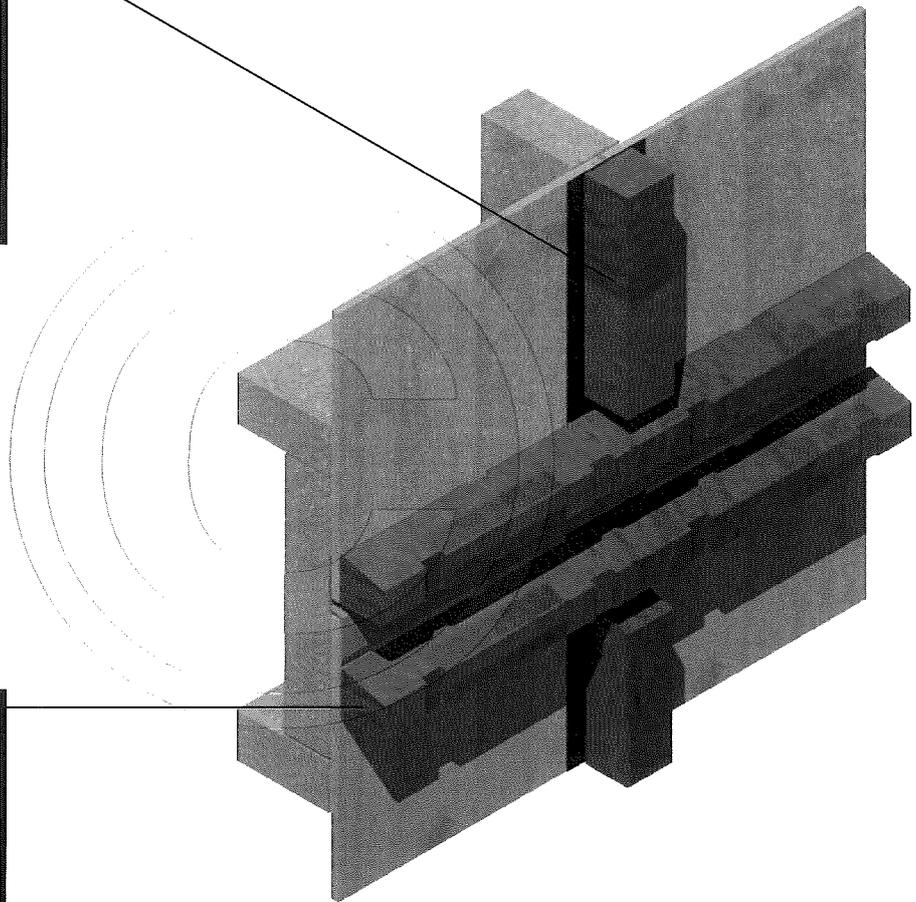
Cladding Fixed to Cavity Battens, not framing.  
Hence Structural Battens.  
Fixings into framing by Structural Engineer.

**CASTELLATED CAVITY BATTEN**  
Structural Cavity Battens, forming nominal 45mm Cavity. Castellated Battens with 15 Degree Falls to Top surface and drip edge to base.

Install Horizontally @ 600 Ctrs. Forms drained and ventilated Cavity meeting requirements of NZBC E2, 9.1.8.

H3.2 Treated to meet requirements for 50 year durability as per B2/AS1 TABLE 1.

Cladding Fixed to Cavity Battens, not framing.  
Hence Structural Battens.  
Fixings into framing 14g x 100 stainless steel screws



TYPICAL RAINSCREEN DETAIL

CAVITY FORMATION

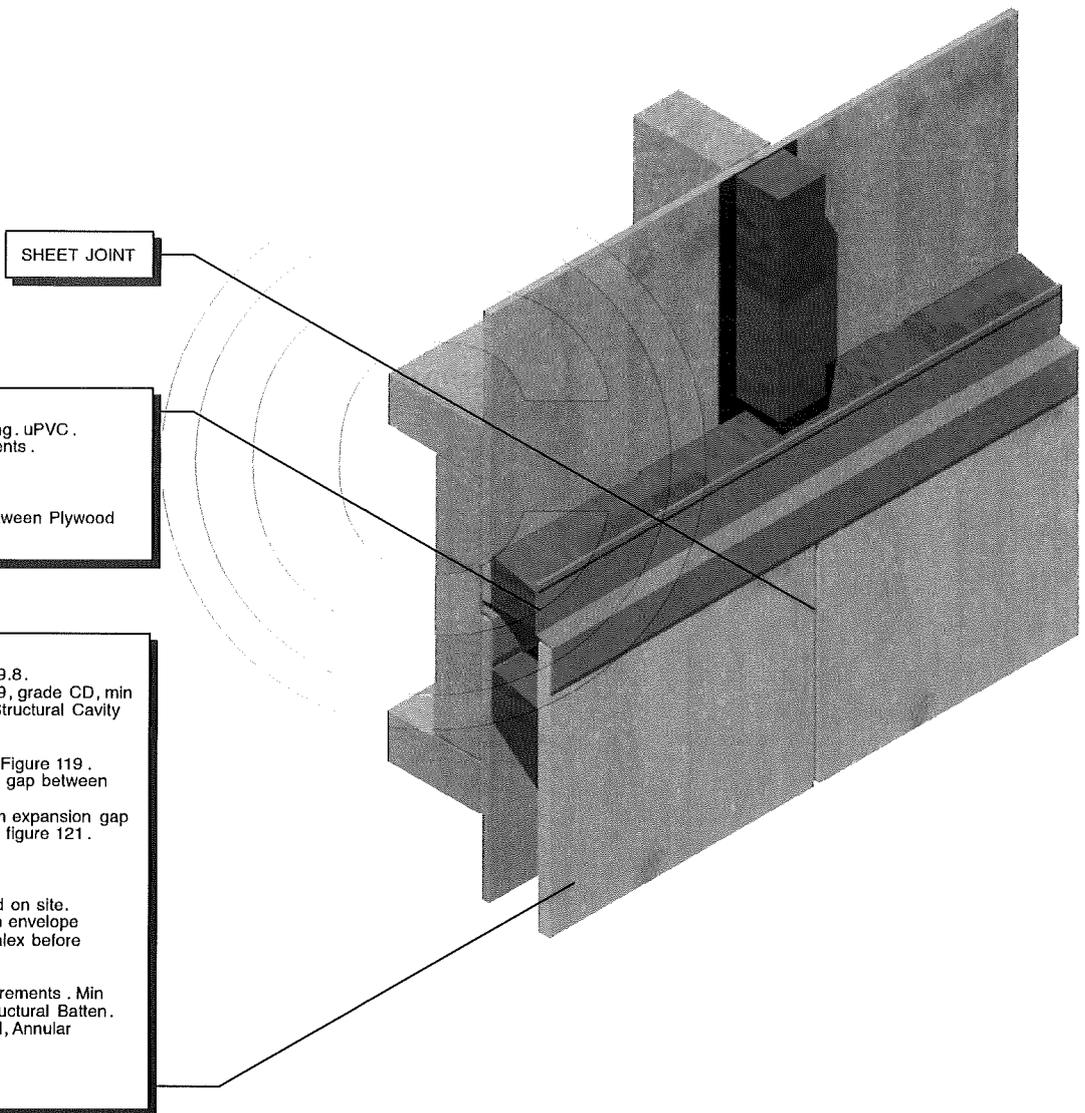
REVISION A 3D DETAIL 12  
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**Z FLASHING:**  
Ecoply Barrier Horizontal Z Flashing . uPVC .  
Install to Manufacturers Requirements .  
  
35mm Min Upstand and Overlap  
  
Maintain 15mm expansion gap between Plywood sheet joints.

**PLYWOOD SHEET CLADDING:**  
Installed as per NZBC E2, Section 9.8.  
Plywood manufactured to NZS 2269, grade CD, min 5 ply, 12mm thickness . Fixed into Structural Cavity Battens .  
  
Vertical Joints: Battened as per E2 Figure 119 .  
Grooved battens with 2mm nominal gap between ply sheets .  
Horizontal Joints: Incorporate 10mm expansion gap and fitted with Z Flashing as per E2 figure 121 .  
35mm upstand and overlap .  
  
**TREATMENT:** H3.1 LOSP  
**FINISH:** Pre-primed off-site . Painted on site .  
Any Cut Edges Must be coated with envelope preservative , such as Holdfast Metalex before installation .  
  
**FIXING:** As Per E2, Table 24 Requirements . Min Framing Penetration 30mm into Structural Batten .  
Use 50x2.8 FH Nail, Stainless Steel, Annular Grooved .  
150mm fixing ctrs to edges .  
300 fixing ctrs to middle .

PLYWOOD INSTALL

TYPICAL RAINDSCREEN DETAIL

REVISION A 3D DETAIL 13  
04 / 12 / 2013

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SHEET JOINT: 2-3mm Gap

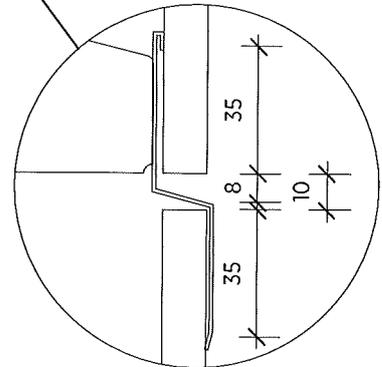
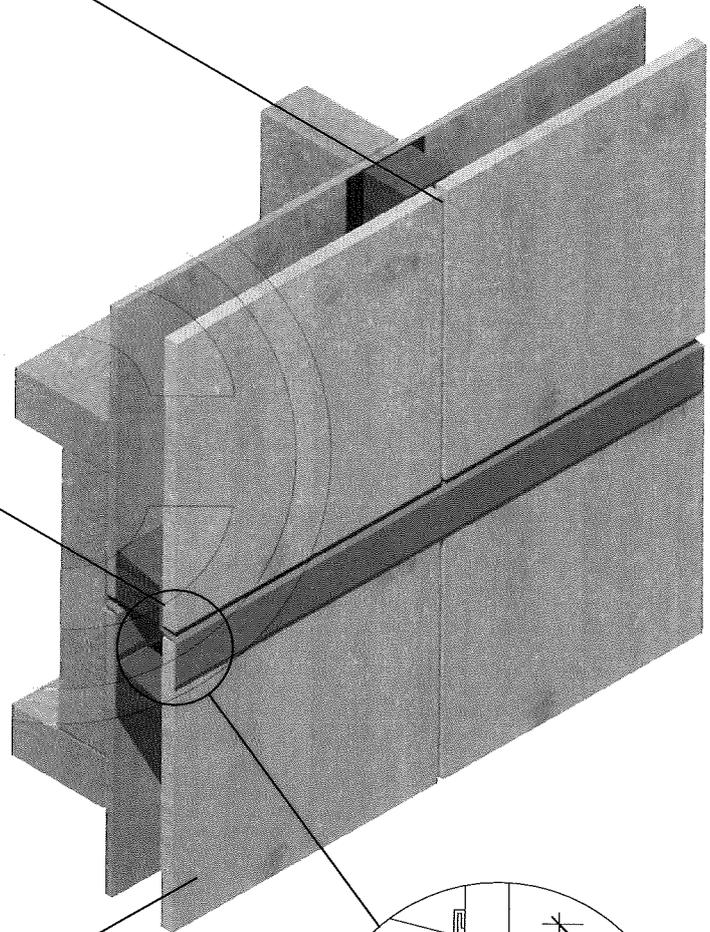
**Z FLASHING:**  
 Ecoply Barrier Horizontal Z Flashing, uPVC.  
 Install to Manufacturers Requirements.  
 35mm Min Upstand and Overlap  
 Maintain 15mm expansion gap between Plywood sheet joints.

**PLYWOOD SHEET CLADDING:**  
 Installed as per NZBC E2, Section 9.8.  
 Plywood manufactured to NZS 2269, grade CD, min 5 ply, 12mm thickness. Fixed into Structural Cavity Battens.

Vertical Joints: Battened as per E2 Figure 119.  
 Grooved battens with 2mm nominal gap between ply sheets.  
 Horizontal Joints: Incorporate 10mm expansion gap and fitted with Z Flashing as per E2 figure 121.  
 35mm upstand and overlap.

**TREATMENT:** H3.1 LOSP  
**FINISH:** Pre-primed off-site. Painted on site.  
 Any Cut Edges Must be coated with envelope preservative, such as Holdfast Metalex before installation.

**FIXING:** As Per E2, Table 24 Requirements. Min Framing Penetration 30mm Into Structural Batten.  
 Use 50x2.8 FH Nail, Stainless Steel, Annular Grooved.  
 150mm fixing ctrs to edges.  
 300 fixing ctrs to middle.



PLYWOOD JOINT  
 TYPICAL RAINSCREEN DETAIL REVISION A 3D DETAIL 14  
 04 / 12 / 2013

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**MACROCARPA BATTEN**  
 OVER Plywood Vertical Sheet Join.  
 EX 150 Board with 6mm Weather Grooves.  
 As Per NZBC E2, Figure 119.

Fixing: Countersunk HexHead or Square Drive  
 Stainless Steel Screws.  
 Finish: None.  
 Untreated, acceptable for 15 year durability, NZBC  
 B2, Table 2A.

NOTE: Boards set out at 1200 Module to Cover Ply  
 Sheet Joints.

5mm Min Gap between Boards.

**PLYWOOD SHEET CLADDING:**  
 Installed as per NZBC E2, Section 9.8.  
 Plywood manufactured to NZS 2269, grade CD, min  
 5 ply, 12mm thickness. Fixed into Structural Cavity  
 Battens.

Vertical Joints: Battened as per E2 Figure 119.  
 Grooved battens with 2mm nominal gap between  
 ply sheets.  
 Horizontal Joints: Incorporate 10mm expansion gap  
 and fitted with Z Flashing as per E2 figure 121.  
 35mm upstands and overlaps.

TREATMENT: H3.1 LOSP  
 FINISH: Pre-primed off-site. Painted on site.  
 Any Cut Edges Must be coated with envelope  
 preservative, such as Holdfast Metalex before  
 installation.

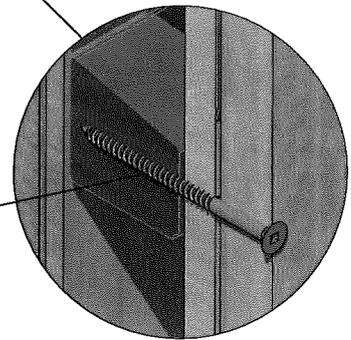
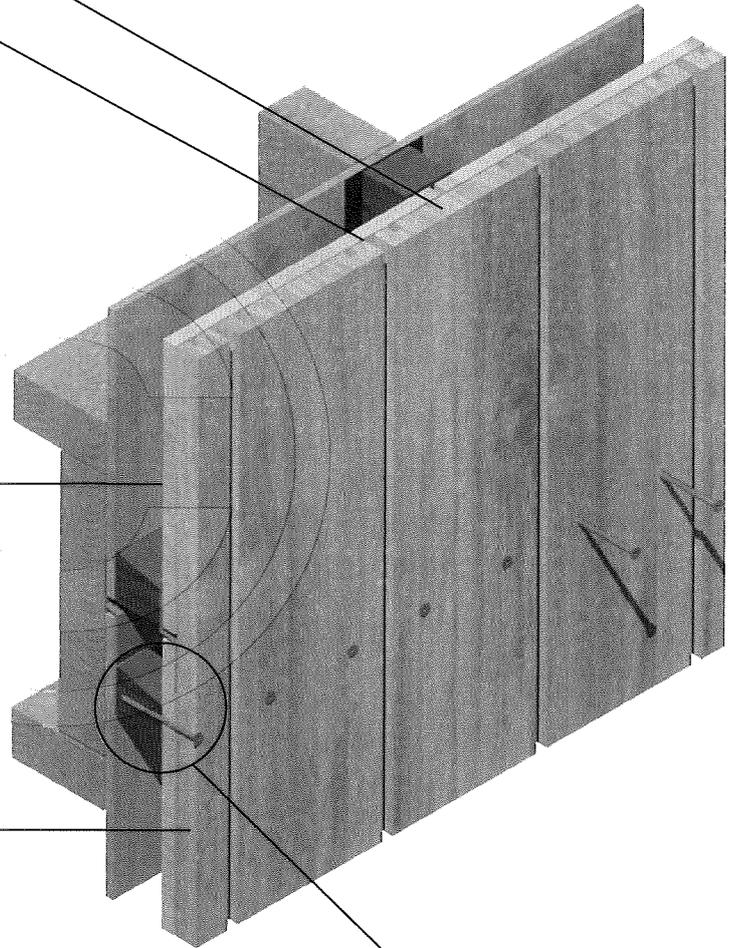
FIXING: As Per E2, Table 24 Requirements. Min  
 Framing Penetration 30mm into Structural Batten.  
 Use 50x2.8 FH Nail, Stainless Steel, Annular  
 Grooved.  
 150mm fixing ctrs to edges.  
 300 fixing ctrs to middle.

**MACROCARPA DECORATIVE RAINSCREEN.**  
 Macrocarpa Vertical Boards with 6mm Weather  
 Grooving.  
 Rainscreen Fixed over Plywood sheet Cladding.  
 Removeable

Fixing: Countersunk HexHead or Square Drive  
 Stainless Steel Screws.  
 Finish: None.  
 Untreated, acceptable for 15 year durability, NZBC  
 B2, Table 2A.

**RAINSCREEN FIXING**  
 Countersunk HexHead or Square Drive Stainless  
 Steel Screws.

Note: Screws do not penetrate RAB  
 Fixings into Structural Battens @ 600 ctrs



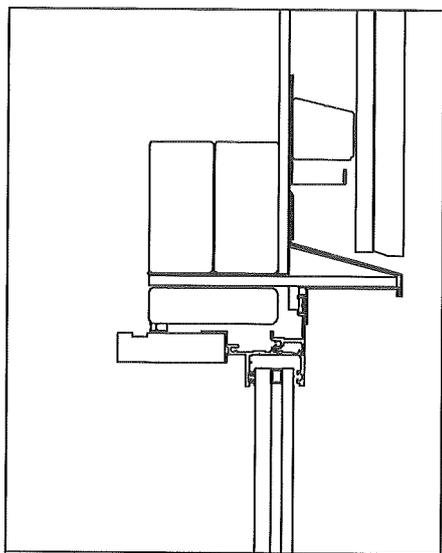
RAINSCREEN

## TYPICAL RAINSCREEN DETAIL

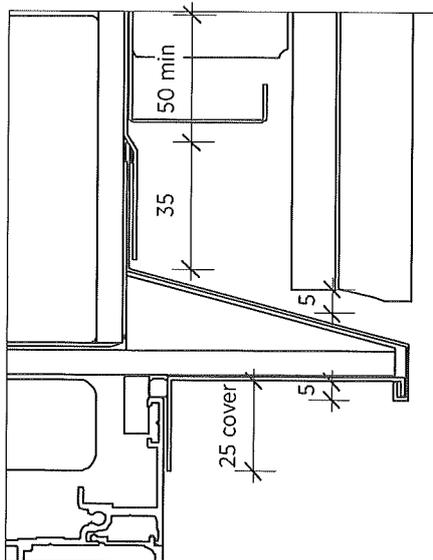
REVISION A  
 04/12/2013

3D DETAIL 15

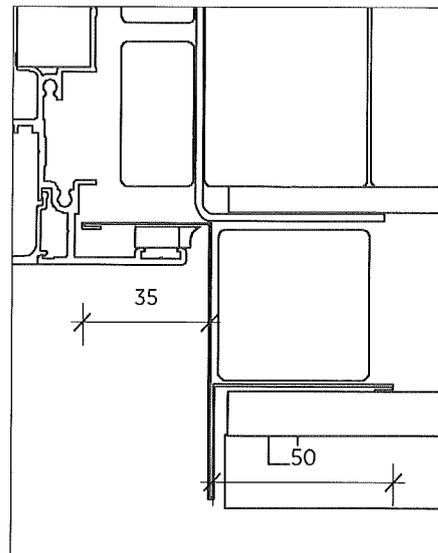
LICENCE TO	Jill & Shane O'Brien	7 Tutere Street, Waikanae	<b>ASSEMBLY</b>
RAB NO	CLIENT NAME	PROJECT ADDRESS	



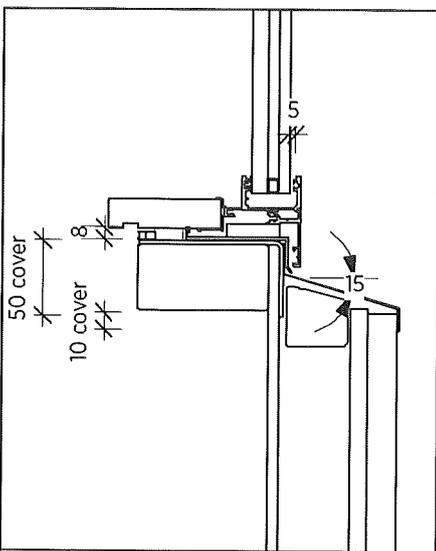
**1 HEAD DETAIL**  
Scale: 1:5



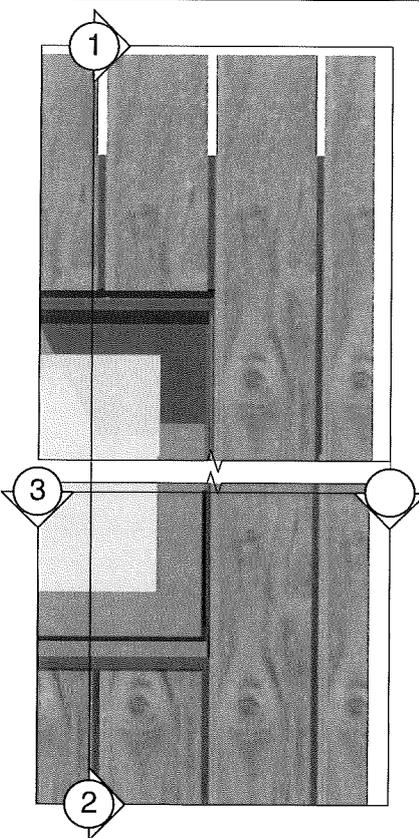
**4 FLASHING DETAIL**  
Scale: Half Actual Size



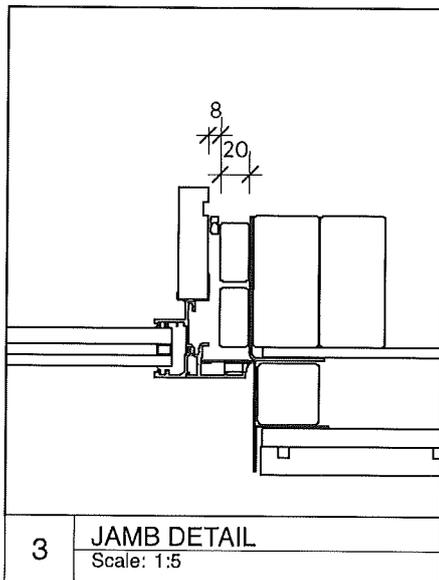
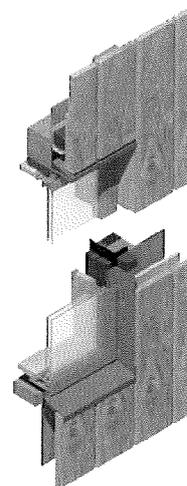
**5 FLASHING DETAIL**  
Scale: Half Actual Size



**2 SILL DETAIL**  
Scale: 1:5



02 APR 2015



**3 JAMB DETAIL**  
Scale: 1:5

**BC 150134**

2D Detail Sections  
Recessed Window

**TYPICAL WINDOW DETAIL** REVISION **A** 3D DETAIL **00**  
04 / 12 / 2013

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Jill & Shane O'Brien

7 Tutere Street, Waikanae

RAB NO

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PROJECT ADDRESS

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**RIGID AIR BARRIER**

Compliant with requirements of NZBC E2, 9.1.7.2. Ecoply Barrier, Structural Plywood Rigid Air Barrier, meets the NZ Building Code rigid sheathing performance requirements as outlined in Section 9.1.4 and Table 23 of E2/ AS1, when installed as per manufacturers requirements.

**SHEET JOINTS:**

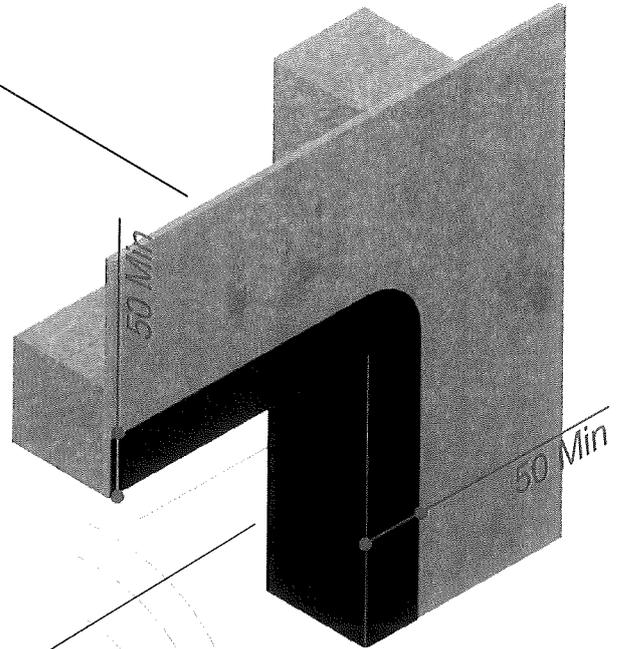
Vertical joints sealed with Ecoply Barrier Sealing Tape.  
Horizontal Joints, use EcoBarrier PVC Z Flashing

**CUT SHEETS:**

Where a sheet end is cut, place the cut end to the top. Always have a sealed sheet end at the bottom to avoid potential moisture ingress into the panel. All other cuts and penetrations must be covered by a suitable flexible flashing tape and installed as per Ecoply Barrier literature. (if brush on preservative treatment used, use Holdfast Metalex end seal).

**FIXINGS:**

As Per Manufacturer Requirements. Stainless Steel Annular grooved Nails in Sea Spray Environments.  
Power Driven: 50 x 2.8.  
Hand Driven: 40 x 2.5.  
Install min 7mm from sheet edges.  
fixing ctrs 150mm at sheet edges, 300mm within sheet.



**WALL FRAMING:**

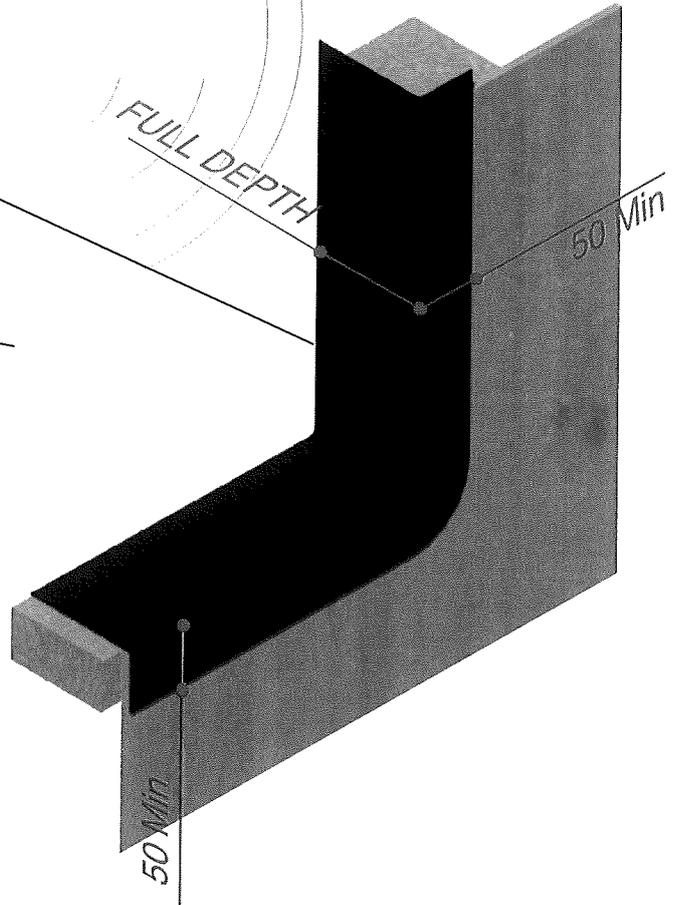
Refer to GA Drawings and Sections for Framing Details.

**FLEXIBLE FLASHING TAPE**

BRANZ Appraised and Manufacturer Approved Flashing Tape. Install to manufacturers instructions. Install to entire opening: Sill, Jamb and Head.

**WALL FRAMING:**

Refer to GA Drawings and Sections for Framing Details.



BC 150134

	OPENING PREP
--	--------------

Wraps & Tape

TYPICAL WINDOW DETAIL REVISION A 3D DETAIL 01  
04 / 12 / 2013

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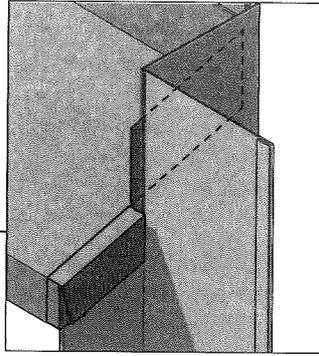
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**HEAD FLASHING**  
Aluminium Head Flashing as per Requirements of NZBC E2, Section 9 for direct fixed sheet claddings, and durability requirements of NZBC E2, Table 20.

1mm thickness 5000 series aluminium. Min 35mm upstand with ends folded as per details to form cap. 15 degree falls and formed drip edges.

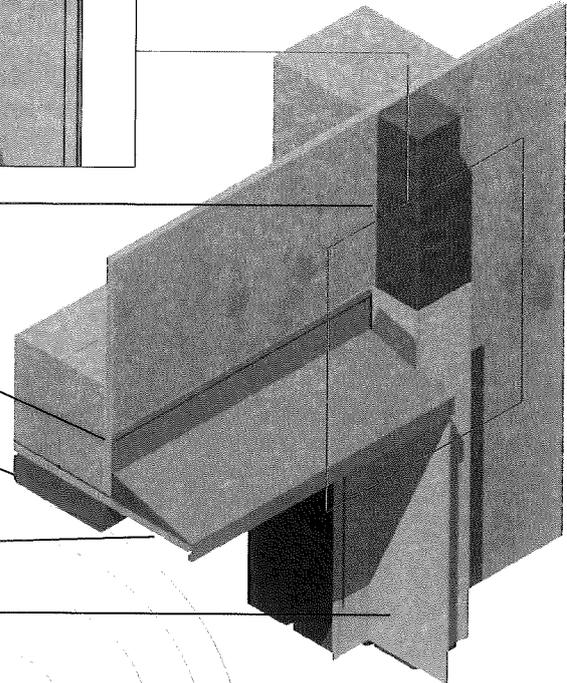
Powdercoat to match window joinery.  
2 Part Head flashing. 1st part shown only.



**CAVITY JAMB BATTEN**  
H3.2 Vertical Timber Cavity Batten to Jamb. Install bond-breaker PVC tape between batten and flashing.

**HEAD FLASHING.**  
Timber Fillet Support to Flashing. H3.1

**HEAD BATTEN**  
H3.1 Timber Batten to Head.



**PLYWOOD FILLET**  
H3.1 18mm Plywood Fillet to Window Head, supporting Head Flashing.

Seal Cut Edges with Holdfast Metalex End Seal Preservative.

**JAMB FLASHING**

**JAMB BATTENS**  
H3.1 Timber Jamb Battens, as per requirements of NZBC E2, Section 9 for Direct Fixed Claddings.

Timber Battens to finish clear of sill tray flashing.

**JAMB FLASHING**  
Aluminium Jamb Flashing as per Requirements NZBC E2, 4.3.2 and Table 20 for Exposure Zone D (NZS 3604)

1mm thickness 5000 series, Custom Folded as shown. Min 35mm lap to Window and Cladding. Bond Breaker lape between Flashing and Batten. Powercoat to match window Joinery.

**SILL FLASHING**  
Aluminium Sill Flashing as per Requirements of NZBC E2, Section 9 for direct fixed sheet claddings, and durability requirements of NZBC E2, Table 20.

1mm thickness 5000 series aluminium. Extend behind back of window frame. Min 8mm upstand to back with sloping end dams. Maintain 5mm clearance to window facing. Powdercoat to match window joinery.

Sill Flashing Installed to lap over 2nd flashing. Care taken by Installer to ensure Sill flashing does not slope backwards into building. Test water flows to building exterior before progressing with window install.

**SILL FLASH 2**  
1mm thickness 5000 series aluminium, 15 degree Falls. Lap under Sill Flash 01 and over Cladding with 10mm min lap over cladding.

Install with full support by sloped Castellated Cavity Battern under. Bond Breaker Tape between.

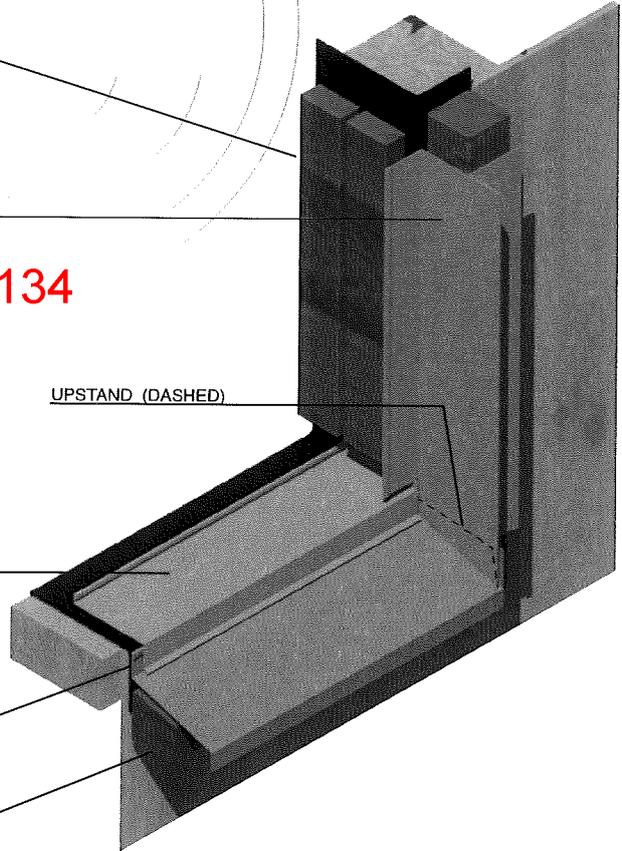
Powdercoat to match window joinery.

**CASTELLATED CAVITY BATTEN**  
Supporting Sill Flash.  
Install Bond Breaker PVC Tape under Flashing

**FLASH OPENING**

**BC 150134**

UPSTAND (DASHED)



RECESSED / EXPRESSED T  
WINDOW FLASHINGS

TYPICAL WINDOW DETAIL

REVISION A 3D DETAIL 02  
04 / 12 / 2013

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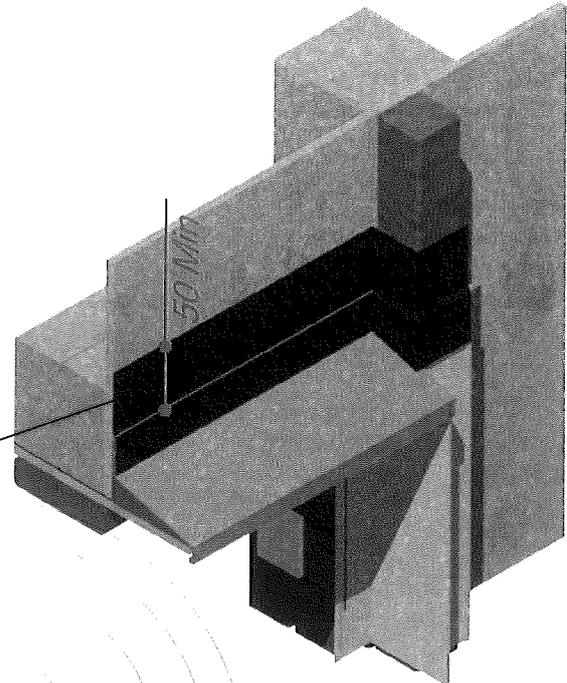
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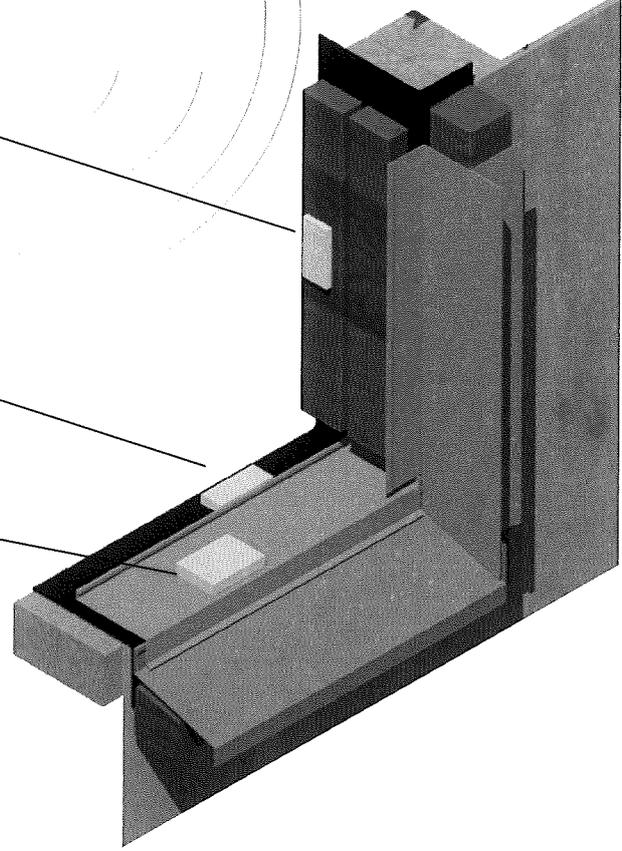


**FLEXIBLE FLASHING TAPE**  
 BRANZ Appraised and RAB Manufacturer Approved Flashing Tape. Install to manufacturers instructions, as per Requirements of NZBC E2, Figure 71 (B)  
 Install Full width of Head flash, sealing Head Flashing, flashing Upstands and Jamb Flashing to RAB and Battens.  
 Min 50mm upstand.

**WINDOW PACKERS**  
 Install WANZ approved packers to sills and Jambs as per WANZ requirements.

**WINDOW PACKERS**  
 Install WANZ approved packers to sills and Jambs as per WANZ requirements.

**FRAME BLOCK**  
 Install WANZ approved Frame Block to support Joinery unit as per Requirements of NZBC E2, Figure 72A.  
 Supports by Window Joinery Manufacturer.



WINDOW PREPARATION

TYPICAL WINDOW DETAIL REVISION A 3D DETAIL 03  
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**COMPRESSIBLE FOAM TAPE**  
Install behind Window Head and Jamb Facings

Foam Tape to be Closed Cell PVC Foam to meet Requirements of NZBC E2, clause 9.1.10.7.

**PROTECTIVE SEALANT:**  
Continuous line of protective Sealant to seal window facing to Flashing. OVER compressible foam bond breaker tape.

Sealant as per requirements of NZBC E2, Figure 83.  
Sealant to Comply with:  
a. Type F, Class 20LM or 25LM of ISO 11600, or  
b. low modulus Type II Class A of Federal Specification TT-S-00230C

**HEAD FLASHING: PART 2**

**AIR SEAL:**  
Foam backing rod and continuous seal around entire window.

**HEAD FLASHING: PART 2**  
Aluminium Head Flashing as per Requirements of NZBC E2, Section 9 for direct fixed sheet claddings, and durability requirements of NZBC E2, Table 20.

1mm thickness 5000 series aluminium. Folded drip edges. Lapped Over and sealed to Window Facing, as per requirements of NZBC E2, Figure 71 (c).

Powdercoat to match window joinery.

**SELECTED ALUMINIUM WINDOW/DOOR:**  
Window Frames to meet Requirements of NZBC E2, 9.1.10 and Installed as per WANZ Guidelines. EXPOSURE ZONE: D / Sea Spray. FINISH: Duratec PowderCoating

**DOUBLE GLAZING:**  
Glazing contractor to select glazing to comply with NZS4223 safety requirements.

Glazing Selected to Maximise Energy Efficiency of Glazing. Generally Argon Filled and Low-E coated.

Glass supplier to coordinate with window and door manufacturers to ensure window bead suits thickness of units. Ensure the double glazing spacer and sealant are fully protected from direct UV.

**AIR SEAL:**  
In accordance with E2/AS1 Section 9.1.6  
Air seal with PEF backing rod. Installed continuous around jamb, sill and frame.

Air Seal shall be made of either:  
1. self-expanding polyurethane foam, or  
2. Sealant complying with:  
a. Type F, Class 20LM or 25LM of ISO 11600, or  
b. low modulus Type II Class A of Federal Specification TT-S-00230C

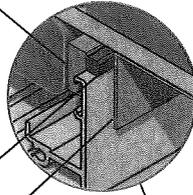
**PROTECTIVE SEALANT:**  
Continuous line of protective Sealant to seal edge of window facing to Flashing. OVER compressible foam bond breaker tape.

As per requirements of NZBC E2, Figure 83.  
Sealant to Comply with:  
a. Type F, Class 20LM or 25LM of ISO 11600, or  
b. low modulus Type II Class A of Federal Specification TT-S-00230C

**COMPRESSIBLE FOAM TAPE**  
Install behind Window Facings to Head and Jamb

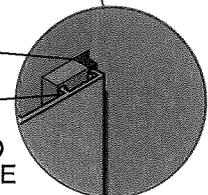
Foam Tape to be Closed Cell PVC Foam to meet Requirements of NZBC E2, clause 9.1.10.7.

SEAL FLASH TO WINDOW FRAME



DO NOT SEAL SILL JUNCTION

SEAL FLASH TO WINDOW FRAME



WINDOW INSTALL

TYPICAL WINDOW DETAIL

REVISION A 3D DETAIL 04  
04 / 12 / 2013

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**CASTELLATED CAVITY BATTEN**  
 Structural Cavity Battens, forming nominal 45mm Cavity. Castellated Battens with 15 Degree Falls to Top and drip edge to base.  
 Install @ 600 Ctrs.  
 H3.2 Treated to meet requirements for 50 year durability as per B2/AS1 TABLE 1.

Forms drained and ventilated Cavity meeting requirements of NZBC E2, 9.1.8.

Cladding Fixed to Cavity Battens, not framing.  
 Hence Structural Battens.  
 Fixings into framing 14g x 100 stainless steel screws

**VERMIN PROOF CAVITY CLOSER**

In accordance with E2/AS1 9.1.8.3 Vermin-proofing  
 Vermin-proofing shall be provided above window heads and at the base of the drained cavity.

Preferred Material: uPVC in accordance with Paragraph E2/AS1/4 .1.  
 Alternative Material: Powder Coated Aluminium .

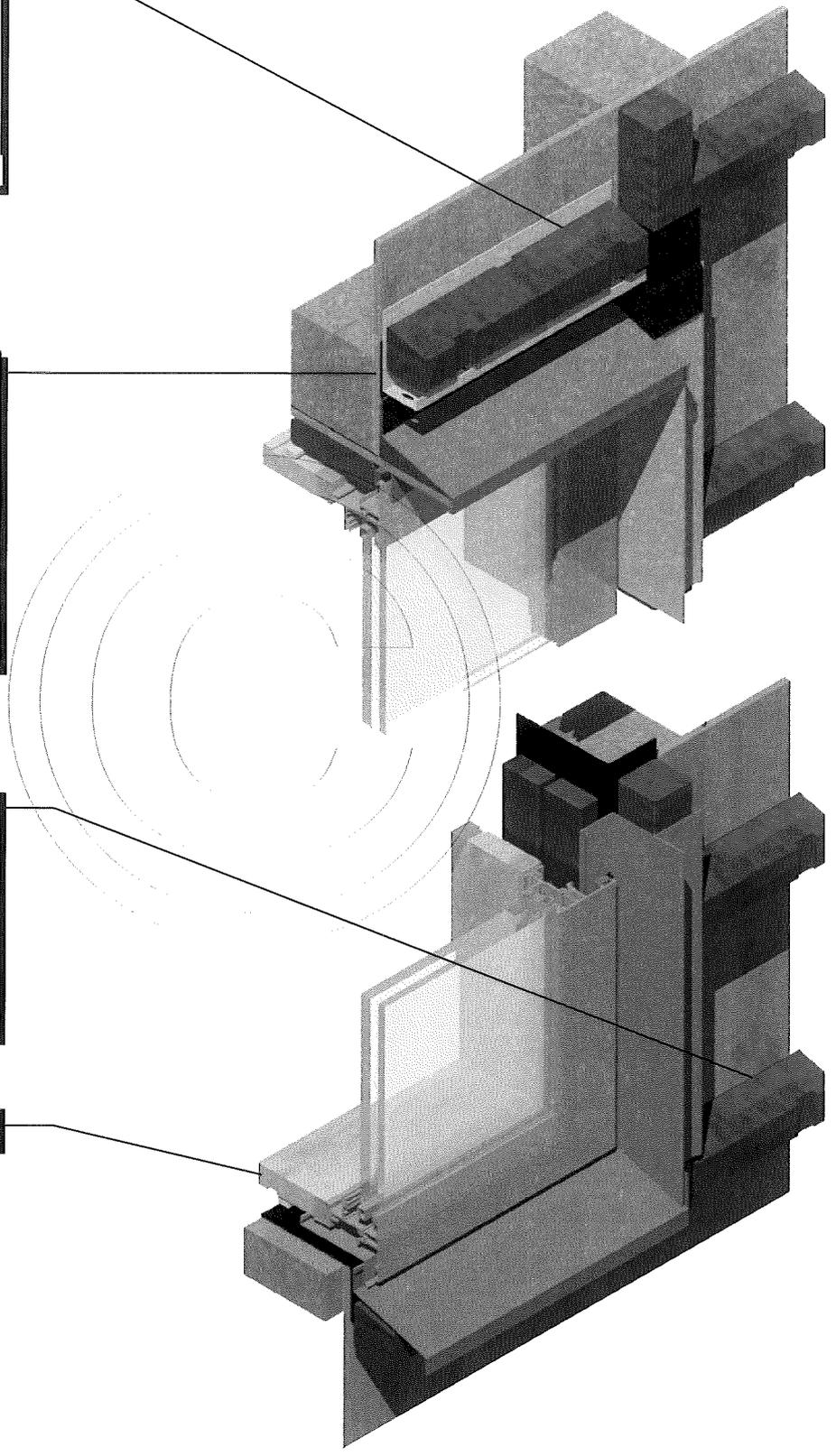
Vermin-proofing shall:  
 a) Provide holes or slots between 3 mm and 5 mm,  
 b) Provide an area of opening of 1000 mm per lineal metre of wall, and  
 c) Be positioned to allow a minimum drip edge to the wall cladding of:  
 i) 10 mm at the base of walls, and  
 ii) 15 mm above window head flashings

**CASTELLATED CAVITY BATTEN**  
 Structural Cavity Battens, forming nominal 45mm Cavity. Castellated Battens with 15 Degree Falls to Top and drip edge to base.  
 Install @ 600 Ctrs.  
 H3.2 Treated to meet requirements for 50 year durability as per B2/AS1 TABLE 1.

Forms drained and ventilated Cavity meeting requirements of NZBC E2, 9.1.8.

Cladding Fixed to Cavity Battens, not framing.  
 Hence Structural Battens.  
 Fixings into framing 14g x 100 stainless steel screws

**PAINT QUALITY PINE LINERS**



CAVITY CONSTRUCTION

TYPICAL WINDOW DETAIL

REVISION A 3D DETAIL 05  
 04 / 12 / 2013

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BC 150134

02 APR 2015

**PLYWOOD SHEET CLADDING:**  
Installed as per NZBC E2, Section 9.8.  
Plywood manufactured to NZS 2269, grade CD, min 5 ply, 12mm thickness.  
Fixed into Structural Cavity Battens.

**Vertical Joints:** Battened as per E2 Figure 119.  
Grooved battens with 2-3mm nominal gap between ply sheets.

**Horizontal Joints:** Incorporate 10mm expansion gap and fitted with Z Flashing as per E2 figure 121.  
35mm upstands and overlaps.

**TREATMENT:** H3.1 LOSP

**FINISH:** Pre-primed off-site. Painted on site.  
Any Cut Edges Must be coated with envelope preservative, such as Holdfast Metalex before installation.

**FIXING:** As Per E2, Table 24 Requirements. Min Framing Penetration 30mm into Structural Batten.  
Use 50x2.8 FH Nail, Stainless Steel, Annular Grooved.  
150mm fixing ctrs to edges.  
300 fixing ctrs to middle.

**PLYWOOD SHEET CLADDING:**  
Installed to form drip edge.

Maintain 5mm clearance gap from cladding to Head Flashing Below

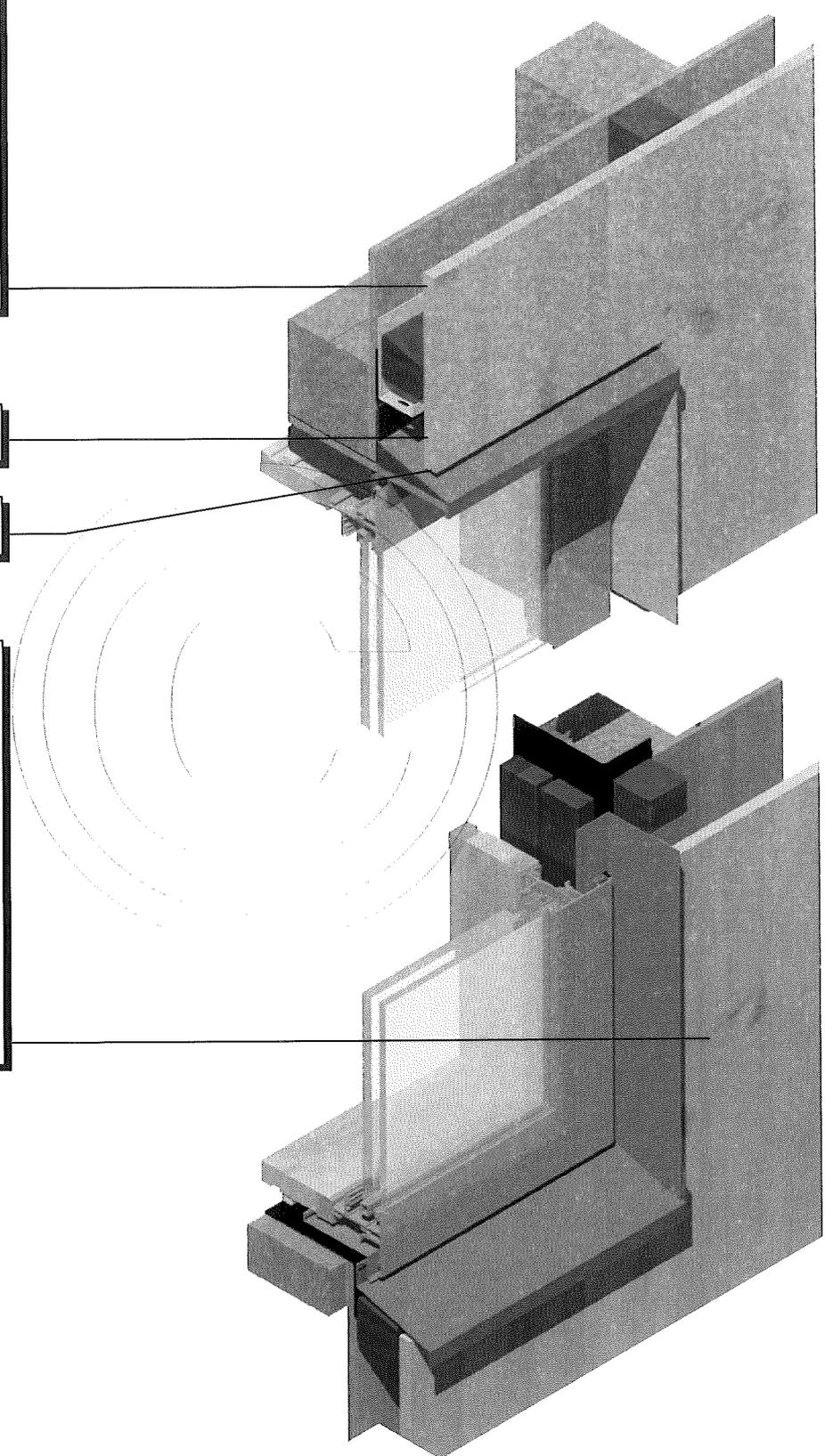
**PLYWOOD SHEET CLADDING:**  
Installed as per NZBC E2, Section 9.8.  
Plywood manufactured to NZS 2269, grade CD, min 5 ply, 12mm thickness.  
Fixed into Structural Cavity Battens.

**Vertical Joints:** Battened as per E2 Figure 119.  
Grooved battens with 2-3mm nominal gap between ply sheets.  
**Horizontal Joints:** Incorporate 10mm expansion gap and fitted with Z Flashing as per E2 figure 121.  
35mm upstands and overlaps.

**TREATMENT:** H3.1 LOSP

**FINISH:** Pre-primed off-site. Painted on site.  
Any Cut Edges Must be coated with envelope preservative, such as Holdfast Metalex before installation.

**FIXING:** As Per E2, Table 24 Requirements. Min Framing Penetration 30mm into Structural Batten.  
Use 50x2.8 FH Nail, Stainless Steel, Annular Grooved.  
150mm fixing ctrs to edges.  
300 fixing ctrs to middle.



CLADDING

TYPICAL WINDOW DETAIL

REVISION A  
04 / 12 / 2013

3D DETAIL 06

LICENCE TO

RAB NO	CLIENT NAME	PROJECT ADDRESS
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**ASSEMBLY**

MACROCARPA DECORATIVE RAINSCREEN .  
Macrocarpa Vertical Boards with Weather Grooving.

Rainscreen Fixed over Plywood sheet Cladding .  
Removeable

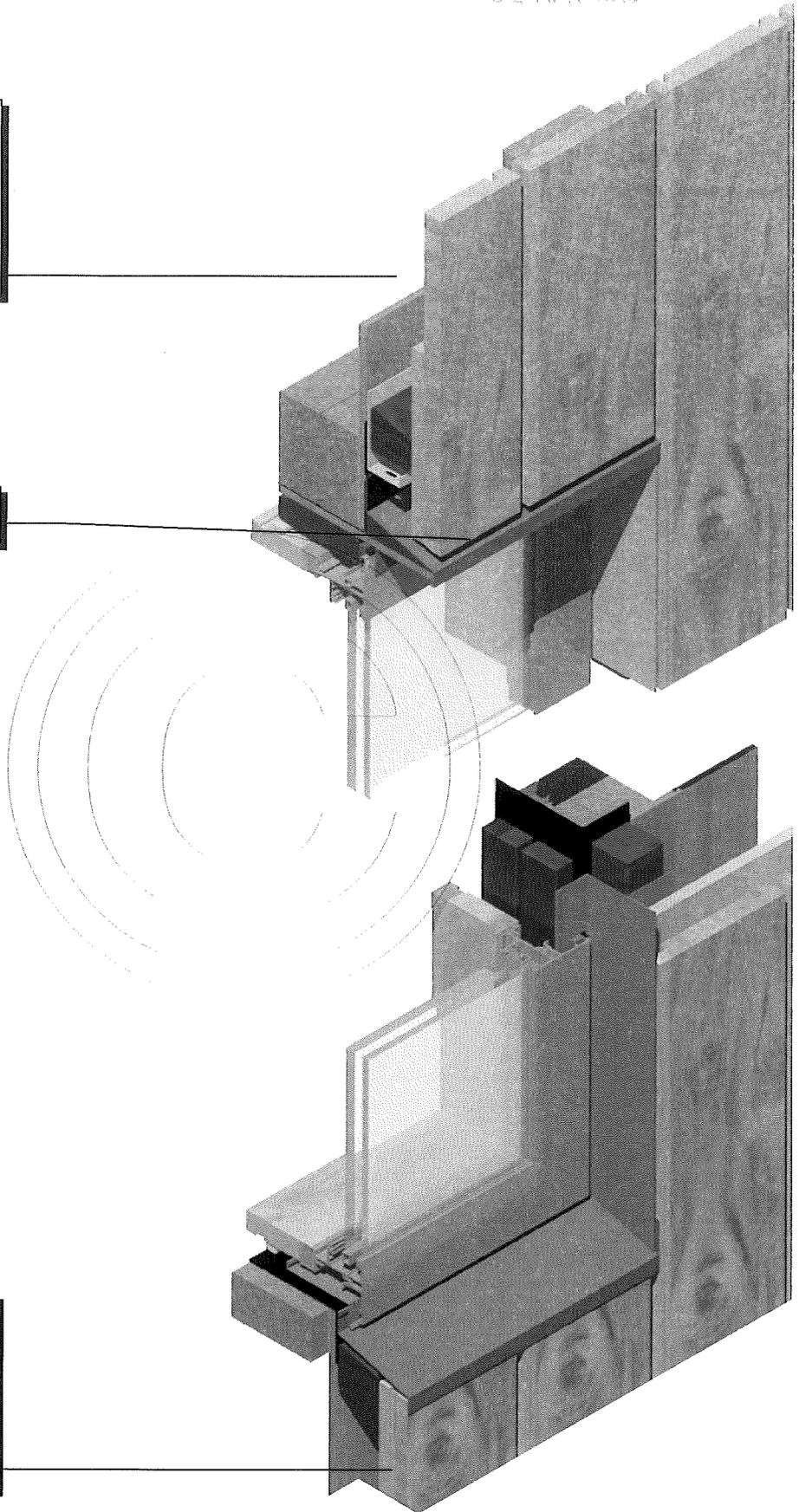
Fixing: Countersunk HexHead or Square Drive  
Stainless Steel Screws .  
Finish: None .  
Untreated , acceptable for 15 year durability , NZBC  
B2, Table 2A.

Maintain 5mm clearance gap from cladding to Head  
Flashing Below

MACROCARPA DECORATIVE RAINSCREEN .  
Macrocarpa Vertical Boards with Weather Grooving.

Rainscreen Fixed over Plywood sheet Cladding .  
Removeable

Fixing: Countersunk HexHead or Square Drive  
Stainless Steel Screws .  
Finish: None .  
Untreated , acceptable for 15 year durability , NZBC  
B2, Table 2A.



RAINSCREEN

TYPICAL WINDOW DETAIL

REVISION A  
04 / 12 / 2013

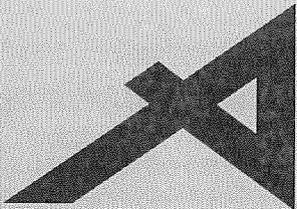
3D DETAIL 07

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**ASSEMBLY**



**BRANZ Appraised**

Appraisal No.764 [2011]

BRANZ Appraisals

Technical Assessments of products  
for building and construction

**BRANZ  
APPRAISAL  
No. 764 (2011)**

**SHADOWCLAD®  
VENTILATED CAVITY  
CLADDING SYSTEM**

Carter Holt Harvey Woodproducts  
New Zealand  
Private Bag 92-106  
Auckland

Tel: 09 636 7016

Fax: 09 633 1582

Web:

[www.chhwoodproducts.co.nz](http://www.chhwoodproducts.co.nz)



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## Product

1.1 Shadowclad® Ventilated Cavity is a cavity-based external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.

1.2 The system consists of Shadowclad® sheets, timber cavity battens, flashings and accessories and is finished with either an acrylic paint system, penetrating, or film forming stain.

1.3 Shadowclad® Ventilated Cavity incorporates a primary and secondary means of weather resistance (first and second line of defence) against water penetration by separating the cladding from the external wall frame with a nominal 21 mm drained cavity.



## Scope

2.1 Shadowclad® Ventilated Cavity has been appraised as an external wall cladding for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- constructed with timber 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,
- situated in NZS 3604 Wind Zones up to, and including 'Extra High'.

2.2 Shadowclad® Ventilated Cavity has also been appraised as an external wall cladding for specifically designed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- constructed with timber framing complying with the NZBC; and,
- situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 2.5 kPa.

2.3 Shadowclad® Ventilated Cavity is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. (*The Appraisal of Shadowclad® Ventilated Cavity relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.*)

2.4 Shadowclad® Ventilated Cavity has also been appraised for use as wall bracing systems for timber framed buildings within the scope of NZS 3604.

## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Shadowclad® Ventilated Cavity, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

**Clause B1 STRUCTURE:** Performance B1.3.1, B1.3.2 and B1.3.4. Shadowclad® Ventilated Cavity meets the requirement for loads arising from self-weight, earthquake, wind, impact and creep [i.e. B1.3.3 (a), (f), (h), (j) and (q)]. See Paragraphs 9.1 – 9.4.

**Clause B2 DURABILITY:** Performance B2.3.1(a), at least 50 years, B2.3.1(b), 15 years, B2.3.1(c) 5 years and B2.3.2. Shadowclad® Ventilated Cavity meets these requirements. See Paragraphs 10.1 - 10.7.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. Shadowclad® Ventilated Cavity meets this requirement. See Paragraphs 14.1 - 14.5.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. Shadowclad® Ventilated Cavity meets this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

3.3 Shadowclad® Ventilated Cavity is used to satisfy the bracing demand requirements of Section 5 of NZS 3604 which is an NZBC Compliance Document.

## Technical Specification

4.1 System components and accessories supplied by Carter Holt Harvey Woodproducts New Zealand are as follows:

### Shadowclad® Sheets

- Shadowclad® sheets are nominal 12 mm thick structural plywood sheets manufactured from New Zealand pinus radiata veneers. They are 1216 mm wide and either 2440 mm or 2745 mm long. They have a textured surface finish on the exposed face.
- Shadowclad® sheets are available as either Shadowclad® Natural or Shadowclad® Prime finish. Shadowclad® Natural is an uncoated panel for use with penetrating stains, film forming stains and paints. Shadowclad® Prime has a factory applied powder coat exterior primer for use with paints and film forming stain topcoats. Shadowclad® Prime is not suitable for use with penetrating stains.
- Shadowclad® Natural and Shadowclad® Prime are both available as Texture and Texture Groove surface finish. Texture Groove has 9 mm wide by 5 mm deep grooves at 150 mm centres running vertically down the outside face of the sheet.
- Shadowclad® sheets are available as Hazard Class H3.1 treated or Hazard Class H3.2 CCA treated. (Note: H3.2 CCA treatment is available for Shadowclad® Prime finished products only.)

### Accessories

- Shadowclad® flashings: horizontal 'Z' flashing, inter-storey 'Z' flashing, internal 90° angle, internal 'W' angle, large internal 'W' angle, external box angle, large external box angle and flat flashing for vertical negative detail. Shadowclad® flashings are manufactured from extruded aluminium.
- Exterior Battens: 65 mm wide x 18 mm thick timber batten, dressed or bandsawn, treated to Hazard Class H3.1.

- Cavity battens: nominal 47 mm wide x 21 mm thick or 75 mm wide x 21 mm thick merchant grade timber treated to Hazard Class H3.1.
- Cavity vent strip – manufactured from aluminium, available in 3600 mm lengths.

4.2 Accessories used with Shadowclad® Ventilated Cavity which are supplied by the building contractor are:

- Shadowclad® sheet fixings: 60 x 3.15 mm hot-dip galvanised or ring shank stainless steel flat head nails, 8 gauge x 65 mm AS 3566 Corrosion Class 4 mechanically zinc plated wood screws or 8 gauge x 65 mm stainless steel wood screws. (Note: Stainless steel fixings must be Grade 316 and hot-dip galvanising must comply with AS/NZS 4680).
- Cavity batten fixings: 50 x 2.8 mm hot-dip galvanised or stainless steel ring shank flat head nails.
- Flexible wall underlay: building paper or wrap complying with NZBC Acceptable Solution E2/AS1 Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall underlay.
- Rigid wall underlay: Sheet complying with NZBC Acceptable Solution E2/AS1 Table 23, or rigid sheathing covered by a valid BRANZ Appraisal for use as rigid air barrier systems.
- Flexible flashing tape: flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1 Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- Window and door trim cavity air seal: air seals complying with NZBC Acceptable Solution E2/AS1 Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal suitable for use around window, door and other wall penetration openings.
- Joinery head flashings - folded from aluminium or galvanised steel to suit the window or door trim opening. Refer to NZS 3604, Section 4 and NZBC Acceptable Solution E2/AS1, Table 20 for durability requirements.
- Flexible sealant - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.
- Bracing panel end stud connection: GIB® HandiBrac™ galvanised steel 90 x 62 x 54 x 1.55 mm thick angle bracket, GIB® HandiBrac™ 50 x 60 x 5 mm thick electroplated washer and GIB® HandiBrac™ fixings, 8 Type 17 screws 5 x 35 mm.
- Timber floor end stud hold down: 12 mm x 150 mm hot-dipped galvanised coach screws.
- Concrete floor end stud hold down: cast-in bolts M12 x 150 mm minimum or proprietary fixings with a minimum characteristic strength of 15 kN.

### Finishing System Specification

4.3 Paint and stain systems are not supplied by Carter Holt Harvey Woodproducts New Zealand and have not been assessed by BRANZ and are therefore outside the scope of this Appraisal.

4.4 All exposed faces, including top edges at sills and all bottom edges of Shadowclad® sheets must be finished with a latex exterior paint system complying with any of Parts 7, 8, 9, or 10 of AS 3730, or at least two coats of a film forming or penetrating stain to protect the Shadowclad® and give the desired finish colour to the exterior walls.

(Note: For Shadowclad®, Carter Holt Harvey Woodproducts New Zealand recommends using paints and stains with a Light Reflective Value (LRV) of greater than or equal to 40%.)

## Handling and Storage

5.1 Handling and storage of all materials supplied by Carter Holt Harvey Woodproducts New Zealand or the building contractor, whether on site or off-site, is under the control of the building contractor. Shadowclad® sheets must be stacked flat, clear of the ground on at least three evenly spaced timber bearers. They must be kept dry at all times either by storing within an enclosed building or under cover when stored externally. Care must be taken to avoid damage to edges, ends and the primed surfaces.

5.2 Accessories must be stored so they are kept clean, dry and undamaged. All accessories must be used within the maximum storage period recommended by the manufacturer.

## Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Shadowclad® Ventilated Cavity. 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

### Framing

#### Timber Treatment

7.1 Timber wall framing behind Shadowclad® Ventilated Cavity must be treated as required by NZBC Acceptable Solution B2/AS1.

#### Timber Framing

7.2 Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases studs must be at maximum 600 mm centres. Dwargs must be fitted flush between the studs at maximum 800 mm centres.

7.3 Additional framing may be required at soffits, internal and external corners and window and door openings for the support and fixing of cavity battens and Shadowclad® Ventilated Cavity.

7.4 Timber wall framing and cavity battens must have a maximum moisture content of 20% at the time of the cladding application. *(Note: If Shadowclad® is fixed to framing with a moisture content of greater than 20% problems may occur at a later date due to excessive timber shrinkage.)*

### General

8.1 When Shadowclad® Ventilated Cavity is used for specifically designed buildings up to 2.5 kPa design differential ULS wind pressure, only the weathertightness aspects of the cladding and maximum framing centres are within the scope of this Appraisal. All other aspects of the building need to be specifically designed and are outside the scope of this Appraisal.

8.2 Punchings in the cavity vent strip provide a minimum ventilation opening area of 1000 mm<sup>2</sup> per lineal metre of wall in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3(b).

8.3 The ground clearance to finished floor levels as set out in NZS 3604 must be adhered to at all times. At ground level paved surfaces, such as footpaths, must be kept clear of the bottom edge of the cladding system by a minimum of 100 mm, and unpaved surfaces by 175 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Table 18.

8.4 At balcony, deck or roof/wall junctions, the bottom edge of Shadowclad® Ventilated Cavity must be kept above the top surface of any adjacent roof flashing by a minimum of 35 mm in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.

8.5 All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for wind zones up to and including Very High, and rigid underlays for buildings in the Extra High wind zone and specifically designed buildings up to 2.5 kPa design differential ULS wind pressure. Unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the cavity batten fixing lengths must be increased by a minimum of the thickness of the underlay.

8.6 Where cladding penetrations are wider than the cavity batten spacing, allowance must be made for airflow between adjacent cavities by leaving a minimum gap of 10 mm between the bottom of the cavity and the flashing to the opening.

8.7 Where the system abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. These details have not been assessed and are outside the scope of this Appraisal.

#### Inter-storey Junctions

8.8 Inter-storey junctions must be constructed in accordance with the Technical Literature. Inter-storey joints must be provided to limit continuous cavities to the lesser of 2-storeys or 7 metres in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4(b).

## Structure

### Mass

9.1 The mass of Shadowclad® Ventilated Cavity is approximately 6.6 kg/m<sup>2</sup> at equilibrium moisture content. The system is therefore considered a lightweight cladding in terms of NZS 3604.

### Impact Resistance

9.2 Shadowclad® Ventilated Cavity has good resistance to impact loads likely to be encountered in normal residential use. The likelihood of impact damage to Shadowclad® Ventilated Cavity when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers should be considered for vulnerable areas.

### Wind Zones

9.3 Shadowclad® Ventilated Cavity is suitable for use in all Building Wind Zones of NZS 3604, up to and including 'Extra High' where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, or up to 2.5 kPa design differential ULS wind pressure where buildings are specifically designed.

**BC 150134**

**Table 1: Bracing Ratings for Shadowclad® Ventilated Cavity**

Specification No.	Minimum Wall Length	Lining Requirements	BU's/m Wind	BU's/m EQ
SC1	0.6 m	Shadowclad® one side	105	120

**Bracing**

9.4 When used in accordance with this Appraisal and the Technical Literature, Shadowclad® Ventilated Cavity can be used to meet the wall bracing element requirements of NZS 3604, for timber framed buildings not requiring specific design. The Technical Literature contains details of the construction of the bracing system and the bracing unit ratings achieved for this system. The bracing ratings are also given within Table 1. 60 x 3.15 mm ring-shanked stainless steel nails must be used when Shadowclad® Ventilated Cavity is used as bracing.

**Durability**

10.1 Shadowclad® Ventilated Cavity meets the performance requirements of NZBC Clause B2.3.1 (a), not less than 50 years when the system is used as a bracing system, the performance requirements of NZBC Clause B2.3.1 (b), 15 years for the Shadowclad® and flashings when used as a non-structural cladding and the performance requirements of NZBC Clause B2.3.1 (c), 5 years for the exterior paint system where used.

10.2 Shadowclad® Ventilated Cavity must be installed with stainless steel nails when used as a bracing element.

**Serviceable Life**

10.3 For Shadowclad® Ventilated Cavity installations to achieve a serviceable life of 50 years, Shadowclad® Prime must be used, and they must be finished with two top coats of 100% acrylic paint with a light reflectance value (LRV) of 40% or greater and be maintained in accordance with this Appraisal to ensure the Shadowclad® sheets and fixings remain dry in service. Shadowclad® Ventilated Cavity must be painted as soon as practicable following installation.

10.4 Shadowclad® Ventilated Cavity installations finished with penetrating stain or non-penetrating film forming stain, are expected to have a serviceable life of at least 15 years provided they are maintained in accordance with this Appraisal. *(Note: This opinion only covers serviceability with regards to structural and weathertightness performance. It does not cover appearance, which may deteriorate significantly, especially when proper and regular maintenance is not carried out.)*

10.5 Coastal locations can be very corrosive to fasteners, especially locations within distances of up to 500 m from the sea including harbours, or 100 metres from tidal estuaries and sheltered inlets, and otherwise as shown in NZS 3604 Figure 4.2. These coastal locations are defined in NZS 3604 as Zone D. To achieve a 50 year serviceable life, Shadowclad® sheets must be fixed with stainless steel fasteners.

10.6 When using CCA treated Shadowclad® aluminium extrusions must be coated in accordance with the requirements of NZBC E2/AS1 Table 20, and are not suitable for use in NZS 3604 Corrosion Zone D where stainless steel must be used.

10.7 Microclimatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals or fertilisers can convert a mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of Shadowclad® sheets in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604 Paragraph 4.2.4, and is outside the scope of this Appraisal.

**Maintenance**

11.1 Regular maintenance is essential to ensure the performance requirements of the NZBC are continually met and to ensure the maximum serviceability of the system.

11.2 Regular cleaning (at least annually) of the paint coating is required to remove grime, dirt and organic growth and to maximise the life and appearance of the coating. Grime may be removed by brushing with a soft brush, warm water and detergent. Paint systems must be recoated at approximately 7 – 10 yearly intervals in accordance with the paint manufacturer's instructions. Penetrating and non-penetrating stains must be recoated every 2 – 3 years in accordance with the stain manufacturer's instructions.

11.3 Annual inspections must be made to ensure that all aspects of the cladding system, including the selected finishing system, flashings and any sealed joints remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress must be repaired immediately. Sealant and paint coatings must be repaired in accordance with the relevant manufacturer's instructions.

11.4 Minimum ground clearances as set out in this Appraisal and the Technical Literature must be maintained at all times during the life of the system. *(Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of Shadowclad® Ventilated Cavity installations.)*

**Control of External Fire Spread**

12.1 Shadowclad® Ventilated Cavity is considered to meet the performance provisions of NZBC C3.3.5 for use as an external wall cladding system when restricted to:

- Single storey buildings 1 m or more from the boundary for all purpose groups.
- Buildings up to 7 m high, 1 m or more from the boundary, for all purpose groups other than SC and SD.
- Fully sprinklered buildings up to 10 m high, 1 m or more from the boundary for all purpose groups other than SC, SD, SA and SR.
- Buildings containing purpose group SH, with a building height less than 10 m and located 1 m or more from the boundary.

*(Note: The scope of this Appraisal limits building heights to 10 m in accordance with the limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1(a). The building heights referenced in Paragraph 12.1 above are as defined in the Definitions Section of the Fire Safety Clauses of the NZBC.)*

**Outbreak of Fire**

13.1 Shadowclad® Ventilated Cavity must be separated from chimneys and flues in accordance with the requirements of Acceptable Solution C/AS1 Part 9, for the protection of combustible materials.

**External Moisture**

14.1 Shadowclad® Ventilated Cavity, when installed in accordance with this Appraisal and the Technical Literature will prevent the penetration of moisture that could cause undue dampness or damage to building elements.

14.2 The cavity must be sealed off from the roof and sub-floor space to meet code compliance with NZBC Clause E2.3.5.

14.3 Shadowclad® Ventilated Cavity allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet code compliance with Clause E2.3.6.

14.4 The details given in the Technical Literature for weather sealing are based on the principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.

14.5 Shadowclad® Ventilated Cavity, where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirements for junctions, penetrations, etc to remain weather resistant.

## Internal Moisture

15.1 Buildings must be constructed with an adequate combination of thermal resistance and ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

### Water Vapour

15.2 Shadowclad® Ventilated Cavity is not a barrier to the passage of water vapour, and when installed in accordance with this Appraisal will not create a risk of moisture damage resulting from condensation.

## Installation Information

### Installation Skill Level Requirements

16.1 Installation and finishing of Shadowclad® Ventilated Cavity must be completed by competent, experienced tradespersons with an understanding of cavity installation, in accordance with instructions given within the Shadowclad® Ventilated Cavity Technical Literature and this Appraisal.

### Shadowclad® Ventilated Cavity Installation

#### Building Underlay and Flexible Sill and Jamb Tape Installation

17.1 The selected building underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturers' instructions prior to the installation of the cavity battens and the rest of the Shadowclad® Ventilated Cavity system. Flexible building underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Generic rigid underlay materials must be installed in accordance with NZBC Acceptable Solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems shall be installed in accordance with the manufacturer's instructions. Particular attention must be paid to the installation of the building underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

#### Cavity Batten Installation

17.2 The cavity battens must be installed over the building underlay to the wall framing at maximum 300 mm horizontal centres where the studs are at 600 mm centres or at 400 mm centres when studs are at 400 mm centres.

17.3 When the cavity battens are part of a structural bracing system they must be fixed in place with 50 x 2.8 mm hot-dip galvanised or stainless steel ring shank flat head hand driven nails at 150 mm centres when over studs, and to the top and bottom plates and dwangs when between studs. The nail fixings must be staggered 12 mm either side of the batten centre line.

17.4 When the cavity battens are not under a structural bracing system they are fixed in place with 50 x 2.8 mm hot-dip galvanised or stainless steel ring shank flat head nails at 300 mm centres when over studs or plates, and to the top and bottom plates and dwangs when between studs.

### Shadowclad® Sheet Installation

17.5 Shadowclad® sheets may be cut on site by power or hand saw. Holes and cut-outs may be formed by using a hole saw.

17.6 Shadowclad® sheets must be dry prior to installation. Before the sheets are installed, cut edges must be sealed with a brush-on timber preservative. The bottom edges and back of the Shadowclad® sheets to a height of 150 mm must be primed or stain coated at ground level and where the sheets are installed above apron flashings on roofs.

17.7 Shadowclad® sheets must be installed starting at the bottom of the wall. The bottom of the Shadowclad® sheets must overhang the bottom plate by a minimum of 50 mm.

17.8 Before the Shadowclad® sheets are installed, the corner detail must be prepared to suit the selected option, e.g. external box angle or boxed corner. The necessary flashings must be installed before commencing sheet fixing.

17.9 The Shadowclad® sheets are fixed with 60 x 2.8 mm hot dip galvanised or ring shanked stainless steel flat head nails, or 8 gauge x 65 mm mechanically zinc plated or stainless steel wood screws at 150 mm centres around the edge of the sheets starting at the corners and at 300 mm centres in the body of the sheet. The fasteners must be no closer than 7 mm to the sheet edges, and on the rebated edge the fasteners must be inside the weather groove.

### Aluminium Joinery Installation

17.10 Aluminium joinery and associated head flashings must be installed by the building contractor in accordance with the Technical Literature. A 7.5 – 10 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place.

### Finishing

17.11 The coating manufacturer's instructions must be followed at all times for application of the paint or stain finish. Shadowclad® Sheets must be painted or stained as soon as practicable following fixing and must be clean and dry before commencing. If Shadowclad® sheets are exposed to the weather for more than 3 months, the surfaces must be washed with a mild detergent solution to remove any dirt, dust, mould or sea spray prior to coating. Allow the recommended drying time between coats and follow the temperature limitations for application.

17.12 Coatings should be applied by brush to ensure adequate coating film build is achieved. Application via roller or spray is not recommended.

### Inspection

17.13 The Technical Literature must be referred to during the inspection of Shadowclad® Ventilated Cavity installations.

## Health and Safety

18.1 Cutting of Shadowclad® sheets must be carried out in well ventilated areas and eye and hearing protection must be worn.

18.2 Safe use and handling procedures for the components that make up Shadowclad® Ventilated Cavity are provided in the relevant manufacturer's Technical Literature.

## Basis of Appraisal

The following is a summary of the technical investigations carried out:

### Tests

19.1 The following testing has been completed by BRANZ:

- BRANZ expert opinion on NZBC E2 code compliance for Shadowclad® Ventilated Cavity was based on testing and evaluation of all details within the scope and as stated within this Appraisal. Shadowclad® Ventilated Cavity details were tested to E2/VM1. The testing assessed the performance of the foundation detail, window head, jamb and sill details, vertical and horizontal Shadowclad® joints, internal and external corners. In addition to the weathertightness test, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of Acceptable Solution E2/AS1 for cavity-based plywood claddings.
- Wind face load and fastener slip testing for Shadowclad® Ventilated Cavity. BRANZ determined design wind suction pressures, and by comparing these pressures with the NZS 3604 design wind speeds and AS/NZS 1170 pressure coefficients, the fixing requirements given in the Technical Literature were confirmed as suitable for timber framed walls.
- P21 testing of Shadowclad® Ventilated Cavity was carried out by BRANZ and expert opinion given to confirm the wall bracing ratings given in the Technical Literature.

### Other Investigations

20.1 Structural and durability opinions have been provided by BRANZ technical experts.

20.2 The performance and testing of plywood wall cladding products in New Zealand and Australia has been considered, including the structural and weathertightness performance, durability and non-hazardous nature.

20.3 Site visits have been carried out by BRANZ to assess the practicability of installation and to examine completed installations.

20.4 The Technical Literature for Shadowclad® Ventilated Cavity has been examined by BRANZ and found to be satisfactory.

## Quality

21.1 The manufacture of Shadowclad® has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.

21.2 The quality of materials, components and accessories supplied by Carter Holt Harvey Woodproducts New Zealand is the responsibility of Carter Holt Harvey Woodproducts New Zealand. The quality control system for the manufacture of Shadowclad® has been assessed and registered as meeting the requirements of AS/NZS 2269 by the Engineered Wood Products Association of Australasia, Certificate No. 911 and ISO 9001 by TELARC, Certificate No. 130.

21.3 The quality control system for the timber treatment of Shadowclad® has been assessed and registered as meeting the requirements of the AasureQuality Timber Treatment Programme for treated timber by the New Zealand Timber Preservation Council Inc., Licence Number 46 for CCA treatment by Carter Holt Harvey and Licence Number 149 for H3.1 LOSP treatment by North Sawn treatment BOP Ltd.

21.4 Quality of installation on site of components and accessories supplied by Carter Holt Harvey Woodproducts New Zealand and the building contractor is the responsibility of the installer.

21.5 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing solutions and joinery, building underlays, flashing tapes, cavity battens, airseals and Shadowclad® sheets in accordance with the instructions of Carter Holt Harvey Woodproducts New Zealand.

21.6 Building owners are responsible for the maintenance of Shadowclad® Ventilated Cavity in accordance with the instructions of Carter Holt Harvey Woodproducts New Zealand.

### Sources of Information

- AS 3730 Guide to the properties of paints for buildings.
- AS/NZS 1170:2002 Structural design actions.
- AS/NZS 4680:2006 Hot-dip galvanized (zinc) coatings on fabricated ferrous articles.
- NZS 3602:2003 Timber and wood-based products for use in building.
- NZS 3603:1993 Timber Structures Standard.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4211:2008 Specification for performance of windows.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (including Amendment 5, 1 August 2011).
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition (Amendment 12, 10 October 2011).
- The Building Regulations 1992.

**BC 150134**



**BRANZ**

In the opinion of BRANZ, Shadowclad® Ventilated Cavity Cladding System 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 Carter Holt Harvey Woodproducts New Zealand, and is valid until further notice, subject to the Conditions of Appraisal.

**Conditions of Appraisal**

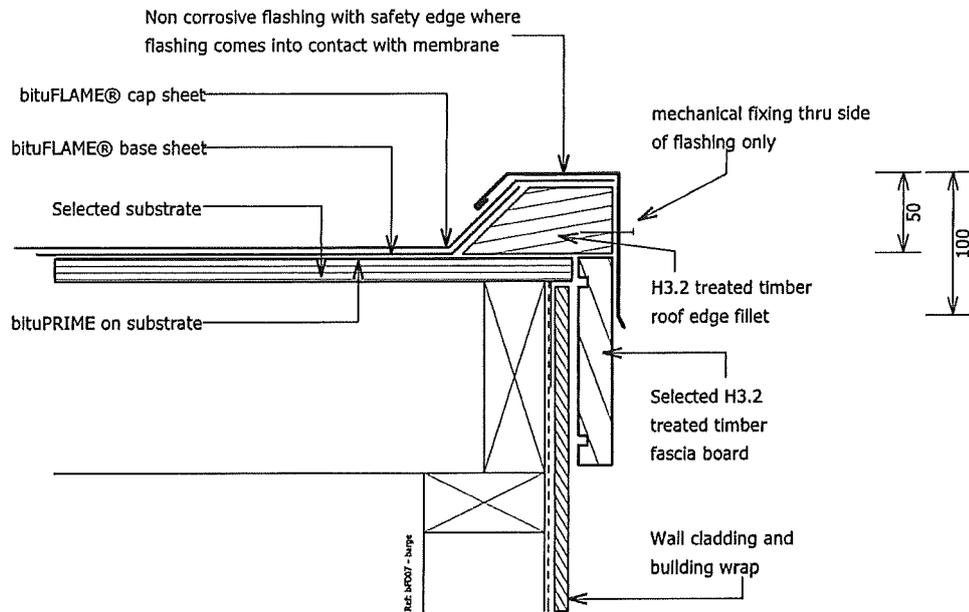
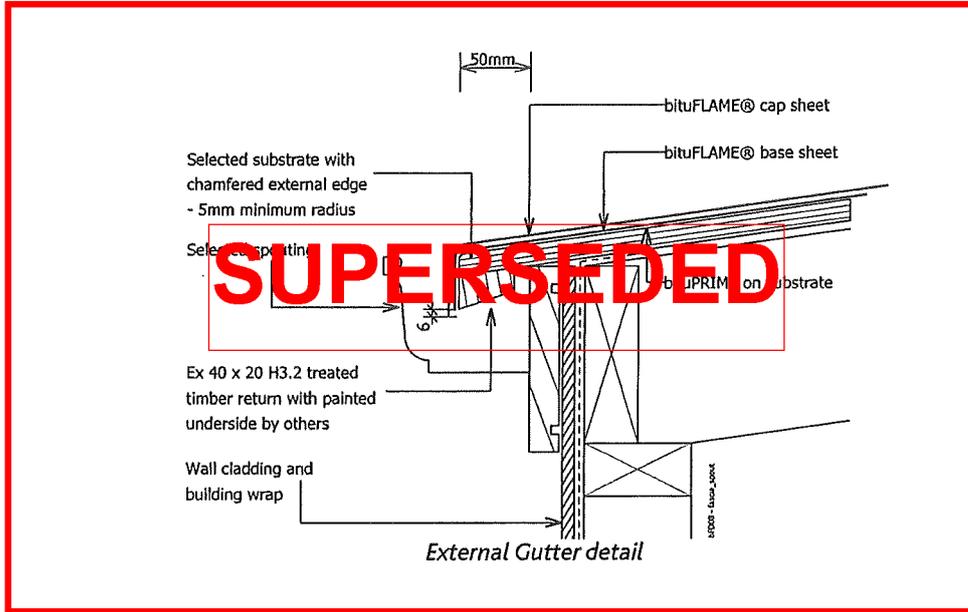
1. This Appraisal:
  - a) relates only to the product as described herein;
  - b) must be read, considered and used in full together with the technical literature;
  - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
  - d) is copyright of BRANZ.
2. Carter Holt Harvey Woodproducts New Zealand:
  - 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 Carter Holt Harvey Woodproducts New Zealand.
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 Carter Holt Harvey Woodproducts New Zealand or any third party.

For BRANZ

P Burghout  
Chief Executive

Date of issue: 23 December 2011

DOUBLE LAYER DETAILING

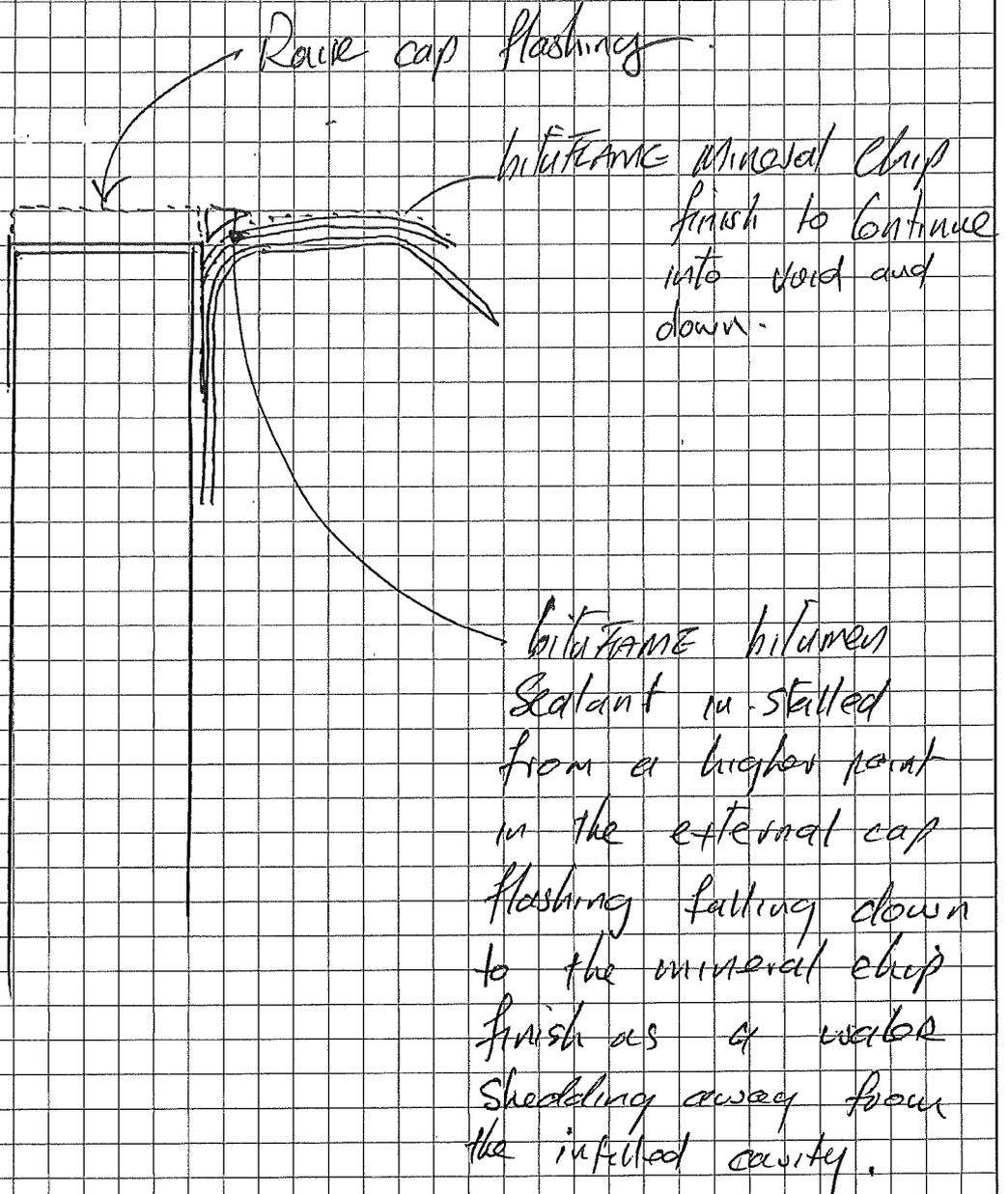


Bargeboard detail

Date: 6/4/2014

Ref: BituFLAME externa

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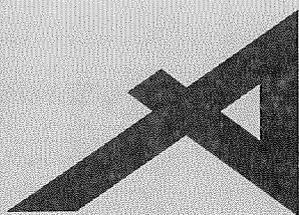
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- bituFLAME** TORCH-ON MEMBRANES
- epiROOF** EPDM RUBBER MEMBRANES
- epiSPAN** WIDE SHEET EPDM RUBBER MEMBRANE
- ecoTUFF** REINFORCED TPO WELDABLE MEMBRANES
- ecoROOF** ECO FRIENDLY ROOFING
- skyGARDEN** GARDEN ROOF SYSTEM
- sunROOF** MEMBRANE SOLAR CELL POWER GENERATION

- warmROOF** INSULATED ROOFING
- dekMASTER** PVC TRAFFICABLE MEMBRANE
- duroMEMBRANES** LIQUID APPLIED MEMBRANE SYSTEM
- ULTRA** CEMENTITIOUS WATERPROOFING
- raviMAT** BENTONITE TANKING AND WATERPROOFING
- bituBOND** SELF ADHESIVE TANKING MEMBRANE
- schluterDITRA** UNDER TILE UNCOUPLING SYSTEM





**BRANZ Appraised**  
Appraisal No.404 [2008]

**BRANZ Appraisals**

Technical Assessments of products  
for building and construction

## **BRANZ APPRAISAL No. 404 (2008)**

This Appraisal replaces BRANZ  
Appraisal No. 404 (2005) issued  
9 August 2005.

Amended 20 June 2013

## **bituFLAME® ROOF MEMBRANE SYSTEMS**

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**BRANZ**

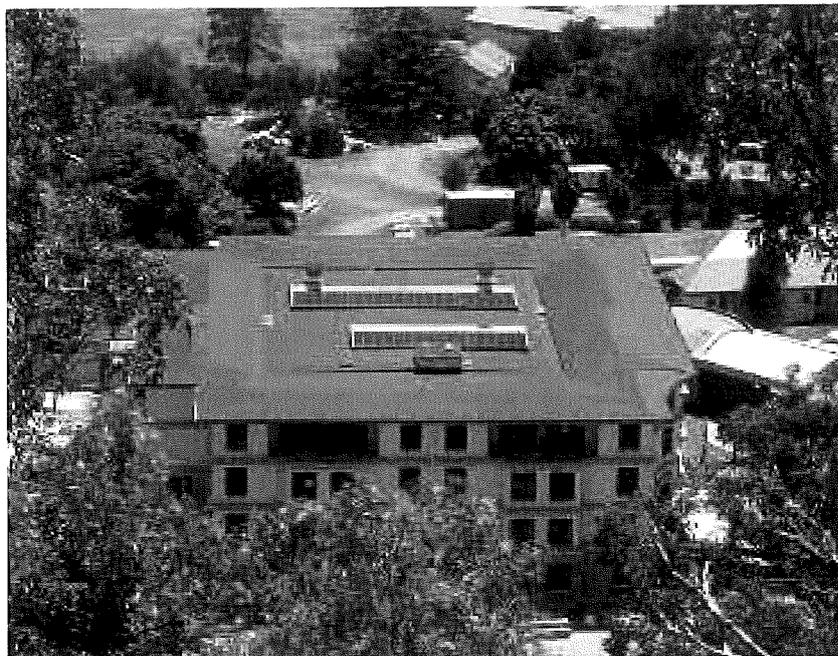
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## Product

1.1 bituFLAME® Roof Membranes are waterproofing membranes for nominally flat, pitched and curved roofs, gutters and parapets. They are installed as a multi layer system with either a mineral chip finished product (bituFLAME® CS Granule) or a fleece finished layer (bituFLAME® CS Mat) with UV protective paint as the top layer, or as a single layer system (bituFLAME® BS) onto a concrete substrate under heavy protection such as paving slabs or a topping screed.

1.2 Both the products are supplied as torch-on, reinforced, polymer-modified bitumen sheets in roll form. The membranes can be fully torched, mechanically or adhesive fixed.



## Scope

2.1 bituFLAME® Roof Membranes have been appraised as roof waterproofing membranes on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with respect to building height and maximum floor plan areas; and,
- with building structures designed and constructed to meet the requirements of the NZBC; and,
- with roof supporting structures of timber framing with substrates of plywood; and,
- with substrates of suspended concrete slabs; and,
- situated in NZS 3604 Wind Zones, up to, and including 'Very High'.

2.2 bituFLAME® Roof Membranes have also been appraised for use as roof waterproofing membranes on specifically designed buildings within the following scope:

- with building structures designed and constructed to comply with the NZBC; and,
- with roof supporting structures of timber framing with substrates of plywood; and,
- with substrates of suspended concrete slab; and,
- subjected to maximum wind pressures (Refer Paragraph 8.2); and,
- with the weathertightness design of all junctions being the subject of specific design by the designer.

*Note: The design of these junctions has not been appraised by BRANZ and is outside the scope of this Appraisal.*

2.3 Roofs waterproofed with bituFLAME® Roof Membranes must be designed and constructed in accordance with the following limitations:

- nominally flat, curved or pitched roofs constructed to drain water to gutters and drainage outlets complying with the NZBC; and,
- constructed to suitable falls (Refer Paragraph 14.3 and 14.4); and,
- with no integral roof gardens.

2.4 The design and construction of the substrate and movement and control joints is specific to each building, and therefore is the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.

2.5 The membranes must be installed by Waterproofing System Ltd approved installers in accordance with the Waterproofing System Ltd Technical Literature referenced in Paragraph 6.1.

## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, bituFLAME® Roof Membrane Systems, 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. bituFLAME® Roof Membrane Systems meet this requirement. See Paragraph 10.1. Performance B2.3.1 (c), 5 years. Alugard, Sungard and Synroof Hi Build meet this requirement. See Paragraph 10.2.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.1 and E2.3.2. bituFLAME® Roof Membrane Systems meet these requirements. See Paragraphs 14.1 – 14.9.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. bituFLAME® Roof Membrane Systems meet this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance. The membranes are an alternative to the membranes specified in NZBC Acceptable Solution E2/AS1, and an Alternative Solution subject to specific design for other buildings not covered within E2/AS1.

## Technical Specification

4.1 Materials supplied by Waterproofing Systems Ltd are as follows:

### bituFLAME® CS Mat

- These are torch-on membranes either 3.0 or 4.0 mm thick with a fleece upper layer and 180 - 200 g/m<sup>2</sup> spun-bonded polyester fabric reinforcement. They are designed to be used as a single or double layer system with UV protection. They are available in 10 m x 1 m rolls.

### bituFLAME® CS Granule Membrane

- A 4.0 mm thick torch-on membrane with a mineral chip finished top surface and a thermofusible polyethylene foil film backing. Designed to be used as a single or a cap layer for double layer systems. It is available in white, green, terracotta or black mineral chip finish.

### bituFLAME® BS Membrane

- A 2.0 or 3.0 mm thick membrane with a polythene top surface and 60 g/m<sup>2</sup> glassfibre mat reinforcement. It is available in 20 m x 1 m rolls and 10 m x 1 m rolls. It is designed to be used as a base sheet for double layer systems or as an underflashing.

### bituPRIME Primer

- A solvent-based, fast drying bituminous primer designed to penetrate concrete or plywood surfaces and provide a bondable surface. It is available in 20 litre cans.

### Alugard UV Coating

- A fortified liquid membrane containing polished aluminum flakes. It is applied to sand-finished membranes as a UV protection.

### duroTUFF® UV Coating

- An acrylic high build membrane used for UV protection where a specific colour finish is required

### DPC Tapes

- A tape used on all plywood joints under a single layer system. The tapes are 50 mm wide.

### bituBOND® Adhesive

- A water-based bitumen adhesive used for glue fixing torch-on membranes to gutters, parapets and other difficult detailing areas.

Table 1: Membrane Systems

System	Single Layer	Double Layer	Protection Required
bituFLAME® CS Mat Membranes	4.0 mm		Paving slabs or cement screeds
bituFLAME® BS Membranes		2.0 or 3.0 mm bituFLAME® BS with 4.0 mm top layer	Alugard, Sungard, duroTUFF®, paving slabs or cement screeds
bituFLAME® CS Granule Membrane		2.0 or 3.0 mm bituFLAME® BS with 4.0 mm top layer	Standard finish of material

## Handling and Storage

5.1 Handling and storage of all materials whether on or off site is under the control of the Waterproofing Systems Ltd trained installers. Dry storage must be provided for all products and the rolls of membrane must be stored in an upright position.

## Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the bituFLAME® Roof Membranes. 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 bituFLAME® Roof Membranes are for use on roofs, gutters and parapets where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas. The products can be used on new or existing buildings. Waterproofing Systems Ltd should be consulted as to the suitability of any existing substrates prior to using bituFLAME® Roof Membranes.

7.2 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membranes. Refer to BRANZ publication "Good Practice Guide - Membrane Roofing".

7.3 The 2.0 mm or 3.0 mm thick bituFLAME® BS membrane is designed for use on roofs and gutters as the first layer of a double layer system and all areas requiring detailing such as upstands, protrusions, rainwater heads and outlets. The bituFLAME® CS membrane can be used as the top layer of a double layer system, or as a single layer system, see Table 1.

## Structure

8.1 Where mechanical fasteners or adhesive fixing is used within the higher wind uplift roof areas. The higher wind uplift roof areas are all roof areas adjacent to roof edges, ridges and hips, and generally for a distance of 1.5 metres away from the roof edge, ridge or hip. On buildings in the 'High' and 'Very High' Wind Zones, the fasteners or adhesive fixings must be at maximum 200 mm centres. All other roof areas or the whole roof on buildings in the 'Low' or 'Medium' Wind Zones may have mechanical fasteners or adhesive fixings at maximum 300 mm centres. It should be noted that all membranes in all Wind Zones, including the base layer in two layer systems, must be fully bonded for a distance of 200 mm from the roof perimeter.

8.2 bituFLAME® Roof Membranes as fully bonded single or double layer systems are suitable for use in areas subject to maximum wind pressures of 6 kPa Ultimate Limit State.

## Substrates

### Plywood

9.1 Plywood must be treated to H3 (CCA treated). LOSP treated plywood must not be used. Plywood must comply with NZBC Acceptable Solution E2/AS1 Paragraph 8.5.3 and 8.5.5. Where specific design is used (i.e. outside the scope of E2/AS1) the plywood thickness and fixing size may increase and centres may decrease to meet specific wind loadings. Timber framing must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases, framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and all sheet edges are fully supported.

### Concrete

9.2 Concrete substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101.

### Existing Construction

9.3 A thorough inspection of the substrate must be made to ensure it is in fit condition and does not contain any materials that will adversely affect the performance of the membrane.

9.4 Repairs must be undertaken, where applicable, to ensure the substrate is sound, the joints are sealed, and the flashings are sound. Plywood substrates must be checked for screw fixings, and if necessary refixed as for new plywood.

## Durability

### Serviceable Life

10.1 bituFLAME® Roof Membranes are expected to have a serviceable life of at least 15 years, provided they are designed, used, installed and maintained in accordance with this Appraisal and the Technical Literature.

10.2 Alugard and duroTUFF® are expected to have a serviceable life of at least 5 years provided they are used, installed and maintained in accordance with this Appraisal and the Technical Literature.

### Chemical Resistance

10.3 Industrial air pollutants and windborne salt deposits should not significantly affect the durability of the membranes. However, the long term properties of the material may be affected by contact with petroleum-based products such as oils, greases and solvents.

## Maintenance

11.1 The membrane roof system, including any areas with a UV coating applied, must be regularly (at least annually) checked for damage, rubbish, debris or coating breakdown. Damage, such as small punctures and tears must be repaired and coatings reapplied as recommended by Waterproofing Systems Ltd.

11.2 Special care must be taken when inspecting the membrane roof systems to ensure the continuing prevention of moisture ingress, and repairs must be undertaken where required.

11.3 Drainage outlets must be maintained to operate effectively.

## Prevention of Fire Occuring

12.1 Separation or protection must be provided to bituFLAME® Roof Membranes 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/MM1 provide methods for separation and protection of combustible materials from heat sources.

## External Moisture

13.1 Roofs must be designed and constructed to shed precipitated moisture. They must also take account of snowfalls in snow prone areas.

A means of meeting code compliance with NZBC Clause E2.3.1 is given by the Technical Literature which aligns with details in NZBC Acceptable Solution E2/AS1.

13.2 When installed in accordance with this Appraisal and the Technical Literature, bituFLAME® Roof Membranes will prevent the penetration of water and will therefore meet code compliance with Clause E2.3.2. The membranes are impervious to water and will give a weathertight roof.

13.3 Roof falls must be built into the substrate and not created with mortar screeds applied over the membrane.

13.4 The minimum fall to roofs is 1 in 30 and gutters are 1 in 60. All falls must slope to an outlet. Inadequate falls will allow moisture to collect and increase the risk of deterioration of the membrane.

13.5 Allowance for deflection and settlement of the substrate must be made in the design of the roof to ensure falls are maintained and no ponding of water can occur.

13.6 bituFLAME® Roof Membranes are impermeable; therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with Clause E2.3.6.

13.7 Drainage flanges must be used for any outlet and must be fitted with a grate or cage to reduce potential sources of blockages. An overflow must be provided where the roof does not drain to an external gutter or spouting.

13.8 Penetrations and upstands of the membranes must be raised above the level of any possible flooding caused by the blockage of roof drainage.

13.9 The design of details not covered by the Technical Literature is subject to specific weathertightness design and is outside the scope of this Appraisal.

## Water Supplies

14.1 Water is not contaminated by bituFLAME® Roof Membrane Systems.

14.2 The first 25 mm of rainfall from a newly installed bituFLAME® Roof Membrane Systems roof must be discarded before drinking water collection starts. This is to remove residues which may have developed in the processes involved in the production of a bituFLAME® Roof Membrane Systems roof.

14.3 Though bituFLAME® Roof Membrane Systems won't contaminate water, it must be noted that all water collected off roof surfaces made from any material is considered to be non-potable due to possible contamination from other sources. Water collection in this way can only be considered potable if it has been passed through a suitable sterilization system. Sterilization systems such as this have not been assessed and are outside the scope of this Appraisal.

## Installation Information

### Installation Skill Level Requirement

15.1 Installation of the membranes must be completed by trained installers, approved by Waterproofing Systems Ltd.

15.2 Installation of substrates must be completed by tradespersons with an understanding of roof construction, in accordance with instructions given within the Waterproofing Systems Ltd Technical Literature and this Appraisal.

### Preparation of Substrates

16.1 Substrates must be dry, clean and stable before installation commences. Surfaces must be smooth and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents. All surface defects must be filled to achieve an even and uniform surface.

16.2 The relative humidity of concrete substrates must be 75% or less before membrane application. The concrete can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 424.

16.3 The moisture content of the plywood and timber substructure must be a maximum of 20% and the plywood sheets must be dry at time of membrane application. This will generally require plywood sheets to be covered until just before the membrane is laid, to prevent rain wetting.

16.4 Substrates must be primed with bituPRIME Primer and left to dry (4-5 hours) before the membrane is installed.

### Membrane Installation

17.1 The membrane must be installed in accordance with the Technical Literature.

17.2 Plywood joints under a single layer must be taped with 50 mm wide DPC tape. All roof and wall junctions must have a 20 mm x 20 mm wooden fillet installed at the junction. Concrete substrate junctions must have a 20 mm x 20 mm cement mortar fillet installed. All external edges must be chamfered to a 5 mm radius to remove sharp edges.

17.3 The membrane must be unrolled without tension onto the prepared substrate and allowed to 'relax' for at least 30 minutes prior to installation.

17.4 The membrane is installed from the lowest point and each layer is installed across the roof fall allowing a 100 mm side overlap and a 150 mm end overlap. The cap sheet layer of a double layer system must be offset against the base sheet layer.

## Inspections

18.1 Critical areas of inspection for waterproofing systems are:

- Construction of substrates, including crack control and installation of bond breakers and movement control joints.
- Moisture content of the substrate prior to the application of the membrane.
- Acceptance of the substrate by the membrane installer prior to application of the membrane.
- Installation of the membrane to the manufacturer's instructions.

## Health and Safety

19.1 Safe use and handling procedures for bituFLAME® Roof Membrane Systems are provided in the Technical Literature. The products must be used in conjunction with the relevant Material Safety Data Sheets for each membrane.

## Basis of Appraisal

The following is a summary of the technical investigations carried out:

### Tests

20.1 The following is a summary of the testing of bituFLAME® Membranes undertaken by BRANZ, and testing by other organizations as listed that has been reviewed by BRANZ and found to be satisfactory:

- BRANZ – Cyclic joint movement to ASTM D5849-95, and nail pull-through and spot bonding peel to ascertain load resistances and tensile adhesion.
- Bitumat Company – Q.U.V. to ASTM G-53; and softening point, penetration, low temperature flexibility, heat resistance of product after artificial ageing, and lap joints after artificial ageing for joint integrity and tensile strength of joint, all to UEAtc methods.
- Materials Science and Engineering Consultants, USA – breaking strength, ultimate elongation, load strain, water resistance, low temperature flexibility, water vapour transmission, dynamic impact, lap joint strength, strength after accelerated weathering and crack bridging capability to CGSB 37-GP-56M and various ASTM standards.
- Al Hoty-Stanger Ltd, Kingdom of Saudi Arabia - thickness, width, cold flexibility, low temperature, softening point, penetration, tear resistance, tensile strength, elongation, load strain, lap joint strength, heat resistance, static indentation, dynamic punching test, all to UEAtc methods; water absorption to ASTM D 570; compressibility; and resistance to hydrostatic pressure to DIN 1048.
- Bureau Veritas International – thickness, weight, flexibility, water absorption, permeability, elongation and shore hardness.
- Saudi Socotec – width, length, weight, thickness, resistance to heat, tensile strength, elongation, tear resistance, softening point, penetration, lap joint strength, cold pliability and puncture resistance all to UEAtc methods.
- Saudi Veritas Ltd – tensile strength, softening point, penetration, cold flexibility, thickness, width, weight, flow, elongation, tear resistance and puncture resistance.

## Other Investigations

- 21.1 A durability opinion has been provided by BRANZ technical experts.
- 21.2 Installation of the membranes has been assessed by BRANZ for practicability of installation and found to be satisfactory.
- 21.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

## Quality

- 22.1 The manufacture of the membranes 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.
- 22.2 The quality of the supply of products to the New Zealand market is the responsibility of Waterproofing Systems Ltd.
- 22.3 Quality on site is the responsibility of the Waterproofing Systems Ltd approved installers.
- 22.4 Designers are responsible for the building design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of Waterproofing Systems Ltd and this Appraisal.
- 22.5 Building owners are responsible for the maintenance of the membrane systems in accordance with the instructions of Waterproofing Systems Ltd and this Appraisal.

## Sources of Information

- AS/NZS 1170: 2002 Structural design action - General principles
- AS/NZS 2269: 2008 Plywood – Structural.
- BRANZ Good Practice Guide – Membrane Roofing, reprint October 2003.
- NZS 3101: 2006 The design of concrete structures.
- NZS 3604: 2011 Timber-framed buildings.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (Amendment 5, 1 August 2011).
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.

**BC 150134**

### Amendment No. 1, dated 12 November 2009.

This Appraisal has been amended to update multi-layer versus single-layer references.

### Amendment No. 2, dated 31 January 2012.

This Appraisal has been amended to update clause changes as required by the introduction of NZS 3604: 2011 and NZBC Acceptable Solution E2/AS1 Third Edition, Amendment 5.

### Amendment No. 3, dated 10 June 2013.

This Appraisal has been amended to update clause changes as required by the introduction of NZBC Fire Clauses C1 – C6 Protection from Fire and A3 Building Importance Levels.

### Amendment No. 4, dated 20 June 2013.

This Appraisal has been amended to remove Sunguard and addition of Water Supplies.



In the opinion of BRANZ, bituFLAME® Roof Membrane Systems are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal. The Appraisal is issued only to Waterproofing Systems Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

#### Conditions of Appraisal

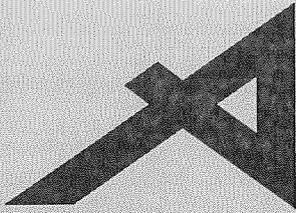
1. This Appraisal:
  - a) relates only to the product as described herein;
  - b) must be read, considered and used in full together with the technical literature;
  - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
  - d) is copyright of BRANZ.
2. Waterproofing Systems 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.
3. 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.
4. 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 Waterproofing Systems Ltd.
5. 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.
6. BRANZ provides no certification, guarantee, indemnity or warranty, to Waterproofing Systems Ltd or any third party.

For BRANZ

A handwritten signature in black ink, appearing to read "Peter Burghout".

P Burghout  
Chief Executive

Date of issue: 19 December 2008



**BRANZ Appraised**  
Appraisal No.827 [2014]

BRANZ Appraisals  
Technical Assessments of products  
for building and construction

**BRANZ**  
**APPRAISAL**  
**No. 827 (2014)**

**ECOPLY® BARRIER**  
**RIGID AIR BARRIER**

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## Product

1.1 The Ecoply® Barrier Rigid Air Barrier is sealed plywood sheets and tapes designed for use as a rigid wall underlay and air barrier (sheathing) behind cavity wall cladding systems. Ecoply Barrier is also for use as a wall bracing system to resist wind and earthquake loads on timber framed buildings.



## Scope

2.1 Ecoply Barrier has been appraised for use as a rigid wall underlay, air barrier and temporary weather-protecting sheathing on timber framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained and vented cavity; and,
- with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
- situated in NZS 3604 Wind Zones up to, and including 'Extra High'.

2.2 Ecoply Barrier has also been appraised for use as wall bracing systems for timber framed buildings within the scope of NZS 3604.

## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Ecoply Barrier, 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 B1 STRUCTURE:** Performance B1.3.1, B1.3.2 and B1.3.4. Ecoply Barrier meets the requirements for loads arising from earthquake and wind [i.e. B1.3.3 (f) and (h)]. See Paragraphs 8.1 - 8.4.

**Clause B2 DURABILITY:** Performance B2.3.1(a), not less than 50 years, B2.3.1(b), 15 years and B2.3.2. Ecoply Barrier meets these requirements. See Paragraphs 9.1 - 9.3.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. When used as part of the wall cladding system, Ecoply® Barrier will contribute to meeting this requirement. See Paragraphs 12.1 and 12.2.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. Ecoply Barrier meets this requirement and will not present a health hazard to people.

3.2 Ecoply Barrier is an **Acceptable Solution** rigid wall underlay and air barrier material in terms of compliance with NZBC Acceptable Solution E2/AS1, Table 23. This is also an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

3.3 Ecoply Barrier can be used to satisfy the bracing demand requirements of Section 5 of NZS 3604 which is an NZBC Compliance Document.

### Technical Specification

4.1 The components and accessories for Ecoply Barrier, which are supplied by Carter Holt Harvey Woodproducts New Zealand are:

- Ecoply Barrier sheets are 7 mm thick, 1200 mm wide and 2440 and 2745 mm long structural plywood, manufactured from radiata pine in accordance with AS/NZS 2269, and H3.2 CCA treated in accordance with AS/NZS 1604.3. The sheets are coated on the front face and four edges with a beige polyester powder coating. Plywood sheets are marked Ecoply Barrier for identification.
- Ecoply Sealing Tape – 60 mm x 30 m, tape for sheet joints.
- Ecoply Frame Flashing Tape – 150 mm x 30 m.
- Ecoply Sill Tape – 150 mm x 20 m.

Tapes are marked Ecoply and type for identification.

4.2 The components and accessories for the Ecoply Barrier, which are supplied by the building contractor are:

- Ecoply Horizontal Joints – PVC horizontal 'Z' flashing supplied by E2 Flashing Solutions.
- Fasteners - 50 x 2.8 mm flat head hand-driven nails, hot-dip galvanised or stainless steel. Paslode Impulse 50 x 2.8 mm round head gun-nails. Hot-dip galvanised or stainless steel. Stainless steel nails must be ring shanked.

(Note: Hot-dip galvanising must comply with AS/NZS 4680 and stainless steel must be Grade 304 or 316.)

- Bracing panel end stud connection: GIB HandiBrac® galvanised steel 90 x 62 x 54 x 1.55 mm thick angle bracket, GIB HandiBrac® fixings, 8 Type 17 screws 5 x 35 mm.
- Timber floor end stud hold down: 12 mm x 150 mm hot-dipped galvanised coach screws.
- Concrete floor end stud hold down: cast-in bolts M12 x 150 mm minimum or proprietary fixings with a minimum characteristic strength of 15 kN.

### Handling and Storage

5.1 Handling and storage of all materials supplied by Carter Holt Harvey Woodproducts New Zealand or the building contractor, whether on or off site, is under the control of the building contractor. Ecoply Barrier plywood sheets must be stacked flat, off the ground and supported on a level platform. They must be kept dry at all times either by storing under cover or providing waterproof covers to the stack. Care must be taken to avoid damage to edges, ends and surfaces. The Ecoply Tapes must be protected from damage and weather and stored in clean, dry conditions away from direct exposure to sunlight. uPVC joints must be protected from physical damage and should be stored flat and under cover.

5.2 Other accessories must be stored so they are kept clean, dry and undamaged.

### Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Ecoply Barrier Specification & Installation Guide which must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Ecoply Barrier Specification & Installation Guide and within the scope of this Appraisal must be followed.

### Design Information

#### General

7.1 Ecoply Barrier is intended for use as rigid wall underlay and air barrier fixed over timber framed walls in order to support wind pressures and to act as a secondary barrier to wind-driven rain. With all joints sealed with Ecoply Tapes no flexible wall underlay is required over the Ecoply Barrier plywood.

7.2 Commencing from installation, the Ecoply Barrier including Ecoply Tapes must not be exposed to the weather for more than 90 days.

7.3 Ecoply Barrier may be used as a temporary weather protecting sheathing to allow the insulation and internal lining of the building to proceed before the wall cladding is installed. To achieve temporary weathertightness, all joints, internal and external corners of the Ecoply Barrier must be sealed, the roof cladding and soffit linings must be installed, the flexible sill and jamb flashing tape system must be installed around the window and door openings, and the window and door joinery must be installed complete with head flashings and air seals. The timber wall framing must have a maximum moisture content as specified by the internal lining system supplier at the time of the insulation installation and internal lining application.

7.4 Ecoply Barrier is suitable for use under wall claddings as a rigid wall underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23 on timber framed buildings. Refer to Table 1.

Table 1: NZBC E2/AS1 Table 23 Requirements

NZBC E2/AS1 Table 23 Rigid Wall Underlay Properties	Property Performance Requirement	Ecoply Barrier Actual Property Performance
Vapour Resistance	≤ 7 MN s/g	2.2 MN s/g
Absorbency	≥ 100 g/m <sup>2</sup>	1451 g/m <sup>2</sup>
Water Resistance	≥ 20 mm	Pass

#### Timber Treatment

7.5 Timber wall framing behind the Ecoply Barrier must be treated as required by NZBC Acceptable Solution B2/AS1.

#### Timber Framing

7.6 Timber framing must be minimum structural grade SG8 and must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170 considering local factors. In all cases studs must be at maximum 600 mm centres. Dwangs must be fitted flush between the studs at maximum 1200 mm centres. (Note: The timber framing must also be suitable for the selected wall cladding. Refer to the selected cladding system's Technical Literature for specific framing requirements.)

7.7 Timber wall framing where the Ecoply® Barrier plywood sheets are joined must be nominal 50 mm width (i.e. 45 mm minimum finished width).

7.8 Timber framing must be kiln dried and as dry as practically possible at the time of the Ecoply Barrier installation.

**Ecoply Barrier Set Out**

7.9 All Ecoply Barrier plywood sheet edges must be fully supported by framing.

7.10 Ecoply Barrier must be installed vertically. At the base of the wall the plywood sheets must hang below the bottom plate a minimum of 15 mm, up to a maximum of 40 mm.

**Ecoply Barrier Plywood and Cladding Fixing**

7.11 Ecoply Barrier plywood sheets must be fixed at maximum 150 mm centres around the perimeter of each sheet and at maximum 300 mm centres to intermediate studs. In 'Extra High' Wind Zones, the fixing centres on the intermediate studs must be closed up to maximum 150 mm centres. The fixings are at the same centres regardless of whether the Ecoply Barrier plywood is being used for bracing or not.

7.12 The length of the selected wall cladding fasteners must be increased by a minimum of 7 mm to maintain the face load strength of the wall cladding system.

**Structure**

**Mass**

8.1 The mass of Ecoply Barrier is approximately 4.0 kg/m<sup>2</sup>. This mass must be added to the selected wall cladding system mass when determining the overall wall cladding mass in terms of NZS 3604.

**Wind Zones**

8.2 Ecoply Barrier is suitable for use in all Wind Zones of NZS 3604, up to, and including, 'Extra High'.

**Bracing**

8.3 The bracing units achieved (wind and earthquake) for the Ecoply Barrier are given in Table 2. The Technical Literature gives details of edge and end fixing distances and provides comprehensive construction and panel hold-down details.

8.4 The bracing units are derived from the BRANZ P21 test method based on a wall height of 2.4 m. For greater wall heights the bracing rating is calculated by multiplying the appropriate value shown in Table 2 by a factor  $f=2.4$  and divided by the wall height in metres. Walls lower than 2.4 m shall be rated as if they were 2.4 m in high.

**Table 2: Bracing Ratings for Ecoply Barrier Single Sided Structural Plywood Brace**

Specification No.	Minimum Wall Length	Lining Requirements	Bottom Plate Hold-down and Fixing	BU/m Wind	BU/m Earthquake
EPB1_0.4	0.4 m	7 mm Ecoply Barrier one side	GIB Handibrac® and NZS 3604*	80	95
EPB1_0.6	0.6 m	7 mm Ecoply Barrier one side	GIB Handibrac® and NZS 3604*	95	105
EPB1_1.2	1.2 m	7 mm Ecoply Barrier one side	GIB Handibrac® and NZS 3604*	120	135**
EPBS_0.9	0.9 m	7 mm Ecoply Barrier one side	NZS 3604*	80	80

Notes:

\* Bottom plate fixed in accordance with the requirements of NZS 3604.

\*\* Timber Floors – A limit of 120 BU/m applies to NZS 3604 timber floors.

**Penetrations for Services**

8.5 Small openings for services of up to 90 x 90 mm may be placed no closer than 90 mm to the edge of the bracing element and service penetrations up to a maximum of 150 mm diameter may be placed no closer than 150 mm from the sheet edge, without affecting the bracing rating of the panel.

**Durability**

9.1 Ecoply Barrier meets code compliance with NZBC Clause B2.3.1 (a), not less than 50 years when used where the cladding durability requirement or expected serviceable life is not less than 50 years, e.g. behind masonry veneer, or where it is used as a bracing element, and code compliance with NZBC Clause B2.3.1 (b), 15 years where the cladding durability requirement is 15 years and the Ecoply Barrier is not used as a bracing element.

**Serviceable Life**

9.2 Provided Ecoply Barrier 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, the Ecoply Barrier is expected to have a serviceable life of at least 50 years.

9.3 Areas of geothermal activity and coastal locations can be very corrosive to fasteners, especially coastal locations within distances of up to 500 metres of the sea including harbours, or 100 metres from tidal estuaries and sheltered inlets in some instances. These coastal locations are defined in NZS 3604 as Zone D and stainless steel fasteners must be used. For installation in NZS 3604 Corrosion Zones C and B hot-dip galvanised steel fasteners complying with the requirements of NZS 3604 may be used.

**Maintenance**

10.1 Ecoply Barrier will not normally require maintenance. However, if damage occurs to the cladding or lining protecting the sheathing or to the sheathing itself, then repairs or replacement must be carried out to ensure the integrity of the rigid air barrier.

**Prevention of Fire Occurring**

11.1 Separation or protection must be provided to the Ecoply Barrier and associated combustible materials 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 Ecoply® Barrier must be used behind claddings that meet the performance requirements of NZBC Clause E2.

12.2 Ecoply Barrier, when installed in accordance with the Ecoply Barrier Specification & Installation Guide and this Appraisal, will assist in the total cladding system's compliance with NZBC Clause E2.

## Installation Information

### Installation Skill Level Requirements

13.1 Installation must always be carried out in accordance with the Ecoply Barrier Specification & Installation Guide and this Appraisal, by competent tradespersons with an understanding of rigid wall underlay air barrier and wall bracing system installation.

### System Installation

#### Ecoply Barrier Installation

14.1 Ecoply Barrier plywood sheets may be cut using any circular saw or hand saw tool. Holes and cut-outs may be formed by using a hole saw.

14.2 Sheets must be dry prior to installation. Cut edges that are left exposed must be sealed in accordance with the Ecoply Barrier Specification & Installation Guide prior to installation.

14.3 Prior to fixing Ecoply Barrier plywood sheets, a check must be made to ensure all sheet edges will be supported by framing. At the base of the wall, the sheet must hang below the bottom plate by a minimum of 15 mm.

14.4 Ecoply Barrier plywood sheets must be fixed to the timber framing with 50 x 2.8 mm hot dipped galvanised flat head clouts or 50 x 2.8 mm ring shanked stainless steel nails. Nails may be either hand driven or power driven. Refer to Paragraph 7.11 for fixing centres and Paragraph 9.3 for material selection.

14.5 At vertical joints Ecoply Barrier must be installed with a 1.5 - 3.0 mm gap between the sheet edges. Sheets at horizontal joints between floor levels must be installed with a minimum 15 mm gap between the edges and must be supported over horizontal framing. All horizontal joints must be flashed with the Ecoply Horizontal Jointer.

14.6 Any damaged areas of Ecoply Barrier, or gaps around service penetrations, must be repaired by covering with joint sealing tape.

#### Joint Sealing Tape Installation

14.7 Ecoply Barrier plywood sheets must be cleaned of dust and other surface contaminants prior the application of the joint sealing tape to ensure adequate adhesion is achieved.

14.8 All vertical sheet joints, internal and external corners, penetrations or damaged areas and over driven nails must be covered with Ecoply Sealing Tape. The manufacturer's instructions regarding the application temperatures for the joint sealing tapes must be followed.

#### Flexible Sill and Jamb Tape Installation

14.9 The Ecoply Sill Tape and Ecoply Frame Flashing Tape must be installed in accordance with the Ecoply Barrier Specification & Installation Guide. Particular attention must be paid to the installation of the sill and jamb tapes around window and door joinery openings to ensure all exposed timber wall framing in the opening is protected.

## Inspections

14.10 The Ecoply Barrier Specification & Installation Guide must be referred to during the inspection of the Ecoply Barrier installations.

## Health and Safety

15.1 Ecoply Barrier should be handled in accordance with the Material Safety Data Sheet for H3.2 CCA treated Ecoply.

15.2 When power tools are used for cutting or forming holes, health and safety measures as set out in the Ecoply Barrier Specification & Installation Guide must be undertaken because of the amount of dust generated.

15.3 Safe use and handling procedures for the Ecoply Barrier and the components that make up the cladding system are provided in the relevant manufacturers' Installation Guides.

## Basis of Appraisal

The following is a summary of the technical investigations carried out:

### Tests

16.1 Racking tests were carried out in accordance with BRANZ Technical Paper P21. The earthquake and wind bracing ratings were determined using the evaluation procedures outlined in BRANZ Technical Recommendation No. 10. The test results and laboratory methods have been reviewed by BRANZ and found to be satisfactory.

16.2 Testing has been carried out by BRANZ to determine the face load pressure resistance of Ecoply Barrier.

16.3 Testing to determine the resistance of Ecoply Barrier plywood to water vapour transmission in accordance with AS/NZS 4200.1 and resistance to water penetration in accordance with AS/NZS 4201.4 has been completed. The results have been reviewed by BRANZ and found to be satisfactory.

16.4 The Ecoply Sealing Tape, Frame Flashing Tape and Sill Tape have been tested to BRANZ criteria to assess the tensile strength of control and UV aged material, nail sealability, water resistance of control and UV accelerated aged material and pliability. BRANZ has determined that the tapes are fit for purpose for the intended use. The adhesion to the Ecoply Barrier plywood sheet has also been tested and found to be satisfactory.

### Other Investigations

17.1 Structural and durability opinions were given by BRANZ technical experts.

17.2 An assessment was made of the durability of the Ecoply Barrier Tapes by BRANZ technical experts.

17.3 BRANZ expert opinion on NZBC E2 code compliance for Ecoply Barrier was based on evaluation of all details within the scope and as stated within this Appraisal. The details contained within the Ecoply Barrier Specification & Installation Guide have been reviewed and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of Acceptable Solution E2/AS1 for a rigid wall underlay.

17.4 Site inspections were carried out by BRANZ to assess the practicability of installation.

17.5 The Ecoply Barrier Specification & Installation Guide has been examined by BRANZ and found to be satisfactory.

**BC 150134**

## Quality

18.1 The manufacture of the Ecoply® Barrier plywood has been examined by BRANZ, including methods adopted for quality control. Details regarding the composition of the materials used were obtained by BRANZ and found to be satisfactory.

18.2 The quality of materials, components and accessories supplied by Carter Holt Harvey Woodproducts New Zealand is the responsibility of Carter Holt Harvey Woodproducts New Zealand. The quality control system for the manufacture of the plywood used for the Ecoply Barrier has been assessed and registered as meeting the requirements of AS/NZS 2269 by the Engineered Wood Products Association of Australasia, Certificate No. 911.

18.3 The manufacture of Ecoply Tapes has been examined on behalf of BRANZ, including methods adopted for quality control. Details of the quality and composition of the materials used were obtained and found to be satisfactory.

18.4 Quality of installation on site of components and accessories supplied by Carter Holt Harvey Woodproducts New Zealand and the building contractor is the responsibility of the installer.

18.5 Designers are responsible for the building design, and building contractors are responsible for the quality of installation in accordance with the instructions of Carter Holt Harvey Woodproducts New Zealand.

## Sources of Information

- AS/NZS 1170: 2002 Structural design action – General principles.
- AS/NZS 2269: 2008 Plywood - Structural.
- AS/NZS 4200.1: 1994 Pliable building membranes and underlays - materials.
- AS/NZS 4201.4: 1994 Pliable building membranes and underlays - Methods of test – Resistance to water penetration.
- BRANZ Appraisal No. 294 (2011) GIB EzyBrace® Systems 2011.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 2011 Timber-framed buildings.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (including Amendment 5, 1 August 2011).
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.

**BC 150134**



**BRANZ**

**In the opinion of BRANZ, Ecoply® Barrier Rigid Air Barrier 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 Carter Holt Harvey Woodproducts New Zealand, and is valid until further notice, subject to the Conditions of Appraisal.**

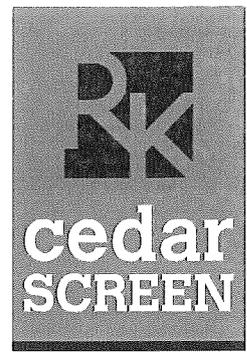
### Conditions of Appraisal

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. Carter Holt Harvey Woodproducts New Zealand:
  - 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 Carter Holt Harvey Woodproducts New Zealand.
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 Carter Holt Harvey Woodproducts New Zealand or any third party.

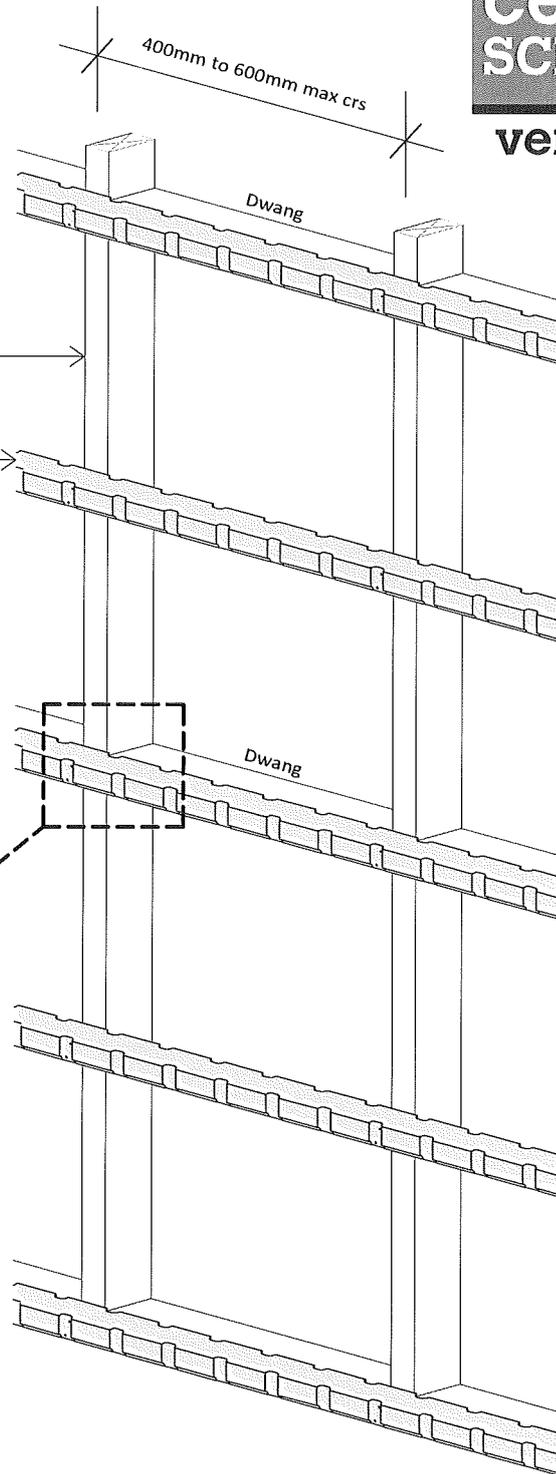
For BRANZ

C Percy  
Chief Executive

Date of issue: 24 January 2014



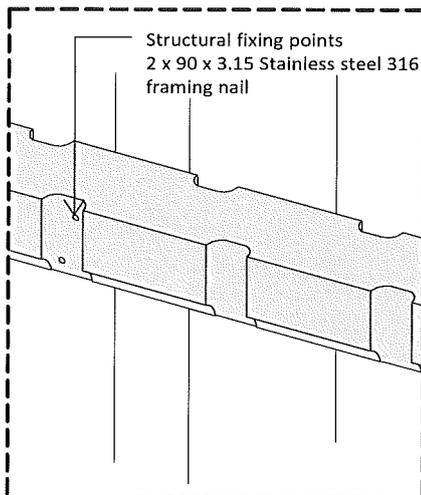
vertical



Timber framing

CS-H 45 Structural cavity batten

BC 150134



Structural fixing points  
2 x 90 x 3.15 Stainless steel 316  
framing nail



Rosenfeld  
Kidson

www.rosenfeldkidson.co.nz

Auckland Branch:  
513 Mt Wellington Highway  
Mt Wellington, Auckland 1060  
T. +64 9 573 0503  
F. +64 9 573 0504

Christchurch Branch:  
15 Edmonton Road, Hornby  
Christchurch 8042  
T. +64 3 349 3316  
F. +64 3 349 3317

Title **Structural Cavity Batten  
Detail**

Drawing **RKV45-RU-48**

Scale 1 : 10 @ A4 Date 02.04.2013

The Council has no record of any services in the vicinity of of the proposed work. Take care.

Ensure that any services are sited clear of the proposed work.

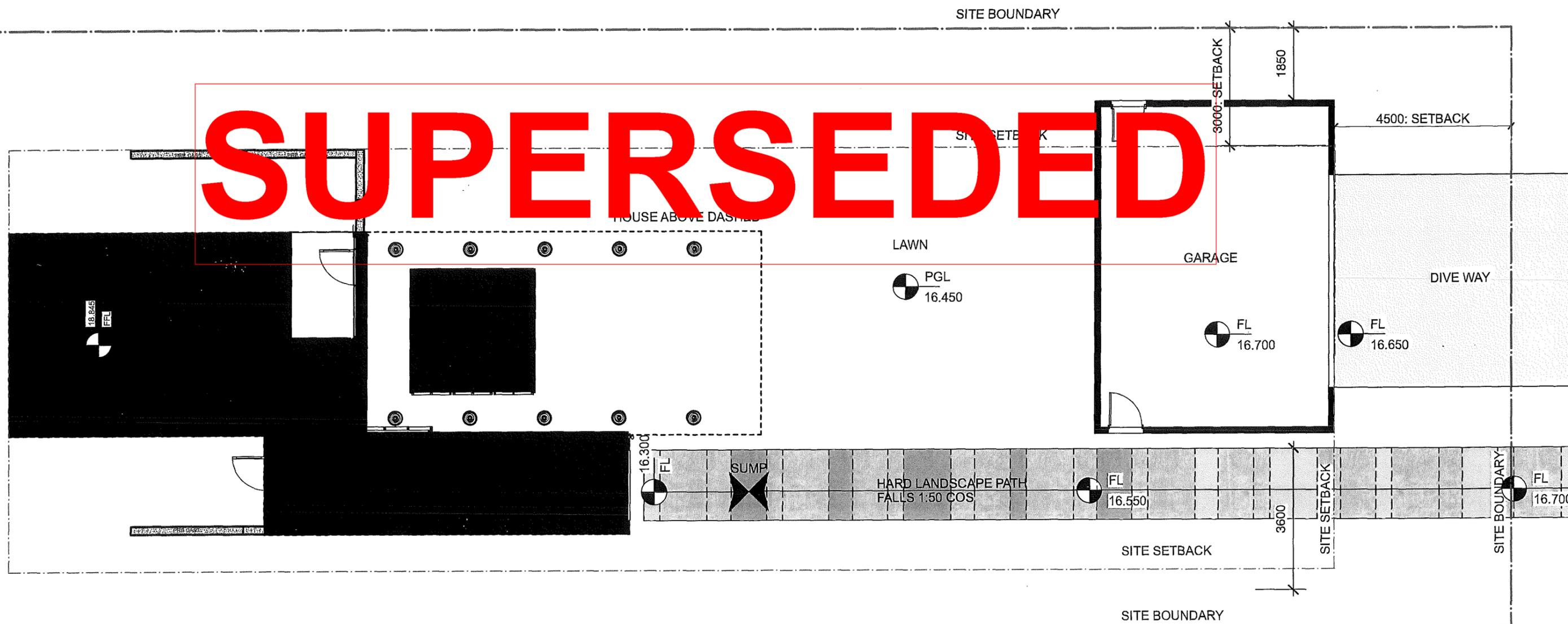
APPROVED  
BY  
PLANNING - Stacey  
Swanson  
24/03/2015

17 MAR 2015  
St 1-11



		CURRENT	REVISION
90.00	GARAGE - SITE PLAN	A	A
91.00	GARAGE - GENERAL ARRANGEMENT	A	A
91.01	GARAGE - ROOFING	A	A
93.00	GARAGE - ELEVATIONS	A	A
94.00	GARAGE - SECTIONS	A	A
94.10	GARAGE - DATA SHEETS	A	A
95.00	GARAGE - DETAILS	A	A
95.01	GARAGE - DETAILS	A	A
95.02	GARAGE - DETAILS	A	A
95.03	GARAGE - DETAILS	A	A

**SUPERSEDED**



O'Brien Garage  
7 Tutere St Waikanae  
Jill & Shane O'Brien

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ASSEMBLY ARCHITECTS LIMITED  
PO BOX 192 ARROWTOWN 9351  
Justin Wright 021 565 363

A 4/11/14 Building Consent - Client Issue  
ISS DATE NOTE

ASSEMBLY  
ARCHITECTS  
LIMITED

GARAGE - SITE PLAN 90.00

DRAWING NUMBER REV

1302\_Garage RD\_02.vpx

## 10 Preliminary & General

## 40 Carpentry

### BUILDING DATA

#### 10 Preliminary & General

#### BUILDING DATA

Building classification: Accessory  
 Floor live load: 1.5 kPa  
 (to NZS 3604, table 1.2 Basic live loads for floors and stairs)

### MANUFACTURER INSTALLATION REQ

#### 10 Preliminary & General

CONTRACTOR TO COMPILE ON SITE CURRENT MANUFACTURERS TRADE LITERATURE FOR INSTALLATION OF ALL SELECTED PRODUCTS.

## 21 Excavation

### DPM

#### 22 Ground Works 221 Ground

Polyethylene (Polythene) sheet DPM  
 To NZS:3604 7.5.6  
 To BRANZ 462 (2004)

MIN 0.25mm thickness.  
 Sealed Joints.

### FIRM GROUND

#### 22 Ground Works 221 Ground

The base of all excavations are to be Firm Original Ground, to meet NZS 4431, with an ultimate bearing strength > 300kPa. Report any soft spots to the engineer, follow instruction to fix.

### GRANULAR BASE

#### 22 Ground Works 221 Ground

Compacted granular fill to NZS:3604: 7.5.3  
 Lay and Compact Compliant Granular Fill Material in layers 150mm max thickness.

Total Compacted Base thickness: MIN 75mm, MAX 600mm

### SAND BLINDING

#### 22 Ground Works 221 Ground

To NZS:3604: 7.5.6.2  
 Place a sand blinding surface over granular fill to protect the DPM.

Min thickness 5mm, Max Thickness 25mm

## 32 Concrete Work

### 125 CONCRETE SLAB

#### 32 Concrete Work 32 CONCRETE

#### REINFORCED EXTERNAL CONCRETE SLAB

125mm Slab thickness.  
 Refer to NZS 3604.  
 Min 25MPa for Exposure Zone D.

### DPC

#### 40 Carpentry 402A Timber Framing

#### DAMP PROOF COURSE

01. Install between all timber framing and concrete slabs and foundations.  
 02. Install Between timber Post/Piles & Bearer members when less than 600mm above ground.

Supercourse 500  
 To BRANZ 329 (2005)

### HYJOIST [SIZE]

#### 40 Carpentry 402a Timber Framing

#### TIMBER ROOF/FLOOR FRAMING

#### CHH HyJoist

Blocking as required.  
 Size, Spacing: as per Framing Plans.

### LINTEL [size]

#### 40 Carpentry 402A Timber Framing

#### TIMBER FRAMING

Refer ENGINEERS Plans for Size.  
 Lintels Sized to NZS 3604 2011.

90mm thick members may be substituted with built up members sized and nailed in accordance with NZS 3604, 2.4.4.7.

### STUD [SIZE]

#### 40 Carpentry 402a Timber Framing

#### TIMBER FRAMING

Pinus Radiata MSG8 to NZS 3604 Requirements  
 Size:VARIES. REFER PLAN.  
 Spacing: 600mm ctrs max.  
 Treatment: H1.2  
 Nogs: Refer cladding Manufacturer Requirements  
 Provide all dwangs nogs and trimmers as required

### RAB 7MM

#### 40 Carpentry 405 Wrap

#### RIGID AIR BARRIER:

Install Ecoply Barrier Air Barrier in accordance with Manufacturers Requirementsto meet E2/AS1 Section 9.1.5 and B2 Durability.  
 7mm H3.2 CCA Treated Plwood Barrier.

Install to best trade practice such that any moisture the touches the wall underlay is prevented from any contact with the framing it protects.

### FLEXIBLE FLASHING TAPE

#### 40 Carpentry 405 Wrap Tape

#### WINDOW SEALING SYSTEM

ProClima Tescon ExtoSeal SIII Tape Window Sealing System.  
 Flexible Flashing Tape.

Install in accordance with BRANZ Appraisal No. 815 [2013] to meet E2/AS1 and B2 Durability.

INSTALL: Flashing Tape Continuous around Entire Opening. 50mm min cover to wall.

### PLY 12

#### 40 Carpentry 406 Timber Cladding

#### CHH SHADOWCLAD PLYWOOD SHEET CLADDING.

Manufacturer Tested to E2/AS1/VM1 & NZS 4284. SHEET CLADDING ON Drained Cavity.  
 Install to Manufacturers Requirements, to E2/VM1 compliance testing.

Species: Pine

Treatment: H3.1 LOSP

Finish: Pre-primed and Painted.

Cavity: Refer Cavity.

Fixing: Stainless Steel.

Ensure All Cut ends are spot treated with Holdfast Metalex prior to Installation.

### CAVITY: HORIZONTAL

#### 40 Carpentry 406 X

Install Drained Cavity to meet Requirements of E2 for Drained and vented cavities.

Horizontal Vented and Drained Cavity. Nominal 45mm cavity depth.

Structural Castellated Cavity Battens H3.2 Treated.

Refer engineer for fixings.

Refer Drawings for cavity details.

Install horizontal Castellated cavity battens to form ventilated and free draining nominal cavity behind cladding. Nominal cavity depth 45mm.  
 Vertical Battens at air cavity.

### PLY 17

#### 40 Carpentry 401a Timber Roofing

#### EXPOSED PLYWOOD SUBSTRATE AND MEMBRANE.

#### FIXING AND ROOFING.

Install to Plywood manufacturer instructions and Roofing Membrane Manufacturer requirements.

ROOF Thickness:17mm MIN.

DECK Thickness: 20mm MIN

Treatment:TREATED H3.2 CCA

Grade: C grade Smooth finish suitable for Membrane Install.

LAID:

Staggered Pattern, Right Angle to Supports. All Edges Supported with Timber Blocking.

Fixing:

316 STAINLESS STEEL COUNTERSUNK SCREW FIXED with Adhesive.

10 Gauge Screws, Min length 3 x thickness of Ply.

TAPED JOINTS: to manufacturers requirements.

Fixing Ctrs: 150mm at edges, 200mm within the sheet.

All Edges fitted with Fillets min 20x20, or if external corner Min 5mm Radius to edge.

### ALUMINIUM PANEL

#### 40 Carpentry 408 Decorative

#### ALUMINIUM PANEL

3mm Marine Grade Aluminium Sheet Panel.  
 Powder coat finish: Dulux Duratec

PANEL FIXING

Stainless Steel Square Drive Screw.

Confirm Fixing Row Setouts with architect.

Check and Confirm all sizes on site.

Pre drill all holes.

Powdercoat all sides and edges.

Panels to lap 35mm over Timber Boards at bases.

### MACROCARPA RAINSCREEN

#### 40 Carpentry 408 Decorative

#### WEATHERGROOVED TIMBER BOARDS

Mill certified heart Macrocarpa 20 x 100mm Boards

with MIN 6x6mm weathergrooves in accordance

ES2.A1 Figure 119.

Fixed to cladding as decorative rainscreen.

FIXING: Countersunk sqr drive Stainless Steel Screws  
 2/60 x 3 @ 600 ctrs

## 43 Metal Window Door

### ALUMINIUM PANEL

#### 43 Metal Windows & Doors 432

#### WINDOW SEALING SYSTEM

#### WINDOW SEALING SYSTEM

MATERIAL: In accordance with Manufacturers  
 Aluminium: min 1mm thick, 5000 series  
 POWDER COATED to match windows.

### POWDERCOAT: DURATEC

#### 43 Metal Windows & Doors 432

DURATEC POWDERCOATING TO ALL EXTERNAL

ALUMINIUM WINDOWS AND ASSOCIATED FLASHINGS

IN SEA SPRAY CORROSION ZONE.

15 Year Warranty.

### WINDOW ALUM

#### 43 Metal Windows & Doors 432

#### ALUMINIUM WINDOWS AND DOORS

#### SELECTED PROFILES.

MATERIAL: Aluminium

Finish: Dulux Duratec Powdercoat to suit Zone D.

Install Windows to manufacturers recommendations and WAZZ Details. Window manufacturer to supply WAZZ support bar as required.

## 45 Roofing

### MEMBRANE

#### 45 Roofing 451 MEMBRANES

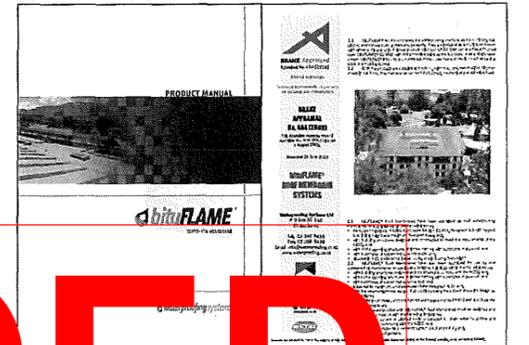
#### BITUFLAME MEMBRANE ROOFING

Install to meet requirements of E2/AS1 for Membrane Roofs and Decks, and BRANZ Appraisal 404 [2008] for bituflame touch-on membrane roofing.

Installation by trained and qualified applicator. refer to drawings for further details.

Substrate: 17mm H3.2 CCA Treated Plywood.

WPS Recommendation of 2 layer bituFlame touch-on System over plywood substrates.



### DPM

#### 45 Roofing 455

#### 80mm ROUND DOWN PIPE

Material to Match Roofing.

Provide warranty.

refer to roofing plan for rainwater calculations

Install to manufacturers requirements

### GUTTER: 125 BOX

#### 45 Roofing 455

#### RAIN WATER SPOUTING

125 Box.

Colour to match alum joinery

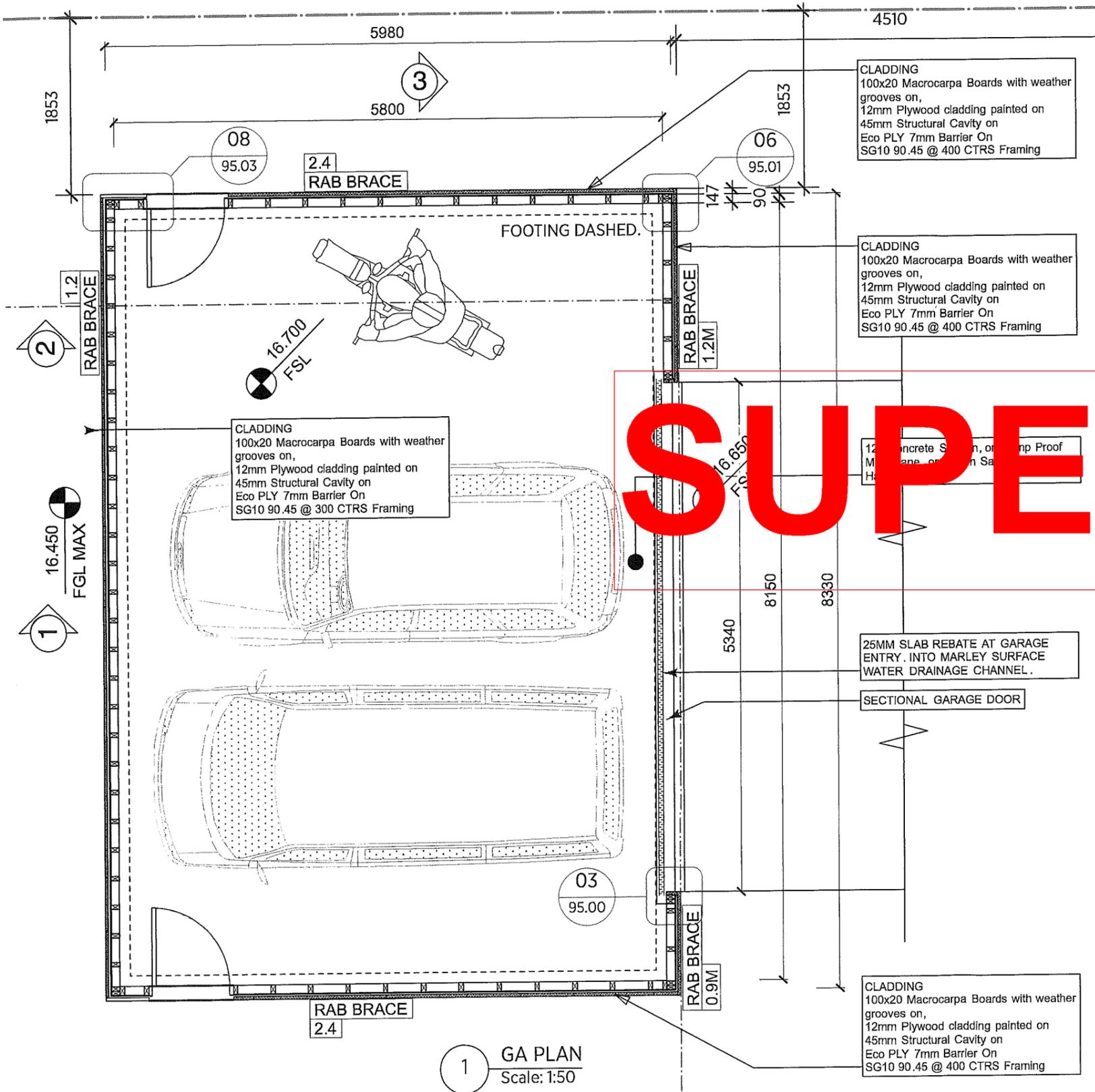
Provide warranty.

Refer to Roofing Plan for Rainwater Calculations.

Install to manufacturers requirements

**SUPERSEDED**

BUILDING COMPLIES WITH KCDC DISTRICT PLAN REQUIREMENTS FOR ACCESSORY BUILDING SETBACKS



**SUPERSEDED**

<p>O'Brien Garage 7 Tutere St Waikanae Jill &amp; Shane O'Brien</p>	<p>© COPYRIGHT ASSEMBLY ARCHITECTS LIMITED PO BOX 192 ARROWTOWN 9351 Justin Wright 021 665 363</p>	<p>A 4/11/14 Building Consent - Client Issue ISS DATE NOTE</p>
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**ASSEMBLY ARCHITECTS LIMITED**

<p>GARAGE - GENERAL ARRANGEMENT</p>	<p><b>91.00</b></p>
<p>DRAWING</p>	<p>NUMBER REV</p>

Overflow from the water storage tank is to be run to a suitably sized soakpit.

000004

17 MAR 2015

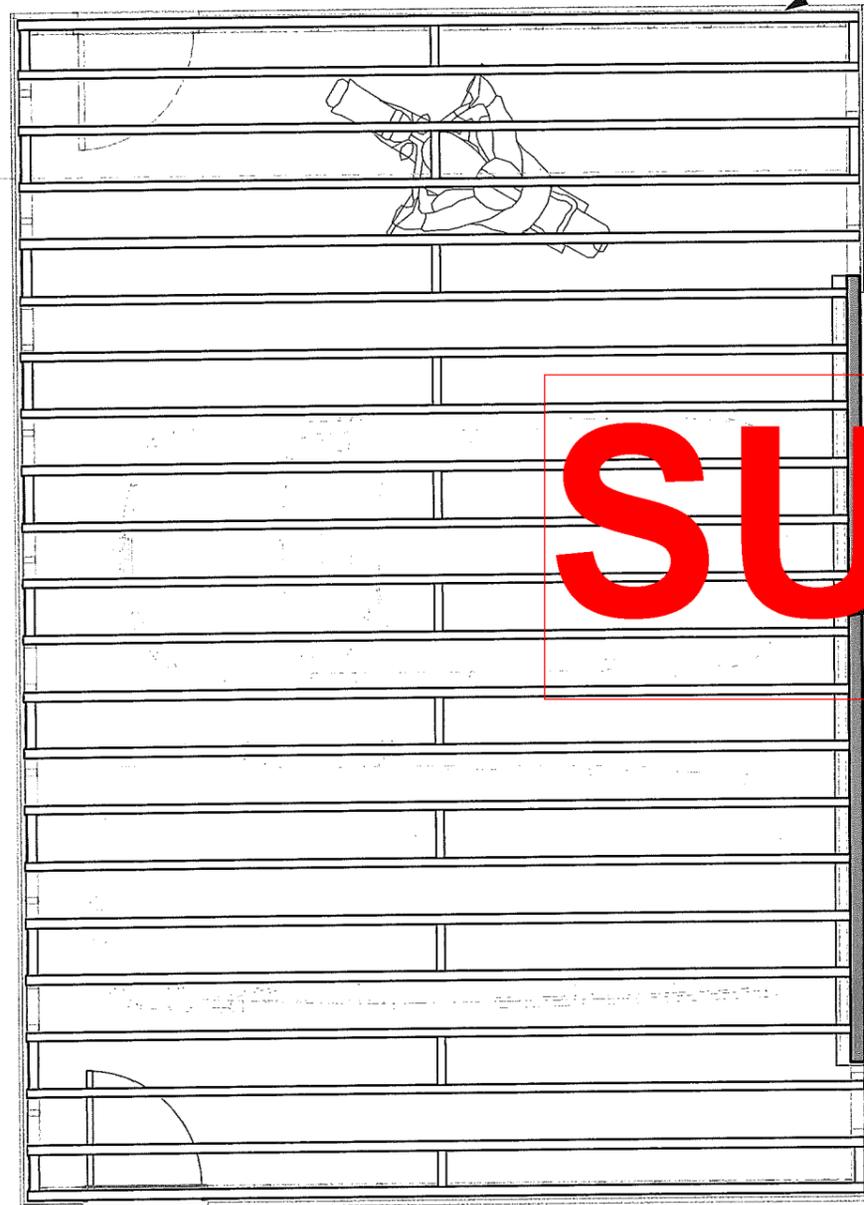
APPROVED BY  
PLUMBING AND DRAINAGE  
Simon C  
20/3/2015

NIWA RAINFALL INTENSITY:  
80 MM/HR  
CATCHMENT AREA < 60 M2  
  
BOX 125 GUTTER AND 80MM DIA DOWNPIPE SUITABLE .  
DESIGNED TO E1/AS1 SECTION 5.  
  
CONNECTION TO SITE RAINWATER COLLECTION TANK.

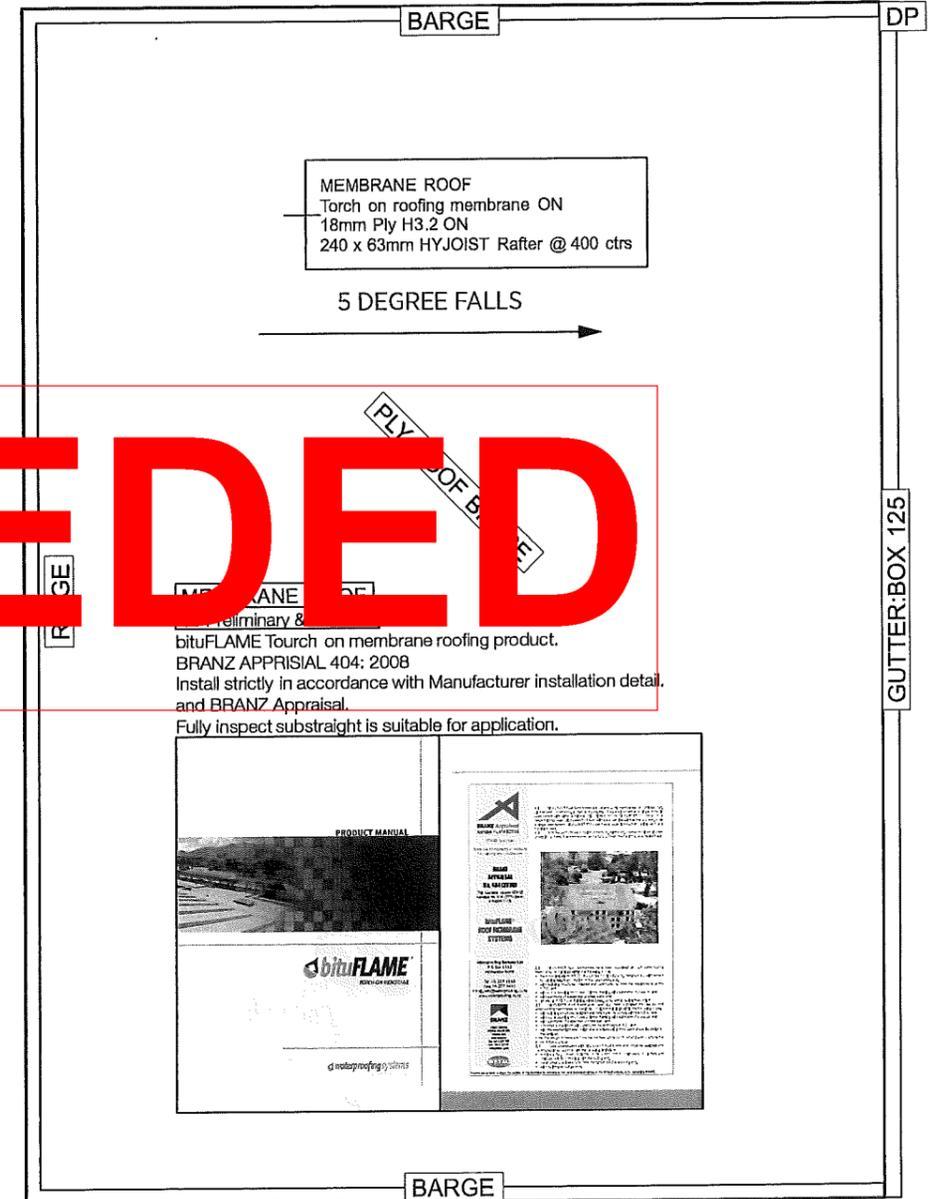
RAFTERS: HYJOIST 240.63 @ 400 CTRS.  
REFER CHH HYJOIST MANUAL FOR INSTALLATION DETAILS.

LATERAL RESTRAINT AT MID SPAN .DETAIL R17 & R18  
SUPPORT & TIE DOWN . DETAILS R10,R11,R13. (2/35\*3.15 FH  
NAILS PER END).  
DETAIL R14 (4/35\*3.15 FH NAILS PER MULTGRIP TAB).  
SUPPORT MEMBER J5 OR BETTER.

TIE DOWN: LOOPED STEEL STRAP . 27\*0.55, LOOPED OVER  
AND NAILED TO SUPPORTS WITH 2/35\*3.15 FH NAILS EACH  
END).



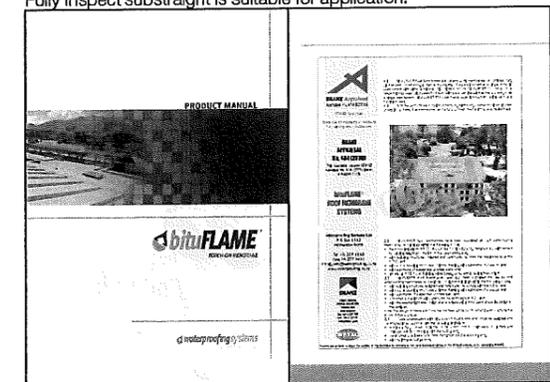
1 ROOF FRAMING  
Scale: 1:50



MEMBRANE ROOF  
Torch on roofing membrane ON  
18mm Ply H3.2 ON  
240 x 63mm HYJOIST Rafter @ 400 ctrs

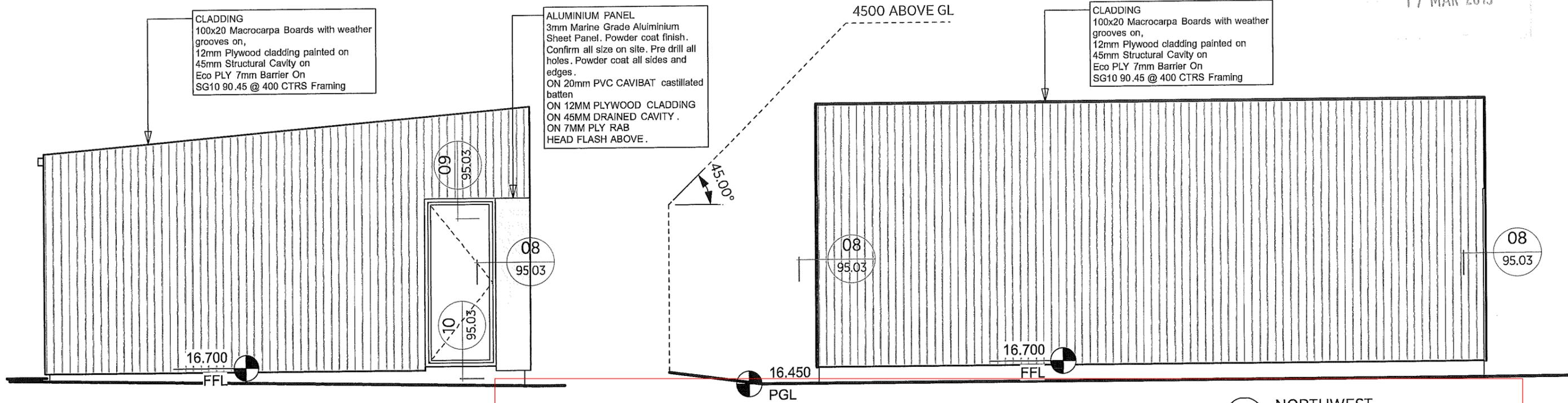
5 DEGREE FALLS

bituFLAME Torch on membrane roofing product.  
BRANZ APPRISAL 404: 2008  
Install strictly in accordance with Manufacturer installation detail  
and BRANZ Appraisal.  
Fully inspect substraights is suitable for application.



LAP MEMBRANE DOWN WALL  
Lap roofing membrane down all  
walls 150mm.

2 ROOFING PLAN  
Scale: 1:50

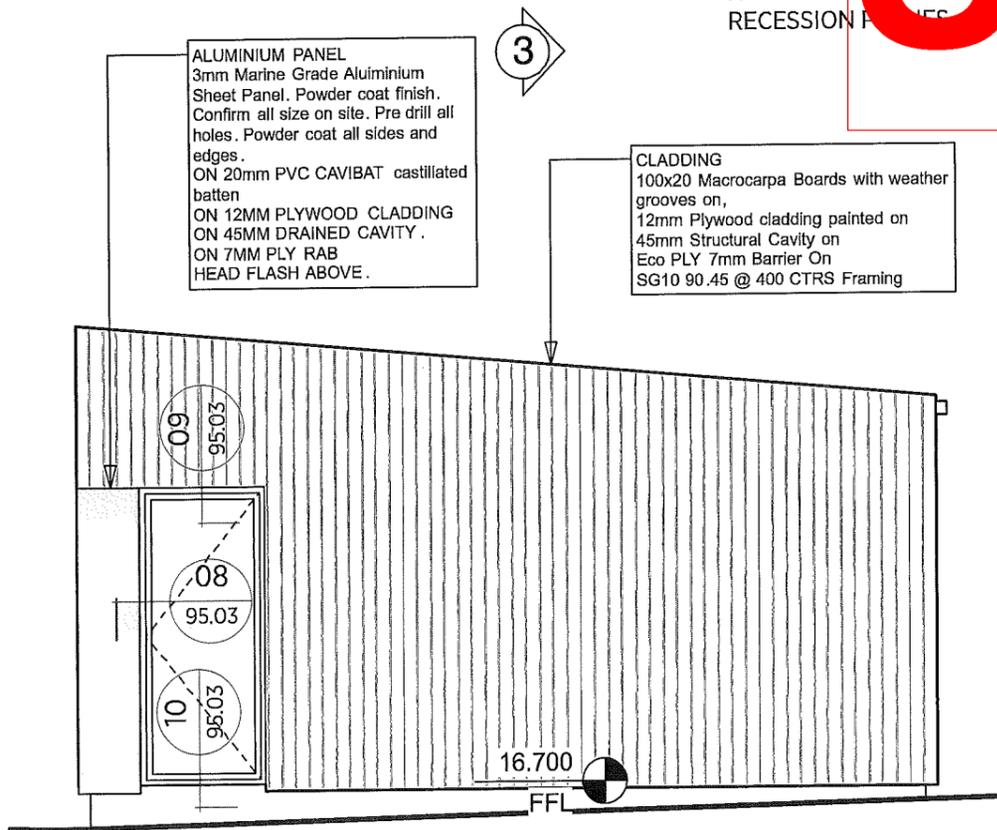


3 NORTHEAST Scale: 1:50

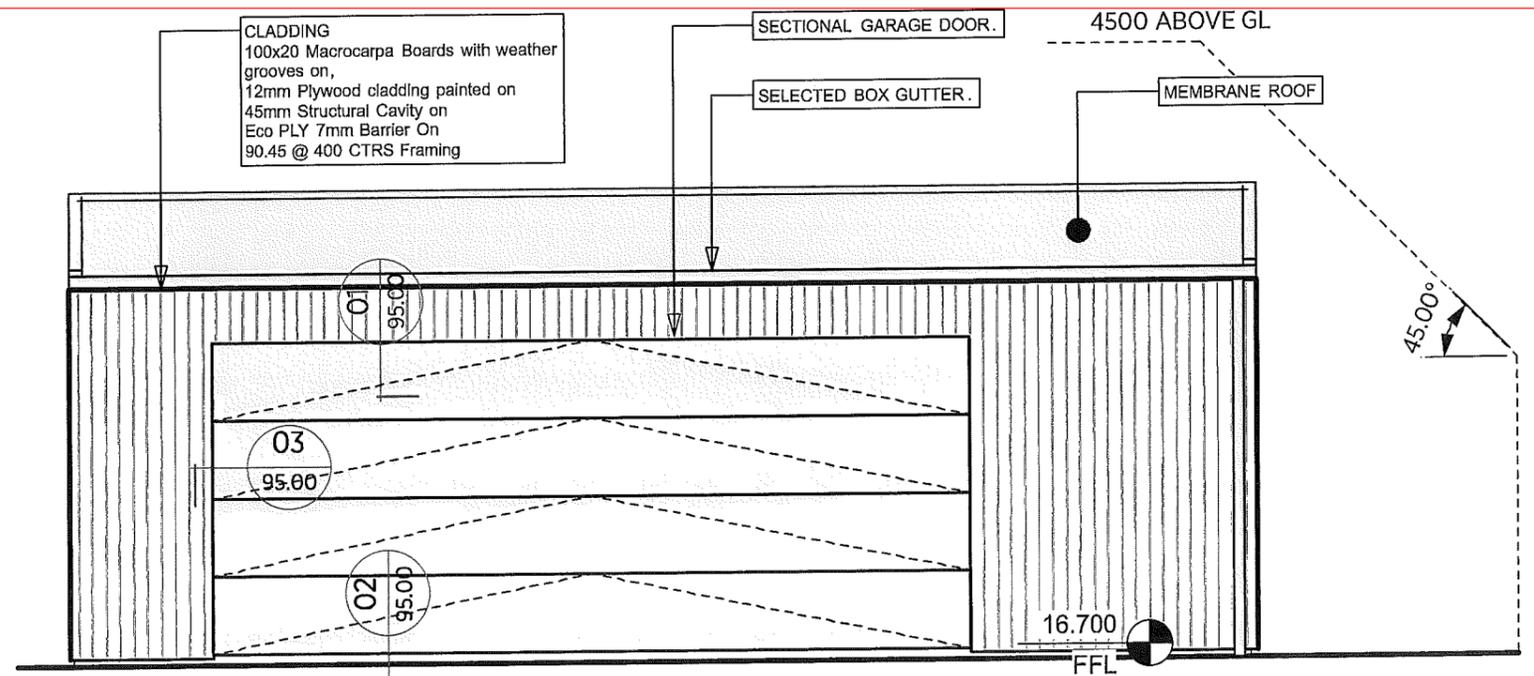
NORTHWEST Scale: 1:50

**SUPERSEDED**

BUILDING HEIGHT REQUIRES WITH KCD DIST REQUIREMENTS FOR ACCESSORY BUILDING HEIGHT AND RECEPTION HEIGHTS



1 SOUTHWEST Scale: 1:50



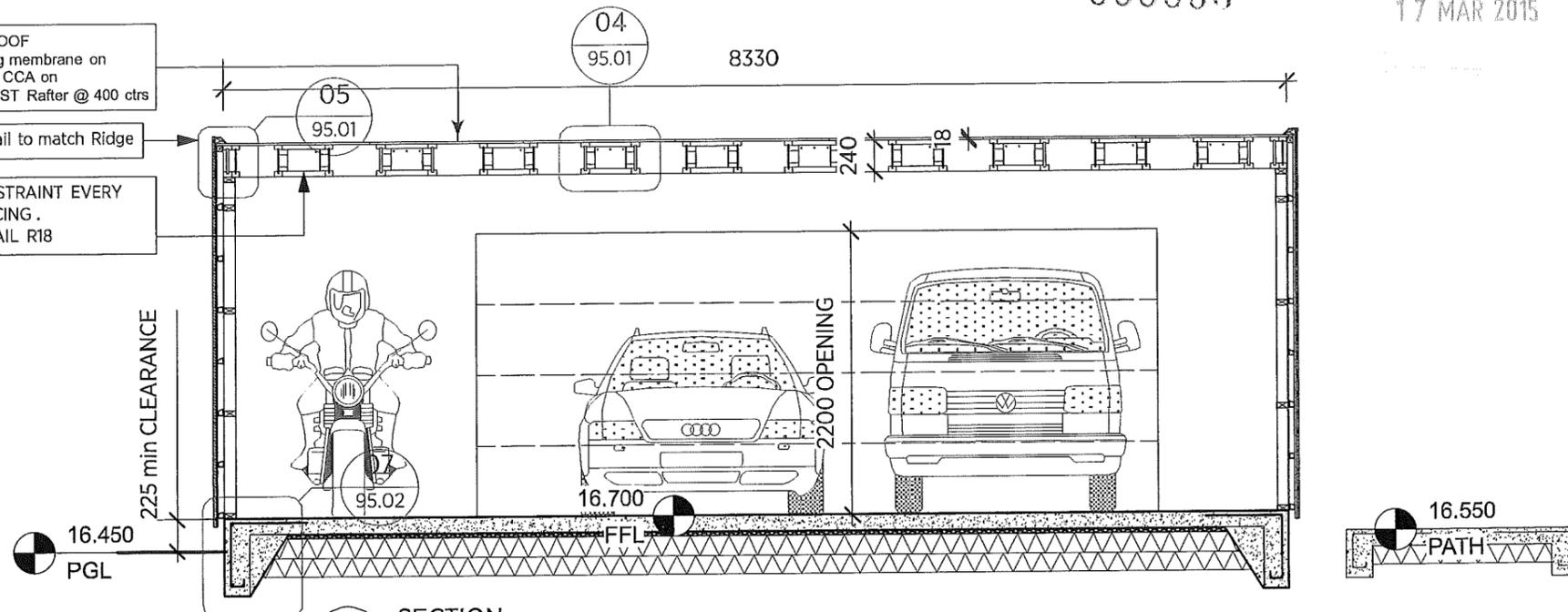
2 SOUTHEAST Scale: 1:50

BUILDING HEIGHT COMPLIES WITH KCDC DISTRICT PLAN REQUIREMENTS FOR ACCESSORY BUILDING HEIGHT AND RESSION PLANES.

MEMBRANE ROOF  
Torch on roofing membrane on  
18mm Ply H3.2 CCA on  
240 x 63 HYJOIST Rafter @ 400 ctrs

Barge detail to match Ridge

MID SPAN RESTRAINT EVERY  
SECOND SPACING.  
HYJOIST DETAIL R18



# SUPERSEDED

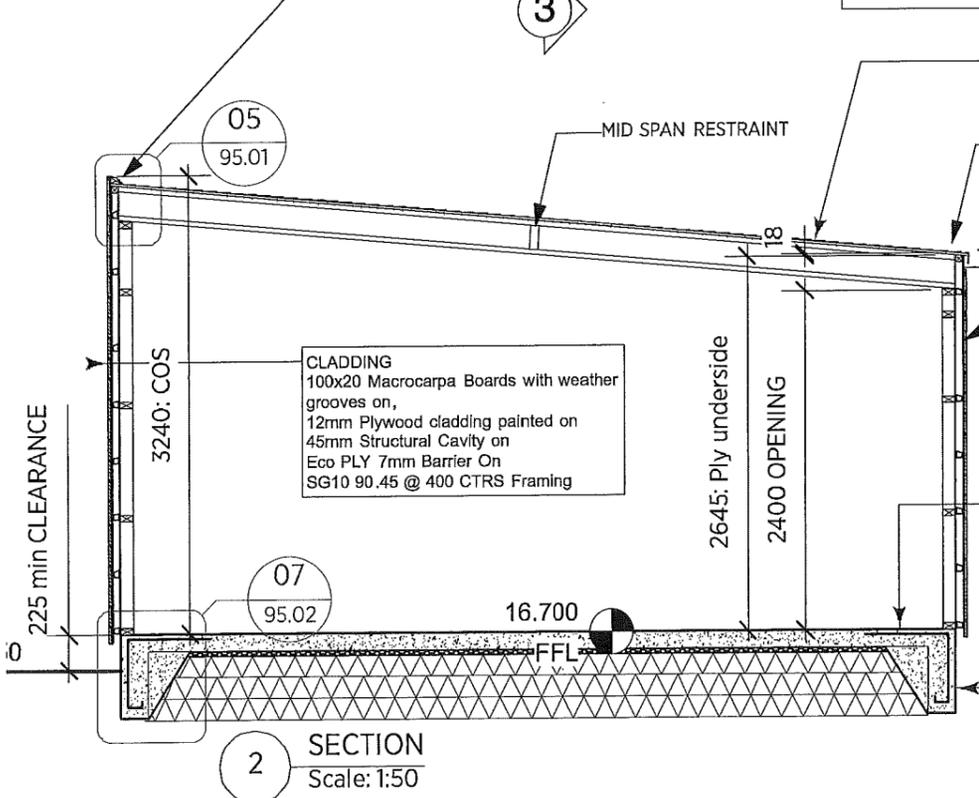
3 SECTION  
Scale: 1:50

RAFTER-RIDGE CONNECTION  
HYJOIST 240 @ 400 CTR.  
LATERAL RESTRAINT AT MID SPAN. DETAIL R17 & R18

TIE DOWN:  
LOOPEO 25\*1 STEEL STRAP, NAILED TO SUPPORTS (2/35\*3.15  
FH NAILS EACH END).  
INSTALL ON BEVELLED BEARING PLATE, MIN 45MM WIDTH.  
FIXED THROUGH HYJOIST FLANGE WITH 1/75\*3.15 EACH SIDE.

RAFTER-RIDGE CONNECTION  
HYJOIST 240 @ 400 CTR.  
LATERAL RESTRAINT AT MID SPAN. DETAIL R17 & R18

TIE DOWN:  
LOOPEO 25\*1 STEEL STRAP, NAILED TO SUPPORTS (2/35\*3.15  
FH NAILS EACH END).  
INSTALL ON BEVELLED BEARING PLATE, MIN 45MM WIDTH.  
FIXED THROUGH HYJOIST FLANGE WITH 1/75\*3.15 EACH SIDE.



2 SECTION  
Scale: 1:50

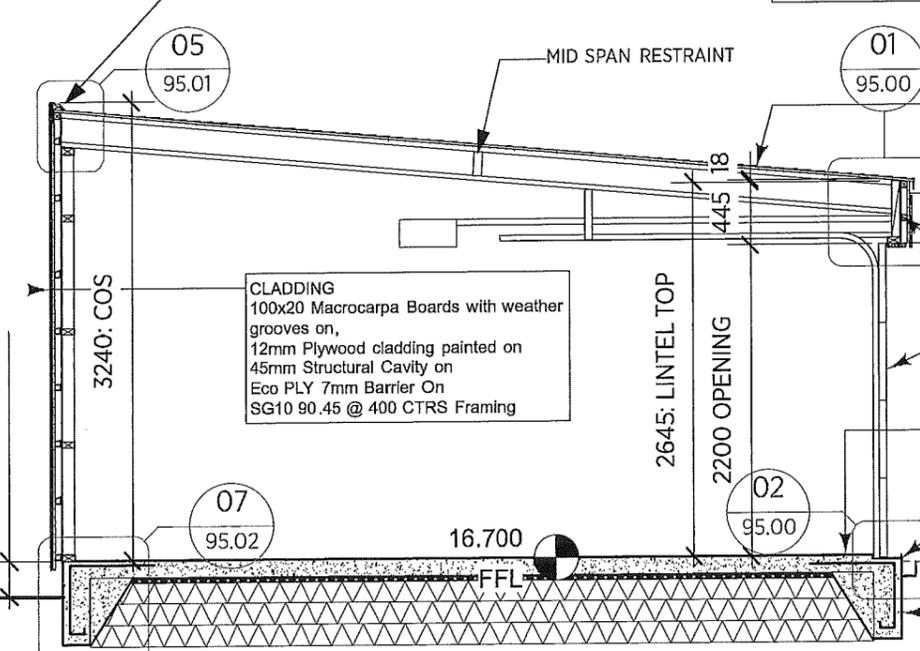
MEMBRANE ROOF  
Torch on roofing membrane on  
18mm Ply H3.2 CCA on  
240 x 63 HYJOIST Rafter @ 400 ctrs

RAFTER CONNECTION TO  
WALL/GUTTER  
AS PER RIDGE CONNECTION.

CLADDING  
100x20 Macrocarpa Boards with weather  
grooves on,  
12mm Plywood cladding painted on  
45mm Structural Cavity on  
Eco PLY 7mm Barrier On  
SG10 90.45 @ 400 CTRS Framing

125 Concrete Slab on, on Damp Proof  
Membrane, on 25mm Sand, on 150mm  
Layers of Hardfill

EXCAVATE TO GOOD GROUND.  
APPROX 600-750mm EXCAVATION.  
REPLACE WITH CERTIFIED COMPACTED  
FILL, TO ENGINEER DIRECTION.



1 SECTION  
Scale: 1:50

MEMBRANE ROOF  
Torch on roofing membrane on  
18mm Ply H3.2 CCA on  
240 x 63 HYJOIST Rafter @ 400 ctrs

HYSpan 400\*63 LINTEL.  
RAFTERS MULTIGRIP HUNG OFF  
LINTEL.

SECTIONAL GARAGE DOOR

125 Concrete Slab on, on Damp Proof  
Membrane, on 25mm Sand, on 150mm  
Layers of Hardfill

25MM SLAB REBATE AT GARAGE  
ENTRY. INTO MARLEY SURFACE WATER  
DRAINAGE CHANNEL.

EXCAVATE TO GOOD GROUND.  
APPROX 600-750mm EXCAVATION.  
REPLACE WITH CERTIFIED COMPACTED  
FILL, TO ENGINEER DIRECTION.

GIB EzyBrace® 2011 Software

Demand Calculation Sheet single storey V06/11

Job Details: Name TUTERE ST GARAGE, Street and Number 1307 TUTERE ST, City/Town/District WAIKANA E, Designer JUSTIN WRIGHT, Date 13/10/2014

Select Lining Option 10 or 13 mm GIB® Plaster

Building Specification

Number of storeys single, Floor Loading 2kPa, Foundation Type slab, Cladding Weight light, Roof Weight light, Room in Roof Space no, Roof Pitch (degrees) 5, Roof height above eaves (m) 0.4, Building height to apex (m) 3.0, Ground to lower floor level (m) 0.2, Stud Height (m) 2.4, Building Length (m) 8.5, Building Width (m) 6.0, Building Plan Area (m2) 51

Building Location

Wind Zone Extra High, Earthquake Zone 3, Soil Type D&E (deep to very), Annual exceedance probability 1/500 (NZS3604:2011 defa)

Bracing Units required for Wind: Demand W (BU) along slab 288, across slab 359

Bracing Units required for Earthquake: Demand along / across E (BU) Walls single 288, slab 263

TUTERE ST GARAGE JUSTIN WRIGHT

GIB EzyBrace® 2011 Software

SINGLE OR UPPER STOREY WALLS ALONG V06/11

Table with columns: Lines (1-10), Bracing Elements (6-10), Line Total Check, Line Label, Bracing Element No., Available Wall Length L (m), Angle to Bracing line (degrees), Element Height H (m), Bracing Type, Supplier, Bracing Units Achieved (W, E)

Totals Achieved: W 192%, EQ 219%, Wind 554, Earthq. 576; Concrete Slab OK OK; Totals Required (from Demand) 288 263

TUTERE ST GARAGE JUSTIN WRIGHT

GIB EzyBrace® 2011 Software

SINGLE OR UPPER STOREY WALLS ACROSS V06/11

Table with columns: Lines (1-10), Bracing Elements (6-10), Line Total Check, Line Label, Bracing Element No., Available Wall Length L (m), Angle to Bracing line (degrees), Element Height H (m), Bracing Type, Supplier, Bracing Units Achieved (W, E)

Totals Achieved: W 110%, EQ 157%, Wind 396, Earthq. 412; Concrete Slab OK OK; Totals Required (from Demand) 359 263

SUPERSEDED

1 GARAGE HEAD  
Scale: 1:4

SECTIONAL GARAGE DOOR. DESIGN AND BUILD BY INSTALLER.

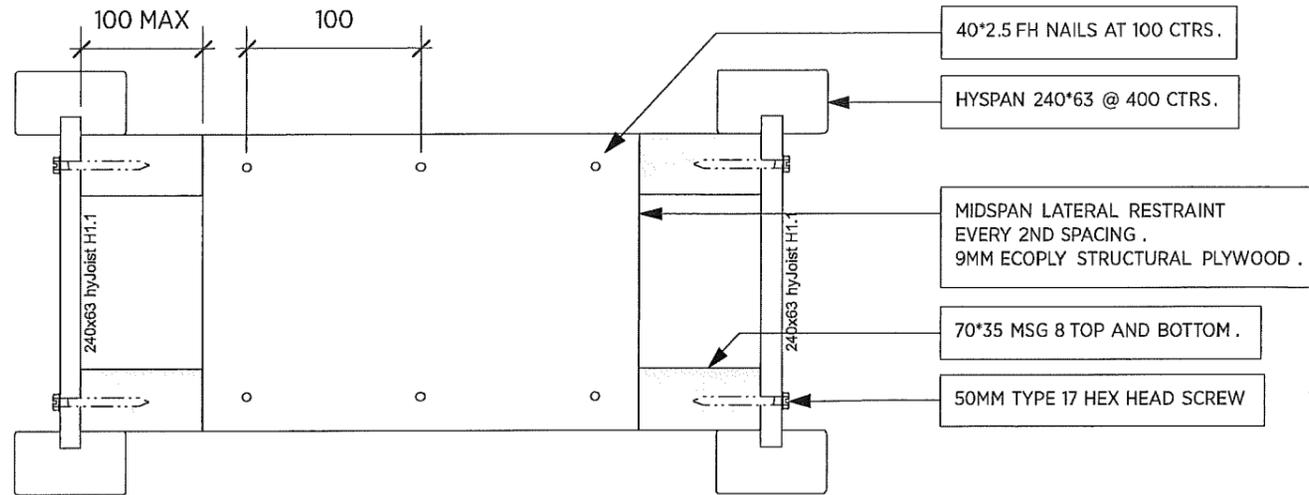
2 GARAGE SILL  
Scale: 1:4

- MEMBRANE SUBSTRATE  
18MM H3.2 Treated ply. Install in accordance with E2.AS.1 Section 8.5.5.1 Plywood manufacturer, and selected Membrane roofing requirements.
- MEMBRANE ROOF  
Selected BRANZ appraised torch on roofing membrane. Installed in accordance with Manufacturers instructions and E2/AS1 Section 8.5.
- PRIME AND PAINT UNDERSIDE OF PLYWOOD DRIP EDGE HEADING.
- HYSpan LINTEL 400\*63. H3.1 TREATED.
- HYJOIST RAFTER-LINTEL FIXING: CHH DETAIL R14  
25\*1.0 GALV STEEL STRAP OVER LINTEL. FIX EACH END 7/35\*3.15 FH NAILS.
- HYJOIST RAFTER WEB STIFFENER: CHH DETAIL R25.  
27MM THICK PLYWOOD STIFFENER  
5 / 75MM CLENCH NAILS EACH SIDE OF STIFFENER. PLY FLUSH TO SUPPORTED BASE FLANGE, WITH 3-4MM GAP TO TOP FLANGE.
- HYJOIST RAFTER-LINTEL FIXING: CHH DETAIL R14.  
1 MULTIGRIP / SIDE. FIX 4/35\*3.15 FH NAILS PER TAB.
- RIGID AIR BARRIER  
Ecoply 'Barrier' 7MM Plywood. Install to manufacturers instructions.
- PLYWOOD SHEET CLADDING: 12mm Ply H3.2  
Installed in accordance with E2/AS1
- WEATHERGROOVED TIMBER BOARDS  
Heart Macrocarpa 20 x 100mm Boards with MIN 6x6mm weathergrooves in accordance ES2.A1 Figure 119.
- VENTILATION  
45mm ventilated cavity. Closed Field Kids  
15-BATT 45mm natural cavity batt  
Headings to be treated Pine H3.2  
Cast with min 1000mm<sup>2</sup> opening per metre to allow ventilation equivalent to vermin proof closer, E2/AS1 Section 9.18.  
Battens to be fixed to each studs at 600mm ctrs. Refer engineers calc for fixing.
- DRIP EDGE
- HEAD FLASH & CAVITY CLOSER.  
FLASH TAPE SEALED TO RAB.
- FLASH TAPE RAB INTO OPENING
- HEAD TRIM: Heart Macrocarpa 20 x 100mm Board
- WEATHERGROOVED TIMBER BOARDS CLAD TO OPENING.  
Heart Macrocarpa 20 x 100mm Boards with MIN 6x6mm weathergrooves in accordance ES2.A1 Figure 119.
- REBATE TO GARAGE DOOR AS PER NZBC E2/AS1 FIGURE 65.
- 125MM CONCRETE SLAB.
- 100MM uPVC DRAINAGE CHANNEL ACROSS FULL OPENING WIDTH OF GARAGE DOOR. MARLEY OR ALLPROOF TYPE. INSTALL TO MANUFACTURERS REQUIREMENTS.

3 GARAGE JAMB  
Scale: 1:4

- GARAGE SLAB REBATE
- SECTIONAL GARAGE DOOR.  
Design and build by installer
- WEATHERGROOVED TIMBER BOARDS CLAD TO OPENING.  
Heart Macrocarpa 20 x 100mm Boards with MIN 6x6mm weathergrooves in accordance ES2.A1 Figure 119.
- FLASH TAPE INTO OPENING.
- CUSTOM WALL BUILD UP  
MACROCARPA HEART BOARDS ON 12MM PLYWOOD, PAINTED ON

**SUPERSEDED**



4 MIDSPAN BLOCK  
Scale: 1:4

**SUPERSEDED**

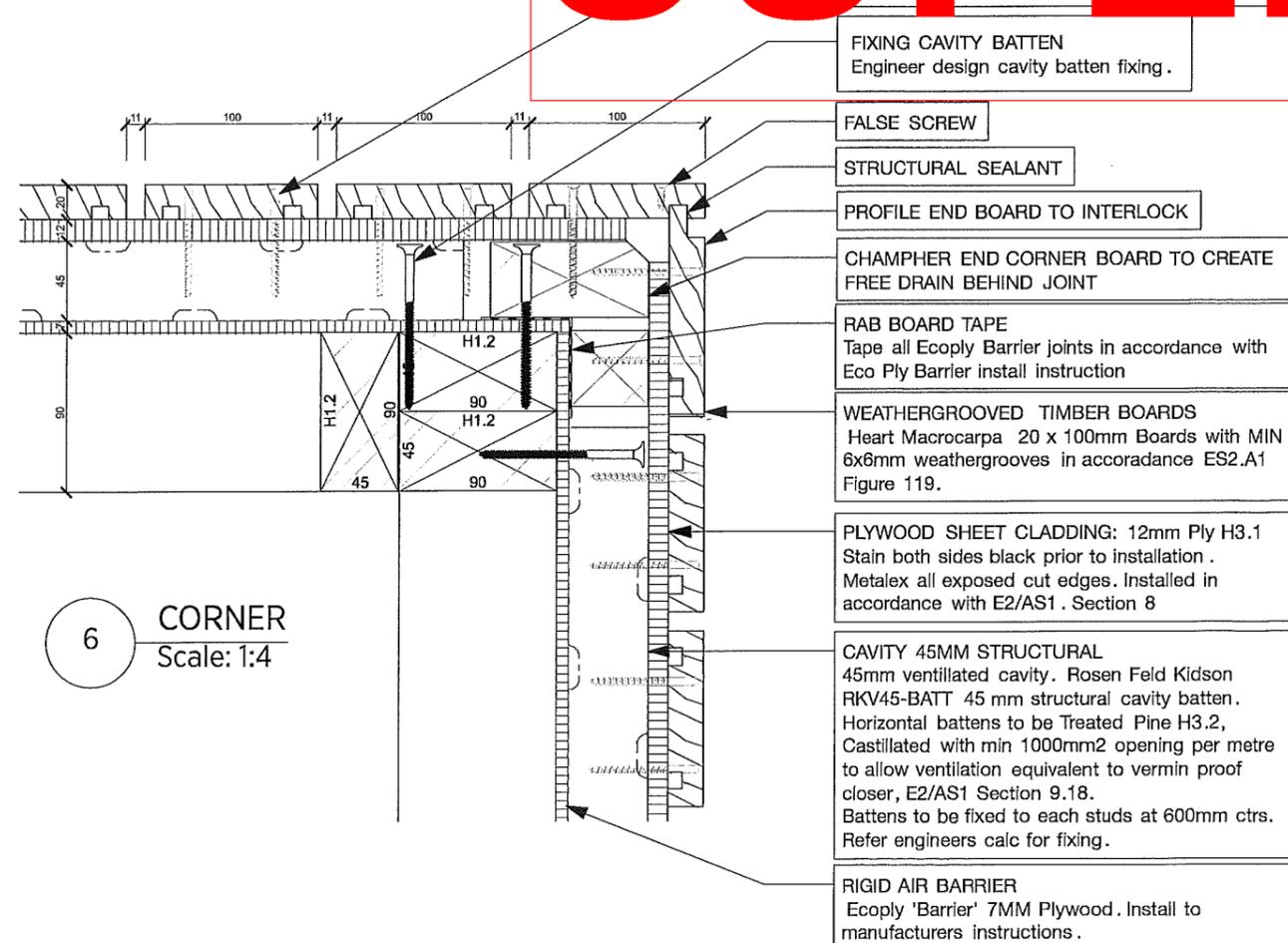
MEMBRANE SUBSTRATE  
18MM H3.2 Treated ply. Install in accordance with E2.AS.1 Section 8.5.5.1 Plywood manufacturer , and selected Membrane roofing requirements .

MEMBRANE ROOF . Selected BRANZ appraised torch on roofing membrane . Installed in accordance with Manufacturers instructions and E2/AS1 Section 8.5.

Bitufame mineral chip finish to continue into void and down .

Bitufame bitumen sealant installed from a higher point in the external cap flashing falling down to the mineral chip finish as water bedding and the infill

CAPPING TO BOARDS  
Ulrich UA 1573 25 x 25 x 1.4mm Aluminium Capping . Powder coat to match window joinery .



6 CORNER  
Scale: 1:4

LAP MEMBRANE DOWN WALL  
Lap roofing membrane down wall 150mm . Rebate out of ply cladding . Metalex exposed face .

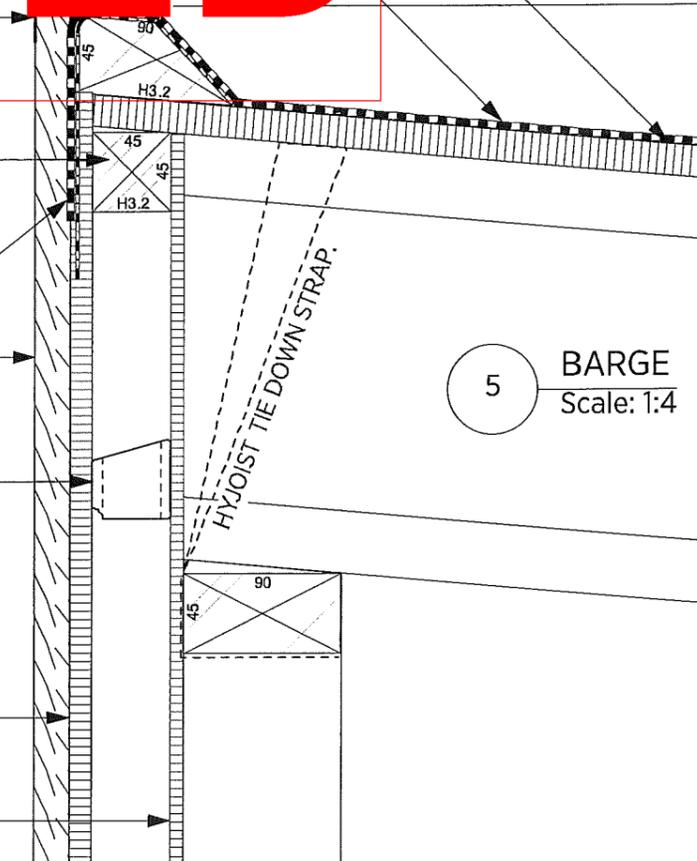
WEATHERGROOVED TIMBER BOARDS  
Heart Macrocarpa 20 x 100mm Boards with MIN 6x6mm weathergrooves in accordance ES2.A1 Figure 119 .

CAVITY 45MM STRUCTURAL  
45mm ventilated cavity . Rosen Feld Kidson RKV45-BATT 45 mm structural cavity batten . Horizontal battens to be Treated Pine H3.2, Castillated with min 1000mm2 opening per metre to allow ventilation equivalent to vermin proof closer, E2/AS1 Section 9.18 . Battens to be fixed to each studs at 600mm ctrs . Refer engineers calc for fixing .

PLYWOOD SHEET CLADDING: 12mm Ply H3.2  
Installed in accordance with E2/AS1

RIGID AIR BARRIER  
Ecoply 'Barrier' 7MM Plywood . Install to manufacturers instructions .

cavity closer batten



5 BARGE  
Scale: 1:4

BOTTOM PLATE: SG10 90.45 ON DPC.

RIGID AIR BARRIER  
Ecoply 'Barrier' 7MM Plywood. Install to manufacturers instructions.

CAVITY 45MM STRUCTURAL  
45mm ventilated cavity. Rosen Feld Kidson RKV45-BATT 45 mm structural cavity batten. Horizontal battens to be Treated Pine H3.2, Castilled with min 1000mm<sup>2</sup> opening per metre to allow ventilation equavlent to vermin proof closer, E2/AS1 Section 9.18. Battens to be fixed to each studs at 600mm ctrs. Refer engineers calc for fixing.

WEATHERGROOVED TIMBER BOARDS  
Heart Macrocarpa 20 x 100mm Boards with MIN 6x6mm weathergrooves in accordadnce ES2.A1 Figure 119.

PLYWOOD SHEET CLADDING: 12mm Ply H3.2  
Installed in accordadnce with E2/AS1

Cavity base closure. PVC 45mm Cavity Closer by Weathertight Solutions.

DIRECT WEARING GARAGE FLOOR  
SLAB Exposed to weather within 500m of high tide mark.

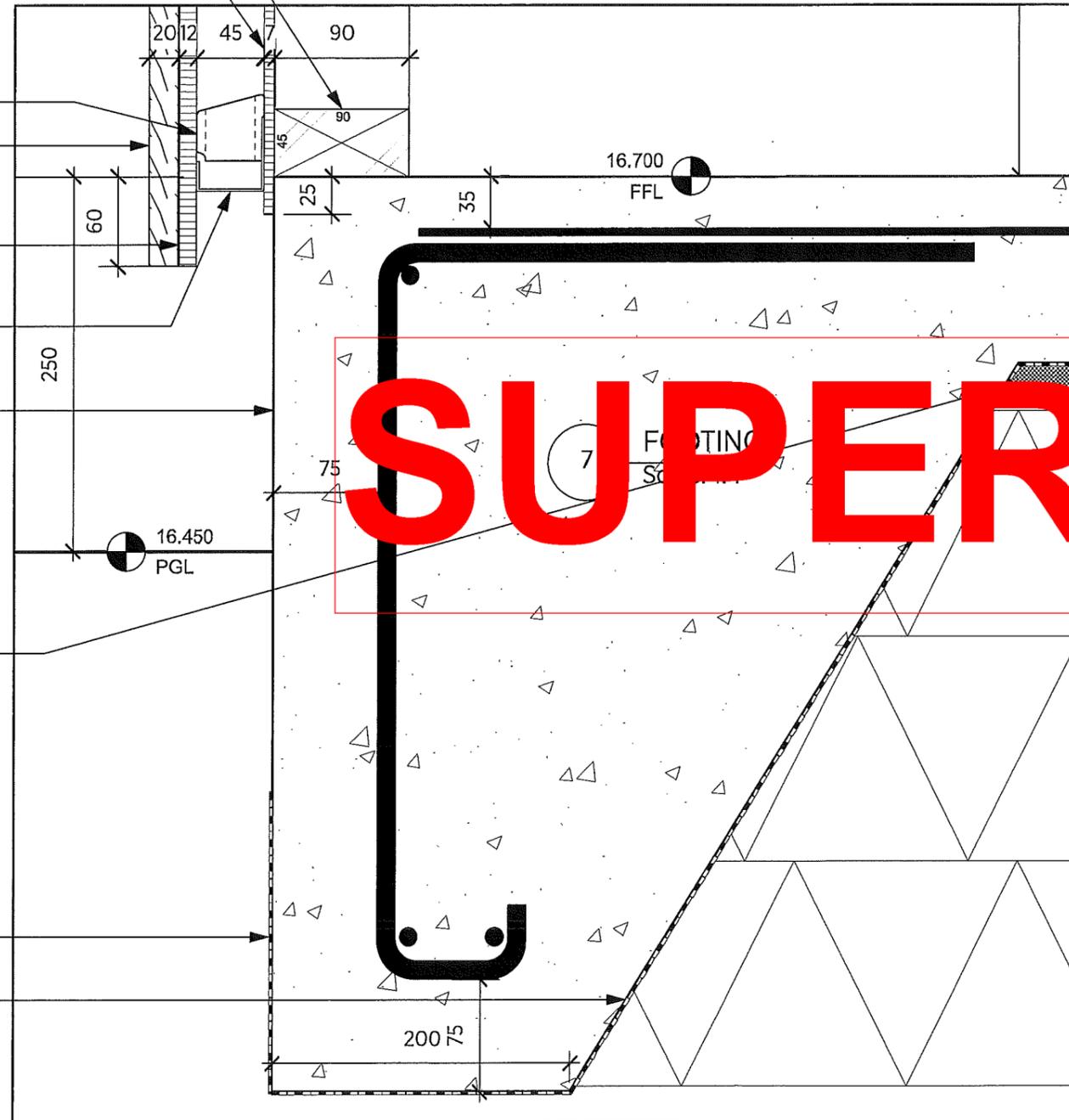
STRENGTH OF CONCRETE-NZS3604:4 .8.2  
25MPa

SLAB THICKNESS-NZS3604:7 .5.8.2  
125MM.

SAND BLINDING  
Refer to NZS3604:7 .5.6.2 Place a sand blinding surface over Granular fill to protect the DPM. Sand blinding surface to be a minimum of 5mm and maximum of 25mm. Thick layers of sand are unsatisfactory support for the slab. A Nominal 5-10mm thickness to fill gaps in the base course mataterial plus a basecourse tolerance allowance of +/-15mm results in max thickness of 25mm.

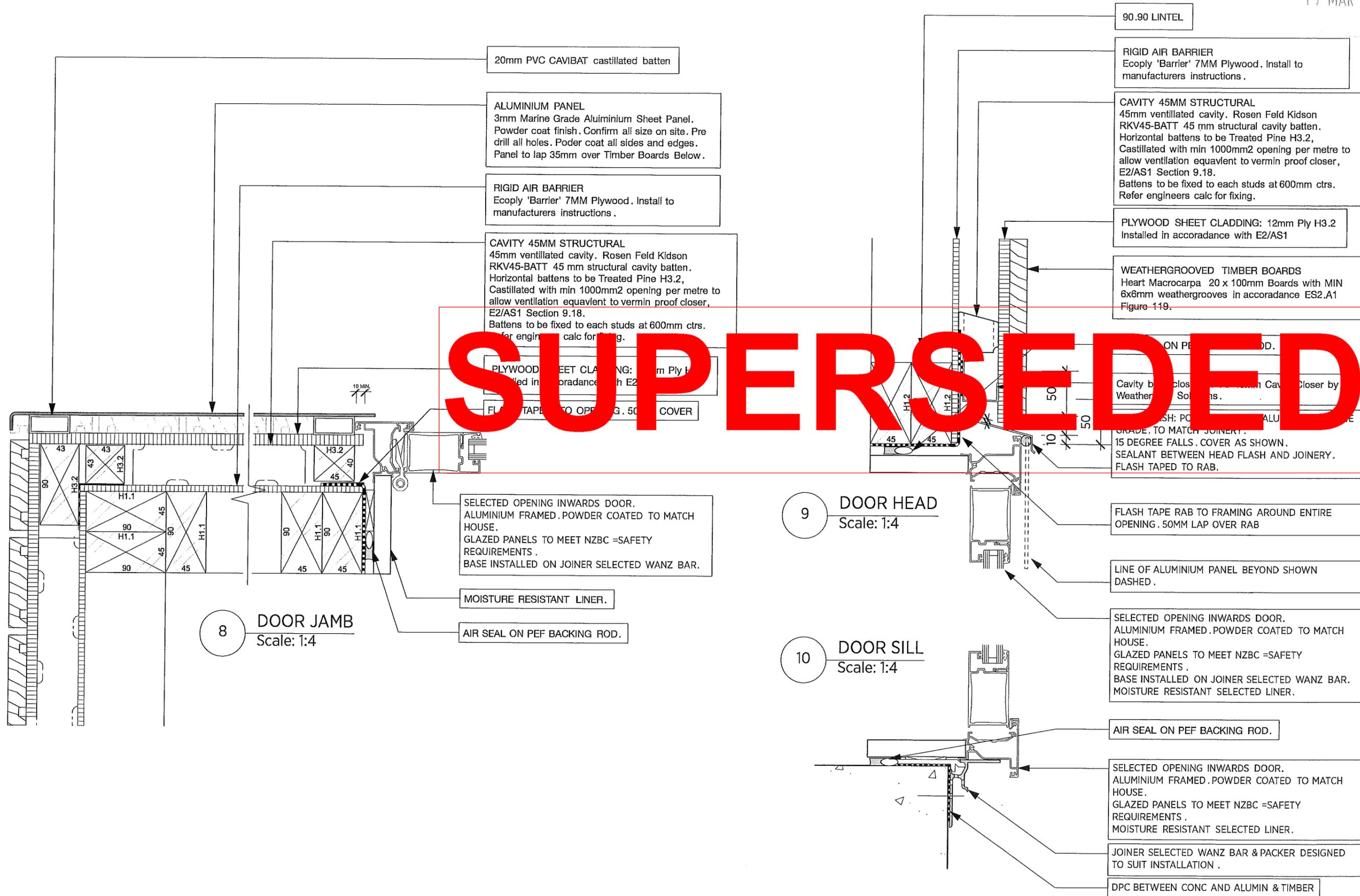
DPM: Polyethylene (polythene) sheet damp-proof membranes AS PER NZS3604 7.5.6

GRANULAR BASE In accordance with NZS3604:7 .5.3 Compact in layers of 150mm Maximum thickness of the area beneath the proposed ground slab. So that total thickness of granular base is not less than 75mm or nor more than 600mm. Granular fill material shall be composed of rounded gravel, crhsued rock or scoria and: 1) Not more than 5% sahill pass through a 2.2mm sieve. B0 100% shall pass either: (i) A 19mm sieve for any fill thickness; or (ii) A 37.5mm Sieve for a fill thcikness exceeding 100mm.



**SUPERSEDED**

**SUPERSEDED**



**Sharleen Howe**

---

**From:** Shane O'Brien <shane@colspec.co.nz>  
**Sent:** Tuesday, 17 March 2015 11:49 a.m.  
**To:** Sharleen Howe  
**Subject:** 1307 - Garage - Floor and Flood Levels  
**Attachments:** 1307 Greater Wellington-Gmail - Waikanae - Residual Flood Level - 7 Tutere Street.pdf; Greater Wellington\_Residual Ponding.pdf; KCDC Maps\_Residual Ponding.pdf; Part\_D\_Operative\_District\_Plan\_Rules\_and\_Standards.pdf

Hello again,

Details from the Architect that may help explain the situation as we see it.

Thanks for your consideration,

Kind regards,

Shane.

**From:** [assemblyjames@gmail.com](mailto:assemblyjames@gmail.com) [<mailto:assemblyjames@gmail.com>] **On Behalf Of** James Norman  
**Sent:** Monday, 16 March 2015 4:44 p.m.  
**To:** Shane O'Brien; Justin Wright  
**Subject:** 1307 - Garage - Floor and Flood Levels

Hi Shane

Below and attached is an review of the Flood Level issue raised by KCDC. This was raised last year with Sharyn at Greater Wellington Regional. I believe it is a non-issue for KCDC for the following reasons:

1. Garage is an accessory building and NZBC E1 Surface Water does not apply,
2. KCDC District Plan specifically exempts accessory buildings from flood hazards.
3. The Site is beyond the 1:100 year flooding line. It lies in the residual ponding area, which has no minimum floor levels in the District Plan, and is beyond the area defined as the Flood Ponding Area.
4. Email from Sharyn at GWRC, 11/2014, confirms there is no minimum floor level requirement in residual ponding area. They make a suggestion, but it is not a requirement.
5. The proposed future KCDC District plan has some additional rules related to floor levels, but this plan is not yet operative and is not applicable.

The attached documents can be used as supporting documentation:

- email from Greater Wellington,
- GWRC hazard map for specific property.
- KCDC GIS map excerpt
- KCDC District Plan excerpt

Resolution:

1. Submit to KCDC, get them to call me directly while in the meeting (027 2308279) and I will discuss with them.
2. or, if you feel the residual ponding is not an acceptable risk, there is scope to either:
  1. lift the slab level of the garage,
  2. Blockwork up a couple courses for the walls, for flood resistance.

lastly, what may be causing some confusion here relates to the survey we have on file, which gives us a contour approximately 16m above sea level, while the Greater Wellington map puts the site more aligned with 4m above sea level. The 2 surveys may be using different datums?

If there are further issues you can contact your surveyor (or pass me their contact information) and confirm whether the survey is set-out to:

Means Sea Level Wellington 1951 Datum

and if not, how their vertical datum relates to the 1951 MSL.

Hope this helps.

**James Norman**

Registered Architect

**Assembly Architects Limited**

telephone 027 2308279

[www.assembly.co.nz](http://www.assembly.co.nz)



James Norman &lt;assemblyjames@gmail.com&gt;

---

**Waikanae - Residual Flood Level - 7 Tutere Street**

---

**Sharyn Westlake** <Sharyn.Westlake@gw.govt.nz>

4 November 2014 at 16:14

To: James Norman &lt;james@assembly.co.nz&gt;

Hi James

I am pleased to respond to your email of 4 November 2014 to Greater Wellington Regional Council (GWRC) regarding the flood hazard at 7 Tutere Street, Waikanae (Lot 85 DP 7462).

I have attached a plan of the property showing the extent of residual ponding flood hazard on the property (boundary highlighted). The light blue area shown on the property is residual ponding. It is my understanding that under the Kapiti Coast District Council District Plan rules there are no minimum building floor level requirements in areas of residual ponding hazard.

However you have requested the residual flood level for ponding in this area, which is RL 3.9m above Mean Sea Wellington 1953 datum, and GWRC suggests that you consider raising any building floor level above this flood level if possible.

Please contact me directly if you would like to discuss this further.

Regards

Sharyn

Sharyn Westlake | Senior Engineer, Strategy and Advisory Specialist

GREATER WELLINGTON REGIONAL COUNCIL

Te Pane Matua Taiao

Shed 39, 2 Fryatt Quay, Pipitea, Wellington 6011 | PO Box 11646, Manners St, Wellington 6142

T: 04 830-4046 | [www.gw.govt.nz](http://www.gw.govt.nz)**From:** assemblyjames@gmail.com [<mailto:assemblyjames@gmail.com>] **On Behalf Of** James Norman**Sent:** Tuesday, 4 November 2014 2:13 p.m.**To:** Sharyn Westlake**Subject:** Waikanae - Residual Flood Level - 7 Tutere Street

[Quoted text hidden]

3/16/2015

Gmail - Waikanae - Residual Flood Level - 7 Tutere Street

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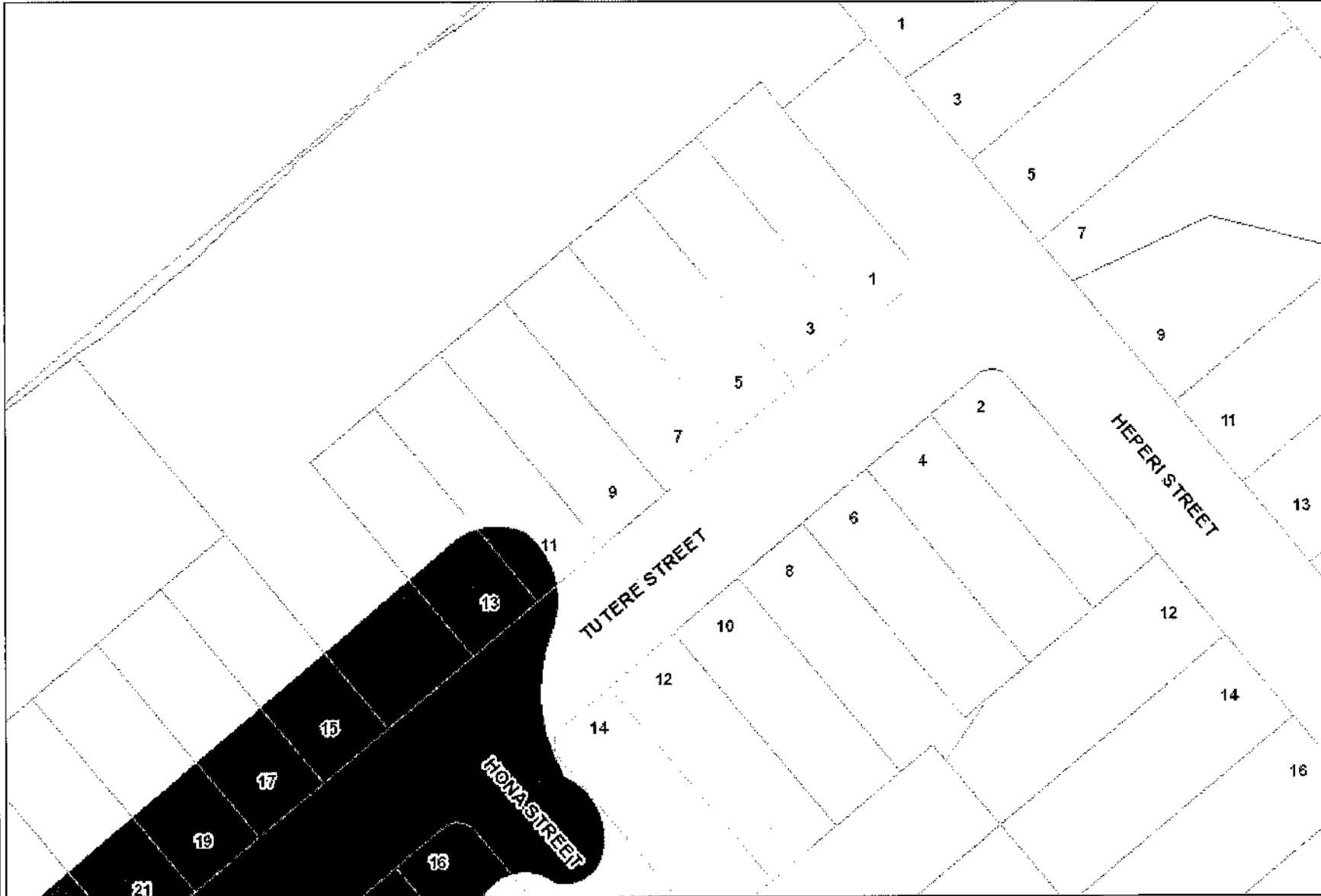


**04112014145323-0001.pdf**

1056K

# Kapiti Coast District Council Property Map

Date Printed: 16-March-2015



## Legend

- Local Authority Bound
- Parcel Boundaries
- North Island Main Trunk
- Street Numbers
- Road Names
- River Corridor
- Stream Corridor
- Overflow Path
- Residual Overflow
- Fill Control
- Storage
- Latest Flood Ponding
- Residual Ponding

0 SCALE 1: 1,000 50.8  
Meters  
Projection: NZGD\_2000\_New\_Zealand\_Transverse\_Mercator

Kapiti Coast District Council accepts no responsibility for incomplete or inaccurate information contained on this map. Use of this website is subject to, and constitutes acceptance of the conditions set out in our disclaimer.

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**DISCLAIMER:**  
 The flood hazard information shown on this plan is based on the best available data at the time of preparation. Specific interpretation of flood risk in any areas shown to be affected by flooding should be obtained by written request from the Greater Wellington Regional Council. The GWRC and other agencies involved in the preparation of this plan assume no responsibility for any interpretation or action taken by any agency or individual in relation to information provided on the plan.

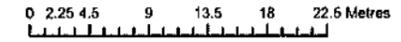


# WAIKANAĒ RIVER - Flood Hazard Map

## 7 Tutere Street

- Waikanae River Hazard Map**
- ZONE**
- Fill Control
  - Overflow Path
  - Ponding
  - Residual Overflow
  - Residual Ponding
  - River Corridor
  - Storage
  - Stream Corridor

Regional Orthophotography Copyright : GWRC / NZAM 2013  
 Topographic and Cadastral data is copyright LINZ



1:500

greater WELLINGTON  
 REGIONAL COUNCIL  
 Te Pone Mātua Taiao



# ASSEMBLY ARCHITECTS LIMITED

02 APR 2015

## NZBC E2/AS1 Risk Matrix

PROJECT	Waikanae Garage	FILE NO.	1307
FROM	James Norman, Assembly Architects Limited	DATE	02/04/2015
		PAGE NO.	1 of 2

**Site:** 7 Tutere Street, Waikanae Beach

**Legal Description:** Lot 85 DP 7462

**Project:** New Garage

### RISK MATRIX AS PER E2/AS1, SECTION 3, TABLE 1

Risk Factor	Score	Risk	Comments
Wind Zone	2	VH	Very high
Number of Stories	0	L	1
Roof Wall Junctions	1	M	
Eaves Width	5	VH	0mm
Envelope Complexity	1	M	
Decks	0	L	None
<b>TOTAL</b>	<b>9</b>		Ply Sheet on Cavity Acceptable

Risk Matrix calculated for worst case scenario for Building Elevations. Risk Matrix applies to all elevations. Plywood Sheet on Drained Cavity is acceptable for a risk score up to 20.

James Norman, for  
Assembly Architects Limited

02 APR 2015



NEW ZEALAND INSTITUTE OF  
**ARCHITECTS**  
INCORPORATED

Form 2A

**Memorandum from licensed building practitioner: Certificate of design work  
Section 45 and Section 30C, Building Act 2004**

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

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

**THE BUILDING**

Street address: 7 Tutere Street

Suburb: Waikanae Beach

Town/City: Waikanae

Postcode: 5036

**THE OWNER**

Name(s): Shane and Jill O'Brien

Mailing address:

Suburb:

PO Box/Private Bag: 205

Town/City: Fielding

Postcode: 4740

Phone number: 0274850316

Email address: [shane@colspec.co.nz](mailto:shane@colspec.co.nz)

**BASIS FOR PROVIDING THIS MEMORANDUM**

I am providing this memorandum in my role as the: Please tick the option that applies (√)	
<input type="checkbox"/>	<b>sole</b> designer of all of the RBW design outlined in this memorandum – I carried out all of the RBW design myself – no other person will be providing any additional memoranda for the project
<input type="checkbox"/>	<b>lead</b> designer who carried out some of the RBW design myself but also supervised other designers – this memorandum covers their RBW design work as well as mine, and no other person will be providing any additional memoranda for the project
<input type="checkbox"/>	<b>lead</b> 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 memoranda relating to their specific RBW design
<input checked="" type="checkbox"/>	<b>specialist</b> designer who carried out specific elements of RBW design work as outlined in this memorandum – other designers will be providing a memorandum covering the remaining RBW design work

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

I Justin Wright carried out / supervised the following design work that is restricted building work

**PRIMARY STRUCTURE: B1**

<b>Design work that is restricted building work</b>	<b>Description</b>	<b>Carried out/ supervised</b>	<b>Reference to plans and specifications</b>
<i>Tick (✓) if included</i>	<i>[If appropriate, provide details of the restricted building work]</i>	<i>[Specify whether you carried out this design work or supervised someone else carrying out this design work]</i>	<i>[If appropriate, specify references]</i>
<i>Cross (X) if excluded</i>			

**Primary structure**

All RBW Design work ( x ) relating to B1		( ) Carried out ( ) Supervised	
Foundations and subfloor framing ( ✓ )		( ) Carried out (✓) Supervised	8 / APR 2015
Walls ( ✓ )		( ) Carried out (✓) Supervised	
Roof ( ✓ )		( ) Carried out (✓) Supervised	
Columns and beams ( x )		( ) Carried out ( ) Supervised	
Bracing ( ✓ )		( ) Carried out (✓) Supervised	
Other ( x )		( ) Carried out ( ) Supervised	

**EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2**

All RBW design work ( ✓ ) relating to E2	To NZBC E2/AS1 & Cladding manufacturer	( ) Carried out (✓) Supervised	Details 95.xx
Damp proofing ( ✓ )	To NZBC E2/AS1.	( ) Carried out (✓) Supervised	Details 95.xx
Roof cladding or roof cladding system ( ✓ )	To NZBC E2/AS1 & Roofing COP	( ) Carried out (✓) Supervised	Details 95.xx
Ventilation system ( ✓ ) (for example, subfloor or cavity)	Cladding System as per Manufacturer req.	( ) Carried out (✓) Supervised	Details 95.xx
Wall cladding or wall cladding system ( ✓ )	Cladding system as per manufacturer reqs.	( ) Carried out (✓) Supervised	Details 95.xx
Waterproofing ( ✓ )	Roof Membrane	( ) Carried out (✓) Supervised	Details 95.xx
Other ( x )		( ) Carried out ( ) Supervised	

**FIRE SAFETY SYSTEMS: C1 – C6**

Emergency warning systems, evacuation and fire service operation systems, suppression or control systems, or other ( x )	( ) 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.

**WAIVERS AND MODIFICATIONS**

Waivers or modifications of the building code are required ( ) Yes (√) No

If Yes, provide details of the waivers or modifications below:	
<b>Clause</b>	<b>Waiver/modification required</b>
<i>[List relevant clause numbers of building code]</i>	<i>[Specify nature of waiver or modification of building code]</i>

**Note:** continue on another page if necessary.

**ISSUED BY**

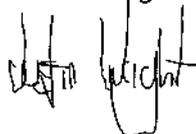
Name: Justin Wright	LBP or Registration number: 3287
The practitioner is a: ( ) Design LBP (√) Registered architect	( ) Chartered professional engineer
Design Entity or Company (optional): Assembly Architects Limited	
Mailing address (if different from below):	
Street address / Registered office: 24 Essex Ave	
Suburb: Butel Park	Town/City: Arrowtown
PO Box/Private Bag:	Postcode: 9302
Phone number: (03) 442 0356	Mobile: 021 565 363
After Hours:	Fax:
Email address: <a href="mailto:justin@assembly.co.nz">justin@assembly.co.nz</a>	Website: <a href="http://www.assembly.co.nz">www.assembly.co.nz</a>

**DECLARATION**

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

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

Signature:  
Date: 04.11.2013

Justin Wright  




## Statement of Compliance with the NZ Building Code

Consent No: 150134

ISSUED BY: **Kapiti Coast District Council**

### PROJECT

Site Address: 7 Tutere Street, Waikanae Beach  
Legal Description: LOT 85 DP 7462  
Work Description: New Garage 50m2  
Building Category: R1

### OWNER

Name(s): SM & JM O'Brien Family Trust  
Address: 320 Kimbolton Road, FEILDING

- 
- [ P ] Application for CCC received and accepted
  - [ P ] Consent description accurate and reflects amendments (if relevant).
  - [ P ] Confirm owner named on Building Consent application is current owner
  - [NA] Confirm new owner details and evidence of ownership are correctly documented
  - [ P ] Confirm all required inspections completed and documented in GoGet
  - [ P ] If inspection(s) have been missed, have they been compensated for?
  - [NA] If supervision was required for any inspection - did it occur?
  - [ P ] Work in accordance with approved consent and approved amendments
  - [NA] Have any notices to fix been uplifted?
  - [ P ] Supporting documentation required in building consent addenda received
  - [NA] Quality assurance documentation
  - [NA] Restricted building work
  - [NA] Owner Builder declaration supplied
  - [NA] Additional information required and received
  - [NA] Earthquake prone building
  - [NA] Swimming Pool details updated
  - [NA] Warnings and Bans
  - [NA] Supervision review
  - [ P ] Code Compliance Certificate Sign Off
  - [NA] All Amendments have been approved & issued
  - [NA] Where applicable, the compliance schedule and compliance schedule statement has been updated or new statement issued
  - [ P ] Approve to issue Code Compliance Certificate if all fees paid
  - [NA] Approve to issue Certificate of Acceptance if all fees paid
  - [NA] Approve to issue Certificate of Public Use if all fees paid

#### NOTES:

Inspections Prepaid:  
Inspections Done:

#### LICENSED BUILDING PRACTITIONERS:

Plumber	22126	Rhys van Bunnik
Drainlayer	12156	David Brokenshire
Electrician	E263365	Myles Raue

---

On review of the documentation and inspection notes it can be considered on reasonable grounds that all work has been completed in compliance with the building consent.

Signed:  
Name: Anthony Wilson  
Position: Building Officer

Date: 23 May 2022

## GoGet Inspection Audit Report

---

Consent No: **150134**  
Applicant: **SM & JM O`Brien Family Trust**  
Site Address: **7 Tutere Street, Waikanae Beach**  
Work Type: **New Garage 50m2**

---

Inspection Type: **Foundations**  
Inspection Outcome: **Fail**  
Inspected By: **Craig Watson**  
Inspection Date: **5 December 2017 11:40 a.m.**  
Duration: **30 minutes**

<b>Inspection Element</b>	<b>Status</b>
General	Fail
Footing depth	Pass
<b>Covered by Engineer</b>	
<b>Footings excavated to required depth as per building consent documentation</b>	
Engineers details required	Fail
<b>Covered by Engineer</b>	
<b>to inspect. ok to pour once engineer signs off.</b>	
Good bearing	Pass
<b>Covered by Engineer</b>	
Reinforcing	Pass
<b>Covered by Engineer</b>	
Siting	Pass
<b>set out from boundary pegs</b>	
Sub-floor vents	N/A
Other	Pass
<b>100 mm pvc waste Wrapped in protection, filled with water and holding</b>	



Taken at 11:36 AM on Tuesday 5/12/2017



Taken at 11:36 AM on Tuesday 5/12/2017



Taken at 11:38 AM on Tuesday 5/12/2017

## SITE NOTICE

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Consent No: **150134**  
Applicant: **SM & JM O`Brien Family Trust**  
Site Address: **7 Tutere Street, Waikanae Beach**  
Work Type: **New Garage 50m2**  
Building Category: **R1**

---

Inspection Type: **Foundations**  
Inspection Outcome: **Fail**  
Inspected By: **Craig Watson**  
Inspection Date: **5 December 2017**

### Passed Items

#### General

Footing depth	<b>Covered by Engineer</b> <b>Footings excavated to required depth as per building consent documentation</b>
Good bearing	<b>Covered by Engineer</b>
Reinforcing	<b>Covered by Engineer</b>
Siting	<b>set out from boundary pegs</b>
Other	<b>100 mm pvc waste Wrapped in protection, filled with water and holding</b>

### Failed Items

#### General

Engineers details required	<b>Covered by Engineer</b> <b>to inspect. ok to pour once engineer signs off.</b>
----------------------------	--

## GoGet Inspection Audit Report

---

Consent No: **150134**  
Applicant: **SM & JM O`Brien Family Trust**  
Site Address: **7 Tutere Street, Waikanae Beach**  
Work Type: **New Garage 50m2**

---

Inspection Type: **Pre Wrap**  
Inspection Outcome: **Fail**  
Inspected By: **Craig Watson**  
Inspection Date: **20 December 2017 9:34 a.m.**  
Duration: **30 minutes**

<b>Inspection Element</b>	<b>Status</b>
General	Fail
Inspection notes	Pass
Drawings	Pass
Additional information/plan	N/A
Cladding type identified	N/A
Framing moisture meets cladding requirements	N/A
Stud spacing appropriate for cladding <b>600 its</b>	Pass
Exterior sheet bracing and angle brace fixing <b>Eco ply nailed off correctly</b>	Pass
Bottom plate connections <b>All complete.</b> <b>All bottom plate connections fixed in compliance with the building consent documentation</b>	Pass
Building wrap type <b>Eco ply</b>	Pass
Bracing requirements <b>All complete</b>	Pass
Purlin fixing	N/A
Decking substrate	N/A
Top Plate Connection <b>nailed off ply@ 75 mm check at pre clad.</b>	Fail
Lintel Connections	Pass
Truss connections <b>As truss plan</b>	Pass
Column posts	N/A
Other	N/A

## SITE NOTICE

Consent No: **150134**  
 Applicant: **SM & JM O`Brien Family Trust**  
 Site Address: **7 Tutere Street, Waikanae Beach**  
 Work Type: **New Garage 50m2**  
 Building Category: **R1**

Inspection Type: **Pre Wrap**  
 Inspection Outcome: **Fail**  
 Inspected By: **Craig Watson**  
 Inspection Date: **20 December 2017**

### Passed Items

#### General

Inspection notes	
Drawings	
Stud spacing appropriate for cladding	<b>600 its</b>
Exterior sheet bracing and angle brace fixing	<b>Eco ply nailed off correctly</b>
Bottom plate connections	<b>All complete. All bottom plate connections fixed in compliance with the building consent documentation</b>
Building wrap type	<b>Eco ply</b>
Bracing requirements	<b>All complete</b>
Lintel Connections	
Truss connections	<b>As truss plan</b>

### Failed Items

#### General

Top Plate Connection	<b>nailed off ply @ 75 mm check at pre clad.</b>
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## GoGet Inspection Audit Report

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Consent No: **150134**  
Applicant: **SM & JM O`Brien Family Trust**  
Site Address: **7 Tutere Street, Waikanae Beach**  
Work Type: **New Garage 50m2**

---

Inspection Type: **Foundation**  
Inspection Outcome: **Pass**  
Inspected By: **Anthony Wilson**  
Inspection Date: **20 May 2022 8:36 a.m.**  
Duration: **0 minutes**

<b>Inspection Element</b>	<b>Status</b>
General	Pass
Footing depth <b>Footings excavated to required depth as per building consent documentation</b>	Pass
Engineers details required <b>Foundation design is as per NZS3604:2011</b> <b>No engineer design involved for this consent</b>	N/A
Agent/owner written approval	N/A
non compliance discussed onsite	N/A
LBP number <b>Not restricted building work</b>	N/A
Next Inspection required	N/A
Site Inspection <b>Checked and noted under 'General' prompts</b>	N/A

---

### **Documentation**

Application for CCC	Required
Electrical safety certificate - Electrician	Required

## GoGet Inspection Audit Report

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Consent No: **150134**  
Applicant: **SM & JM O`Brien Family Trust**  
Site Address: **7 Tutere Street, Waikanae Beach**  
Work Type: **New Garage 50m2**

---

Inspection Type: **Pre Wrap**  
Inspection Outcome: **Pass**  
Inspected By: **Anthony Wilson**  
Inspection Date: **20 May 2022 8:37 a.m.**  
Duration: **0 minutes**

<b>Inspection Element</b>	<b>Status</b>
General	Pass
Fire Separations	N/A
Top Plate Connection <b>Nailed off ply@ 75 mm, Ben Kusabs the Builder has provided a Producer Statement to verify this was carried out.</b>	Pass
LBP number	N/A
Agent/owner written approval	N/A
non compliance discussed onsite	N/A
Next Inspection required	N/A

---

### **Documentation**

Application for CCC	Required
Electrical safety certificate - Electrician	Required

**GoGet Inspection Audit Report**

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Consent No: **150134**  
 Applicant: **SM & JM O`Brien Family Trust**  
 Site Address: **7 Tutere Street, Waikanae Beach**  
 Work Type: **New Garage 50m2**

---

Inspection Type: **Final Inspection**  
 Inspection Outcome: **Pass**  
 Inspected By: **Anthony Wilson**  
 Inspection Date: **20 May 2022 10:20 a.m.**  
 Duration: **45 minutes**

<b>Inspection Element</b>	<b>Status</b>
Exterior	Pass
All previous inspections/notes passed	Pass
<b>Drainage connection was carried out during the drainage of the house under BC140009</b>	
Drawings	Pass
Additional information/plan	N/A
Sub-floor ventilation	N/A
Roof fixings	Pass
Spouting and down-pipes	Pass
Deck structure	N/A
Flashings - roof	Pass
Penetrations - flashings	N/A
Barriers	N/A
Gully dishes	N/A
<b>100mm Waste connected to main drain</b>	
Stormwater and site drainage	Pass
Handrails	N/A
Wastes to gully	N/A
Fixings - durability	Pass
Steps/stairs	N/A
Terminal vents/AAVs	N/A
<b>Not required</b>	
Cladding painted/sealed	Pass
Flashings - windows/doors	Pass
Cladding ground clearance	Pass
non compliance discussed onsite	N/A
Final check complete	N/A
Other	Pass
<b>Plumbing visible at time of final inspection, plumber and drain layer have provided producer statements also to verify connection by registered trades.</b>	
<b>Drainage connection inspected under BC140009</b>	
Interior	Pass
All previous inspections/notes passed	Pass
Drawings	Pass
Additional information/plan	N/A
Service areas-floors/walls	Pass
<b>Toilet and hand basin over floated concrete</b>	
Stair design	N/A
Handrails	N/A

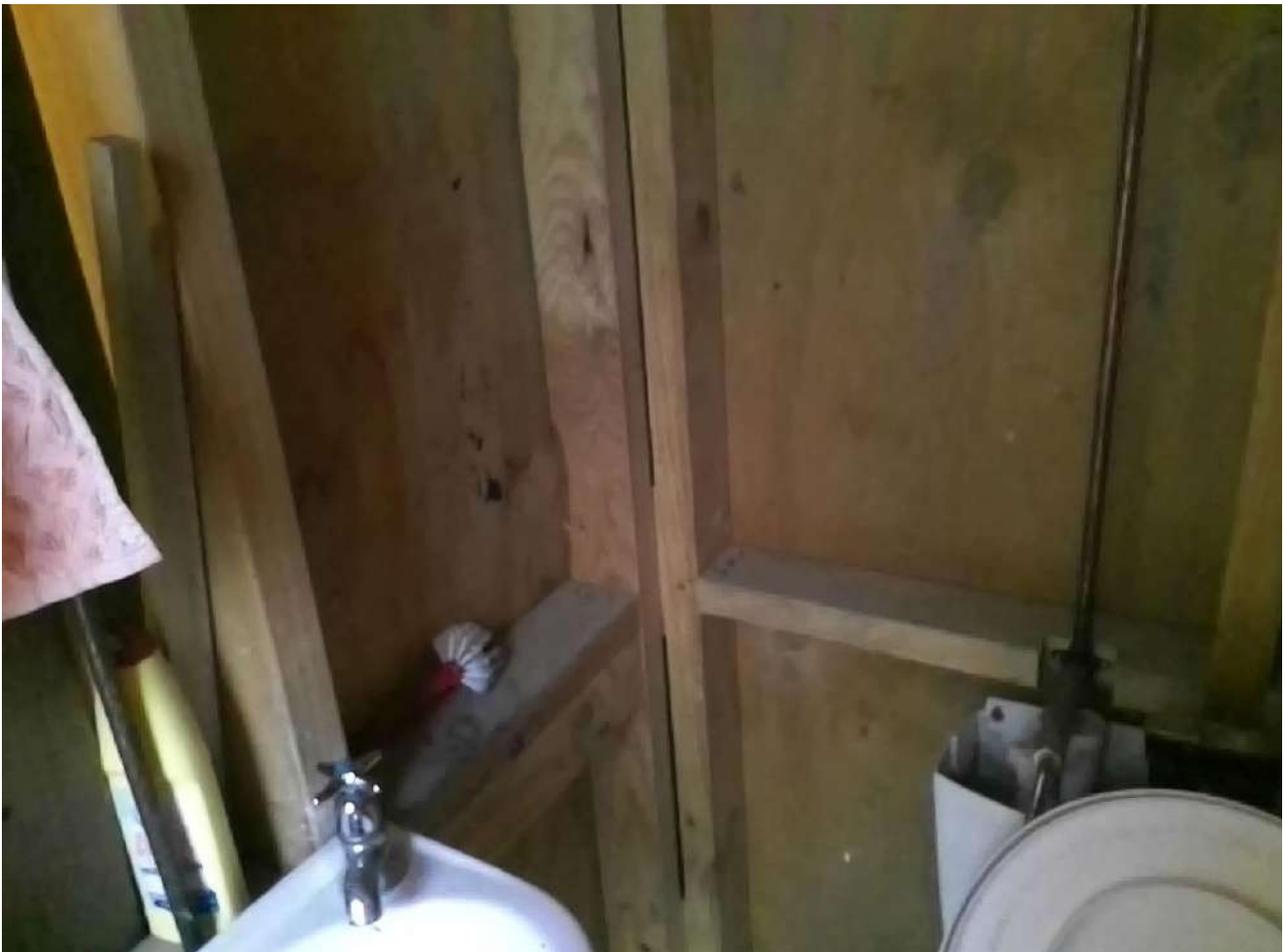
Balustrades	N/A
Lightings	Pass
<b>Electrical safety certificate supplied</b>	
Laundering	N/A
Cooking facilities	N/A
Smoke detectors	N/A
Food storage/preparation	N/A
Ventilation	N/A
Insulation and clearance	N/A
HWC flues	N/A
HWC restraint	N/A
Tempering valve	N/A
Glazing - human impact	N/A
Hot water temp	N/A
Solid fuel heater	N/A
Water supply tank	N/A
Trap seals and AAVS	Pass
<b>No AAVs, trap in place under hand basin</b>	
Cistern flushing	Pass
<b>Tested and working well</b>	
WC pan connection	Pass
<b>Sealed to floor</b>	
Septic tank	N/A
Window labels	N/A
non compliance discussed onsite	N/A
Final check complete	Pass
<b>All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.</b>	
Other	N/A
Intertenancy/commercial	N/A
Other	N/A

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<b>Documentation</b>	
Application for CCC	Required
Electrical safety certificate - Electrician	Required



Taken at 9:59 AM on Friday 20/05/2022



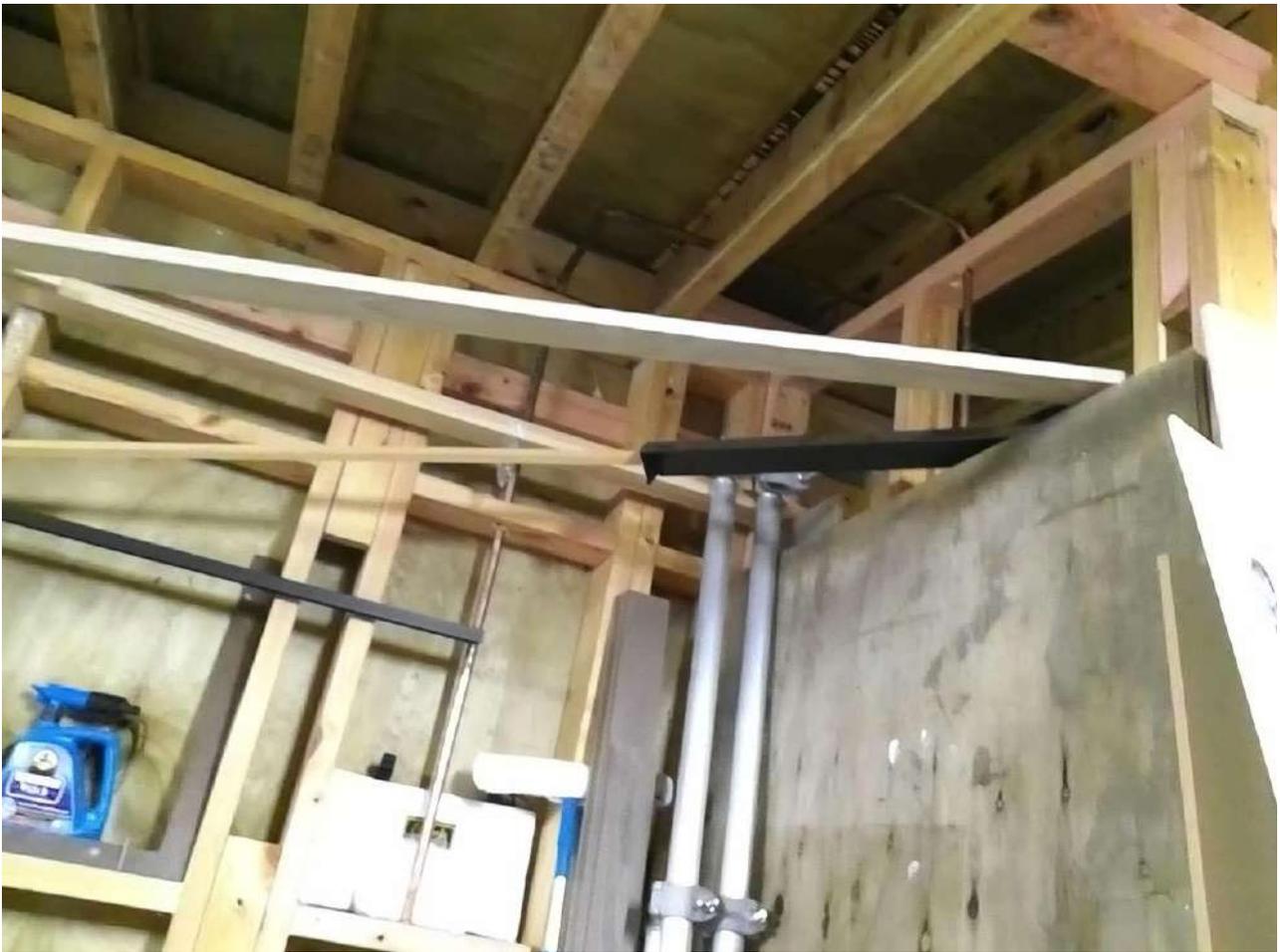
Taken at 9:59 AM on Friday 20/05/2022



Taken at 9:59 AM on Friday 20/05/2022



Taken at 10:00 AM on Friday 20/05/2022



Taken at 10:00 AM on Friday 20/05/2022



Taken at 10:01 AM on Friday 20/05/2022



Taken at 10:01 AM on Friday 20/05/2022



Taken at 10:08 AM on Friday 20/05/2022



Taken at 10:08 AM on Friday 20/05/2022



Taken at 10:08 AM on Friday 20/05/2022



Taken at 10:09 AM on Friday 20/05/2022



Taken at 10:09 AM on Friday 20/05/2022



Taken at 10:09 AM on Friday 20/05/2022



Taken at 10:10 AM on Friday 20/05/2022



Taken at 10:10 AM on Friday 20/05/2022

## SITE NOTICE

Consent No: **150134**  
 Applicant: **SM & JM O`Brien Family Trust**  
 Site Address: **7 Tutere Street, Waikanae Beach**  
 Work Type: **New Garage 50m2**  
 Building Category: **R1**

Inspection Type: **Foundation**  
 Inspection Outcome: **Pass**  
 Inspected By: **Anthony Wilson**  
 Inspection Date: **20 May 2022**

### Passed Items

General

Footing depth	<b>Footings excavated to required depth as per building consent documentation</b>
---------------	---

Inspection Type: **Pre Wrap**  
 Inspection Outcome: **Pass**  
 Inspected By: **Anthony Wilson**  
 Inspection Date: **20 May 2022**

### Passed Items

General

Top Plate Connection	<b>Nailed off ply@ 75 mm, Ben Kusabs the Builder has provided a Producer Statement to verify this was carried out.</b>
----------------------	--

Inspection Type: **Final Inspection**  
 Inspection Outcome: **Pass**  
 Inspected By: **Anthony Wilson**  
 Inspection Date: **20 May 2022**

### Passed Items

Exterior

All previous inspections/notes passed	<b>Drainage connection was carried out during the drainage of the house under BC140009</b>
Drawings	
Roof fixings	
Spouting and down-pipes	
Flashings - roof	
Stormwater and site drainage	
Fixings - durability	
Cladding painted/sealed	
Flashings - windows/doors	

Cladding ground clearance  
Other

**Plumbing visible at time of final inspection, plumber and drain layer have provided producer statements also to verify connection by registered trades. Drainage connection inspected under BC140009**

Interior

All previous inspections/notes passed  
Drawings  
Service areas-floors/walls  
Lightings  
Trap seals and AAVS  
Cistern flushing  
WC pan connection  
Final check complete

**Toilet and hand basin over floated concrete  
Electrical safety certificate supplied  
No AAVs, trap in place under hand basin  
Tested and working well  
Sealed to floor  
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**

---

**Documentation**

Application for CCC  
Electrical safety certificate - Electrician

**Status**

Required  
Required

SM & JM O'Brien Family Trust  
320 Kimbolton Road  
FEILDING

11 October 2019

Dear Building Consent Applicant / Building Owner

**Notification of Code Compliance Certificate Decision**  
**Building Consent: 150134**

**Site Address:** 7 Tutere Street, Waikanae Beach  
**Legal Description:** LOT 85 DP 7462  
**Project Description:** New Garage 50m<sup>2</sup>

Kapiti Coast District Council wrote to you previously explaining the requirements related to applying for a Code Compliance Certificate when building work is completed, and the obligation on the Building Consent Authority (BCA) to decide to issue or to refuse to issue a Code Compliance Certificate. No response to this letter has been received, and the deadline for the BCA to make a decision has been reached.

The BCA has insufficient information to determine that work is completed in accordance with the approved building consent documentation and therefore has decided to refuse to issue a Code Compliance Certificate.

If you have any questions or you would like to discuss this matter, please contact me on (04) 296 4700 or 0800 486 486 referencing Building Consent: 150134.

Yours sincerely



Michelle Salmon  
**Building Inspections Team Leader**