MEYER CRUDEN ENGINEERING LTD

Producer Statement 1

Project: 2020249

Lot 47 Prospectors Park, Cromwell

Prepared for: Central Otago District Council

MEYER CRUDEN ENGINEERING LTD
156 Swann Road, RD2 Cromwell 9384 | Level 1, 78 Ardmore Street, Wanaka 9305
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Table of Contents

1. Producer Statement 1

Central Otago District Council
200925
Approved Building Consent
03/03/2021

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Building Code Clause(s) B1

PRODUCER STATEMENT – PS1 – DESIGN

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

ISSUED BY: Meyer Cruden Engineering Limited
(Design Firm)

TO: SA Studio
(Owner/Developer)

TO BE SUPPLIED TO: Central Otago District Council
(Building Consent Authority)

IN RESPECT OF: Structural Design of timber framed residential dwelling
(Description of Building Work)

AT: 11 Searle Drive, Prospectors Park
(Address)

Town/City: Cromwell (Address) **LOT** 47 **DP** 542590 **SO**

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

Design of wall bracing and verandah area footings. Raft foundation to dwelling as per RIB Raft manual.

(Extent of Engagement)

services in respect of the requirements of Clause(s) B1 of the Building Code for:

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

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

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

☐ Alternative solution as per the attached schedule

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

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

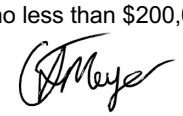
On behalf of the Design Firm, and subject to:
(i) Site verification of the following design assumptions "Good" ground in accordance with NZS 3604:2011 Section 3
(ii) All proprietary products meeting their performance specification requirements;

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

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

I, Carl James Meyer (Name of Design Professional) am: ■ CPEng 230586 # ☐ Reg Arch #

I am a member of: ■ Engineering New Zealand ☐ NZIA and hold the following qualifications: BE (Hons), CPEng, CMENGNZ
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ: ■

SIGNED BY Carl James Meyer (Name of Design Professional) (Signature) 

ON BEHALF OF Meyer Cruden Engineering Limited (Design Firm) Date 15-12-2020

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

Compliance Documents Schedule:
NZBC B1/VM1 (NZS1170:2011, NZS3603:1993, NZS 3604:2011

NOTE:
We are not able to provide a Producer Statement for durability because compliance needs to be shown on a material-by-material basis using a variety of compliance methods, and not all materials used have a clear compliance path.

However, we can confirm that for the structural elements shown in our documentation. Timber - timber treatment has been selected in accordance with Table 1A of B2/AS1. Concrete - concrete covers have been selected in accordance with NZS 3101, Part 1, Section 3. Mild Steel - steel protection has been specified in accordance with the 'Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings' AS/NZS 2312.1:2014. We note that this is on a time to first maintenance basis.

Drawing schedule:

Title:	2020249 St Johns
By:	Meyer Cruden Engineering Limited
Date:	15-12-2020
Numbered:	E0.0, E2.1-2.2

Title:	House for St John
By:	SA Studio
Date: Numbered:	A_001, A_002, A_003, A_010, A_100, A_101, A_102, A_103, A_104, A_105, A_110, A_200, A_201, A_300, A_301, A_302, A_303, A_400, A_401, A_500, A_501, A_502, A_503, A_504, A_505, A_506, A_507, A_508, A_600, A_601, A_602, E0.1, E2.1, E2.2

The following inspections will be completed by Meyer Cruden

Engineering:

- None. CODC Inspectors to undertake all usual inspections.

All other inspections required shall be completed by the Consenting Authority.

We are not able to provide Producer Statements 4's for work we have not been called to inspect.

2. Certificate of Design Work

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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:	11 Searle Drive	
Suburb:		
Town/City:	Cromwell	Postcode:

THE OWNER(S)		
Name(s):		
Mailing address:		
Suburb:	PO Box/Private Bag:	
Town/City:		Postcode:
Phone number:	Email address:	

Central Otago District Council
200925
Approved Building Consent
03/03/2021

Central Otago District Council
200925
Approved Building Consent
03/03/2021

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23/12/2020
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BASIS FOR PROVIDING THIS MEMORANDUM

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

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

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

I Carl Meyer carried out / supervised the following design work that is restricted building work

PRIMARY STRUCTURE: B1

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick ✓ if included. Cross ⊗ if excluded	If appropriate, provide details of the RBW	Tick ✓ whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
All RBW design work relating to B1 ⊗		○ Carried out ✓ Supervised	
Foundations and subfloor framing ✓	Verandah footings. Raft foundation as per Firth Rib Raft Technical Manual.	○ Carried out ✓ Supervised	

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick ✓ if included. Cross ✗ if excluded	If appropriate, provide details of the RBW	Tick ✓ whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
Walls ✗		○ Carried out ○ Supervised	
Roof ✗		○ Carried out ○ Supervised	
Columns and beams ✗		○ Carried out ○ Supervised	
Bracing ✓	Wall bracing design.	○ Carried out ✓ Supervised	
Other ✗		○ Carried out ○ Supervised	

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick ✓ if included. Cross ⊗ if excluded	If appropriate, provide details of the RBW	Tick ✓ whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2			
All RBW design work relating to E2 ⊗		◯ Carried out ◯ Supervised	
Damp proofing ⊗		◯ Carried out ◯ Supervised	
Roof cladding or roof cladding system ⊗		◯ Carried out ◯ Supervised	
Ventilation system (for example, subfloor or cavity) ⊗		◯ Carried out ◯ Supervised	
Wall cladding or wall cladding system ⊗		◯ Carried out ◯ Supervised	
Waterproofing ⊗		◯ Carried out ◯ Supervised	
Other ⊗		◯ Carried out ◯ Supervised	

Central Otago District Council
200925
Approved Building Consent
03/03/2021

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23/12/2020
CODC

Design work that is RBW	Description of RBW	Carried out or supervised	Reference to plans and specifications
Tick ✓ if included. Cross ✗ if excluded	If appropriate, provide details of the RBW	Tick ✓ whether you carried out this design work or supervised someone else carrying out this design work	If appropriate, specify references
FIRE SAFETY SYSTEMS: C1 - C6			
Emergency warning systems Evacuation and fire service operation systems ✗ Suppression or control systems Other		◯ 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.			

WAIVERS AND MODIFICATIONS

Waivers or modifications of the Building Code are required. ◯ Yes ✗ No

If Yes, provide details of the waivers or modifications below:

Clause	Waiver/modification required
List relevant clause numbers of building code	Specify nature of waiver or modification of building code required

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ISSUED BY

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

Name: Carl Meyer	LBP or Registration number: 230586
The practitioner is a: ◯ Design LBP ◯ Registered architect ✓ Chartered professional engineer	
Design Entity or Company (optional): Meyer Cruden Engineering Limited	
Mailing address (if different from below):	
Street address/Registered office: 156 Swann Road, RD2	
Suburb:	Town/City: Lowburn
PO Box/Private Bag:	Postcode: 9384
Phone number: 03 4450 670	Mobile:
After hours:	Fax:
Email address: carl@mcengineering.co.nz	Website:

DECLARATION

I Carl Meyer 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: 15-12-20

Central Otago District Council
200925
Approved Building Consent
03/03/2021

3. Design Calculations

3.1 Design Brief

DESIGN BRIEF

- 202 m^2 single storey timber framed residential dwelling at Lot 47 Prospectors Park.
- True Oak corugate roofing on timber framed trusses by others (slope of 5^o).
- 140mm thick timber framed exterior walls with mixture of lightweight trueoak vertical metal & shiplap vertical wall claddings.
- Internal walls are mixture of 140mm and 90mm timber framed walls with plasterboard wall linings.
- Building Importance Level 2
- Wind Terrain Category 2, "High" wind zone
- Snow loads to be applied, site elevation = 200m above sea level, Snow region N5
- Seismic loads based on; $\mu = 2$ (plasterboard lining braced walls); $T_1 < 0.4$ seconds. Bracing demand and capacity calculated using GIBEzy Brace software.

SPECIFIC STRUCTURAL INSPECTIONS BY MEYER ENGINEERING

- None: CODC building inspectors to undertake all usual inspections.

3.2 Loadings

SNOW ACTION (sub-alpine) CALCULATIONS TO AS/NZS 1170.3:2003

ANNUAL PROBABILITY OF EXCEEDANCE

Structure Design Life: 50 years

Importance Level (1 Low - 4 Exceptional): 2

$P_{U.L.S.}$ = 0.007
$R_{U.L.S.}$ = 149.3 years
$P_{S.L.S.}$ = 0.04
$R_{S.L.S.}$ = 25 years

Probability Factor

U.L.S	kp =	1.25
S.L.S	kp =	0.85

ALTITUDE

ho 200 m

REGIONAL GROUND SNOW LOAD

Site Location: Region = N5

Regional Snow Load	U.L.S	Sg =	0.90	Kpa
	S.L.S	Sg =	0.61	Kpa

ROOF SNOW LOAD

Exposure reduction Coefficent: Exposure = sub alpine, Ce = 1.00

Roof slope: α = 5.0 degrees — Main roof

Balanced Shape Coefficent:

	$\mu 1$ =	0.70	Main roof
	$\mu 1$ =	1.80	Drifting 1
	$\mu 1$ =	1.20	Drifting 2
U.L.S	s =	0.63 Kpa	Main roof
	s =	1.62 Kpa	Drifting 1
	s =	1.08 Kpa	Drifting 2
S.L.S	s =	0.43 Kpa	Main roof
	s =	0.00 Kpa	0
	s =	1.10 Kpa	Drifting 1

WIND ACTION CALCULATIONS TO AS/NZS 1170.2:2011

ANNUAL PROBABILITY OF EXCEEDANCE

Structure Design Life: 50 years

Importance Level (1 Low - 4 Exceptional): 2

$P_{U.L.S.}$ = 0.002
$R_{U.L.S.}$ = 500 years
$P_{S.L.S.}$ = 0.04
$R_{S.L.S.}$ = 25 years

REGIONAL WIND SPEEDS

Site Location: Region = A (1 to 7)

Regional wind speed
$V_{U.L.S.}$ = 45 m/s
$V_{S.L.S.}$ = 37 m/s

SITE EXPOSURE MULTIPLIERS

Terrain/Height Multiplier
Terrain category: cat = 2
Height (average roof height): z = 4.40 m
M(z,cat) = 0.91
Sheilding Multiplier: Ms = 1.00
Topographic Multiplier: Mt = 1.00

SITE WIND SPEEDS AND Site wind speed
U.L.S. V_{site} = 41 m/s — High wind zone
S.L.S. V_{site} = 34 m/s

Site wind pressure
U.L.S. p_{site} = 1.01 kPa
S.L.S. p_{site} = 0.69 kPa

WIND ACTION CALCULATIONS TO NZS 3604:2011

Topographic Class — Hill height
H = m
L = m — Lesser of 3H or 500m
h = m — Height to crest from distance L
Smoothed hillside gradient h/L = 0.00
Distance from site to crest of hill d = 0.00 m — d/H = 1000

Topographic Class = T1

Wind Zone
Wind Region = A
Ground Roughness = Open
Site exposure = Exposed

Wind Zone (to NZS3604:2011) = High
Wind Zone (to BRANZ Map) = High

EARTHQUAKE ACTION CALCULATIONS TO NZS 1170.5:2004

ANNUAL PROBABILITY OF EXCEEDANCE

Structure Design Life: 50 years

Importance Level (1 Low - 4 Exceptional): 2

$P_{U.L.S.}$ = 0.002
$R_{U.L.S.}$ = 500 years
$P_{S.L.S.}$ = 0.04
$R_{S.L.S.}$ = 25 years

SITE HAZARD SPECTRA

Spectral shape factor

Soil class: D - Deep or soft soil

Period: T = 0.4 secs
$C_h(T)$ = 3

Hazard factor: Z = 0.24

Return period factor: R_u = 1.00
R_s = 0.25

Near fault factor

Distance = 20 km
$N(T,D)$ = 1.00 $N_{max}(T)$ = 1.00

$C(T)_{U.L.S.}$ = 0.72
$C(T)_{S.L.S.}$ = 0.18

STRUCTURAL CHARACTERISTICS

Period of vibration

Displacement: d_i = 0 mm
Displacing force: F_i = 0 kN
Seismic weight: W_i = 0 kN

T_1 = 0.4 secs

Structural ductility factor

$m_{U.L.S.}$ = 2 $m_{S.L.S.}$ = 1.25

Structural performance factor: S_p = 0.7

DESIGN EARTHQUAKE ACTIONS

Ultimate limit state: **$C_d(T_1)$ = 0.32**

Serviceability limit state: **$C_d(T_1)$ = 0.11**

3.3 Bracing

GIB EzyBrace® Bracing Software

Demand Calculation Sheet

Job Details

Name:	St John House Prospectors Park
Street and Number:	
Lot and DP Number	
City/Town/District	
Designer	
Company	Meyer Cruden
Date	

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Building Specification

Number of Storeys	1
Floor Loading	2 kPa
Foundation Type	Slab
	Single
Cladding Weight	Light
Roof Weight	Light
Room in Roof Space	No
Roof Pitch (degrees)	5
Roof Height above Eaves (m)	2
Building Height to Apex (m)	4.8
Ground to Lower Floor (m)	0.2
Average Stud Height (m)	3.85
Building Length (m)	14.1
Building Width (m)	20.5
Building Plan Area (m²)	202

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Approved Building Consent
03/03/2021

Building Location

Wind Zone = High

Earthquake Zone 2

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

Bracing Units required for Wind

	Along	Across
Single Level	**1052**	**661**

Bracing Units required for Earthquake

	Along & Across
Single Level	**765**

Single Level Along Resistance Sheet

Job Name: St John House Prospectors Park

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Wind	EQ
Demand	
1052	765
Achieved	

Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind BUs	EQ BUs	1793 170%	1717 224%
M	1	1.20		3.85	EPBG_1.2	Ecopy	112	112		
	2	1.20		3.85	EPBG_1.2	Ecopy	112	112		
									224 OK	224 OK
N	1	1.00		2.465	EPBG_0.4	Ecopy	97	112		
	2	2.00		3.85	EPBG_0.4	Ecopy	125	143		
									222 OK	255 OK
O	1	3.20		2.465	GS1-N	GIB®	215	187		
									215 OK	187 OK
P	1	3.90		2.465	GS1-N	GIB®	262	228		
									262 OK	228 OK
Q	1	2.70		3	BL1-H	GIB®	276	225		
	2	2.20		2.465	GS1-N	GIB®	148	129		
									424 OK	353 OK
R	1	0.80		2.765	EPBG_0.4	Ecopy	69	80		
	2	0.80		2.765	EPBG_0.4	Ecopy	69	80		
	3	1.90		2.465	GS1-N	GIB®	128	111		
									267 OK	271 OK
S	1	1.20		3.85	EPBS_1.2	Ecoply	49	52		
	2	2.60		3.85	EPBS_2.4	Ecoply	130	146		
									178 OK	198 OK

Central Otago District Council
200925
Approved Building Consent
03/03/2021

Single Level Across Resistance Sheet

Job Name: St John House Prospectors Park

									Wind	EQ
									Demand	
									661	765
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind BUs	EQ BUs	1799 272%	1749 229%
A	1	0.70		2.465	EPBS_0.6	Ecoply	41	44		
	2	1.30		2.465	EPBS_1.2	Ecoply	82	89		
	3	1.10		2.465	EPBS_0.6	Ecoply	64	70		
	4	4.90		2.465	EPBS_2.4	Ecoply	382	429		
									569 OK	632 OK
B	1	7.20		3.4	BL1-H	GIB®	651	529		
	2	1.60		2.765	BL1-H	GIB®	178	144		
	3	0.45		2.465	EPBG_0.4	Ecopy	44	50		
	4	0.45		2.465	EPBG_0.4	Ecopy	44	50		
									916 OK	774 OK
C	1	0.80		3.8	EPBG_0.4	Ecopy	51	58		
	2	0.80		3.6	EPBG_0.4	Ecopy	53	61		
	3	0.40		2.765	EPBG_0.4	Ecopy	35	40		
									139 OK	159 OK
D	1	1.40	20	3.85	EPBG_1.2	Ecopy	123	123		
	2	0.90	20	3.85	EPBG_0.4	Ecopy	53	61		
									176 OK	184 OK

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JOB No:	SHEET No:
PROJECT:	DATE:
	BY:

LIVING AREA ACROSS

WIND (SED)

$$V^*_w = 1.01 \times 0.8 \times \left(\frac{4.8}{2} \times 0.7 + \frac{3.6}{2} \times 0.5\right)$$
$$= 2.09 \text{ kN/m}$$

SEISMIC (SED)

$V^*_{UPPER} = 3.5 \text{ kN/m}$

$V^*_{LOWER} = 1.95 \text{ kN/m}$

CAPACITY

(C) $V^* = (3.5 \text{ kN/m} \times 2.4\text{m} + 1.95 \text{ kN/m} \times 1\text{m}) \times 20 \text{ BU/kN}$
$= 207 \text{ BU} \quad (10.35 \text{ kN})$

$\phi V = 160$ BU (NG) ← USE DIAPHRAGM TO BRACE BACK TO (B) AP

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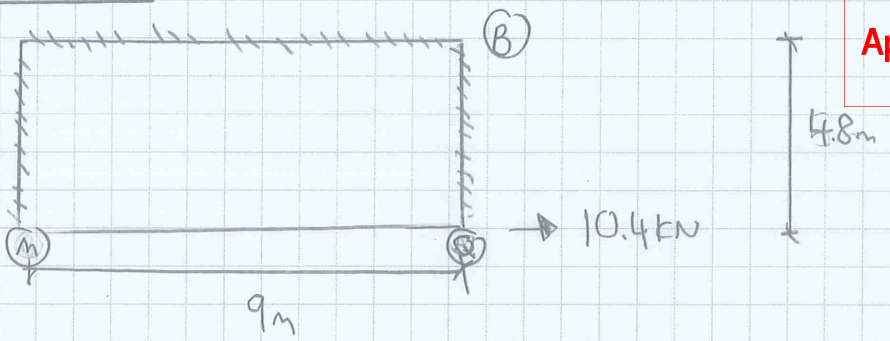
DIAPHRAGM



$V^* = 1.15\ kN/m$ GIB DIAPHRAGM (OK)

$V^*_{M/Q} = 10.4kN \times \frac{4.8m}{9m}$

$= 5.5kN$ 110 BU.

$\phi V_n = 224$ BU (ok) 200%.

$\phi V_Q = 225$ BU (OK) 200 % ← LOWER

(B) $V^* = 3.5kN/m \times 4.8m + 1.95kN/m \times$ | + 2.

$= 18.8kN$ (375 BU)

$\phi V \geq 530$ BU (ok) 140 % (ok)

SEISMIC WEIGHT CALCULATIONS

Number of Levels = 1 (Including roof but excluding ground level)

Roof Level Height = 4.20	LOAD TYPE	DEAD LOADS	LIVE LOADS	TRIB L	W/H	AREA	Ψε	Ψa	Total
	upper roof	0.40		14.0	5.0	70.0	-	-	28.0
upper external walls below		0.30		20.5	2.1	43.1	-	-	12.9
upper internal walls below		0.30		22.0	2.1	46.2	-	-	13.9
	lower roof	0.40		10.5	2.0	21.0	-	-	8.4
lower external walls		0.30		9.0	1.4	12.6	-	-	3.8
		-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
								Σ =	67.0

Level Height = 0	LOAD TYPE	DEAD LOADS	LIVE LOADS	TRIB L	W	AREA	Ψε	Ψa	Total
	roof					-			-
					-	-		-	-
						-		-	-
						-		-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
								Σ =	-

Level Height = (4.20)	(1) LOAD TYPE	DEAD LOADS	LIVE LOADS	TRIB L	W	AREA	Ψc	Ψa	Total
	roof	-	-	-	-	-	-	-	-
	floor					-	-	-	-
exterior walls above							-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
						-	-	-	-
								Σ =	-

Seismic Weight (kN) = 67

EQUIVALENT STATIC METHOD

This design method for structures not exceeding 10m height

$C_d(T_1)$ = 0.32

Seismic Weight = 67 kN

Seismic Shear V = 21 kN

F_t = 2 kN

Structure Level	Seismic Weight	Level height			Static design force	
	W_i (kN)	h_i (m)	$W_i h_i$	$W_i h_i/\Sigma wihi$	F_i (kN)	F_i (BU's)
Roof	67	4.2	281	1.000	21	429
0	0	0	0	0.000	0	0
0	0	0	0	0.000	0	0
	67		281	1.000	21	429

Upper Roof Across 3.5056 kN/m
Lower Roof Across 1.9488 kN/m

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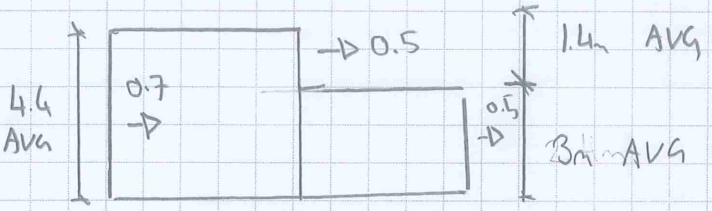
LIVING AREA ALONG BRACING

WIND (SED)



CASE ① $C_{pi} = 0.0$

$$V'_{(1)} = 1.01 \times 0.8 \times \left(\frac{4.4}{2} \times 0.7 + 0.5 \times \frac{1.4}{2} \right)$$

$$= 1.53 \text{ kN/m}$$

$$V'_{(2)} = 1.01 \times 0.8 \times 0.5 \times \frac{4.4}{2}$$

$$= 0.9 \text{ kN/m}$$

CASE ② $C_{pi} = 0.3$

$V'_{(1)} = 1.89$ kN/m

$V'_{(2)} = 0.36$ kN/m

CAPACITY

(Q) $V'_Q = 1.89 \text{ kN/m} \times 6.8\text{m}$

$= 12.9\text{kN}$ (260 BU)

$\phi V_Q = 230$ BU (NG) ALLOW FOR STUDS TO TRANSFER LOAD AT STEP IN WALL

(M) $V'_M = 1.89 \text{ kN/m} \times 4.5\text{m}$

$= 8.5\text{kN}$ (170 BU)

$\phi V_M = 230$ BU 135 % (OK)

3.4 Post Footing

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JOB No:	SHEET No:
PROJECT:	DATE:
	BY:

POST FOOTING

TRIB AREA = $\frac{4m}{2} \times \frac{2.8m}{2}$

= $2.8m^2$

1.2GtS = 0.4kPa x 1.2 + 1.08 kPa

= 1.57 kPa

Pt LOAD = 1.57 x 2.8

= 4.4 kN 500 W x 250 D x 900 L 11 kPa (OK)

CONCRETE NOTES

1 - Minimum concrete strength shall be 20MPa or higher as shown on architectural drawings.

2 - All reinforcing steel shall be ductility class E conforming with the requirements of AS/NZS 4671.

3 - Clear cover to all reinforcing, including stirrups, ties, etc shall be as follows, unless noted otherwise; Cast against earth 75mm, Cast against formwork 50mm.

EXPOSURE SITUATION	FOOTING	BEAMS & MAIN BARS	COLUMNS, STIRRUPS, TIES, SPIRALS	SLABS/WALLS DIA≤24mm DIA≥24mm
CAST AGAINST & EXPOSED TO EARTH	75	75	75	75
EXPOSED TO WEATHER OR EARTH -CAST IN PLACE (BOXING) - PRECAST	50 40	50 40	40 30	35/45 30/40
NOT EXPOSED TO WEATHER OR EARTH -CAST IN PLACE -PRECAST		45 35	25 20	30/30 25/25

4 - Reinforcing in footings and slabs shall be adequately supported to ensure all reinforcing stays in place during concrete pouring. Vertical starters shall be tied in place.

5 - All hooks and bends in reinforcing shall comply with NZS 3101: Part 1:2006.

GRADE OF STEEL	BAR TYPE	BAR Ø db, (mm)	MINIMUM INSIDE BEND Ø db, (mm) PLAIN BARS	DEFORMED BARS
300 MPa OR 500 MPa	STIRRUPS & TIES	6 – 20	$2d_b$	$4d_b$
		24 - 40	$3d_b$	$6d_b$
	ALL OTHER BARS	6 - 20	$5d_b$	$5d_b$
		24 - 40	$6d_b$	$6d_b$

6 - Reinforcing laps in concrete to comply with the table below. Where more than 300mm of fresh concrete is cast in the member below the bar increase the below lap lengths by 30%.

CONCRETE STRENGTH	20MPA		25MPA		30MPa		40MPA	
STEEL GRADE	D	HD	D	HD	D	HD	D	HD
12mm Ø	410	680	360	600	330	550	290	480
16mm Ø	540	900	480	800	440	740	380	640
20mm Ø	680	1120	600	1000	550	920	480	800

Min lap lengths for reinforcing mesh as below: unless manufactures specifications states otherwise		
MESH	LAPPING ON ENDS	LAPPING SIDE
SE62	250 (1 ¼ SQUARES)	250 (1 ¼ SQUARES)
SE72	250	250
SE73	350 (1 ¼ SQUARES)	250 (1 ¼ SQUARES)
SE73 DE	150	150
SE82	250 (1 ¼ SQUARES)	250 (1 ¼ SQUARES)
SE82 DE	150	150
SE92	250	250
SE92 DE	160	160
SE93 DE	150	150

7 - Welding of reinforcing is not permitted unless shown on the drawings or approved by the engineer in writing.

8 - Provide 2- D12 diagonal trimming bars 1200mm long at 45°angle at all re-entrant corners of slab. The first bar should be at 50mm side cover to the internal corner. The two bars should be spaced at 80mm spacing.

9 - Any Reid bar screwed into Reid Threaded Inserts shall be epoxy glued in place as per latest RamsetReid guidance. Use Epcon C8 Xtrem Epoxy as a thread filler.

10 - Contact Meyer Cruden Engineering Ltd (03) 4450 670 for concrete footing pre-pour inspection. 48 hours minimum notice required for inspections.

11 - Engineer must be notified if any specialist floor finishes are required (polished/honed finish).

12 - Concrete is not to be poured on frozen ground.

13 - Concrete slabs must be cured by flooding with water for a minimum of three days or alternative curing methods approved by the engineer in writing.

14 - If concrete slabs are likely to be exposed to freezing conditions apply Sika Purigo curing membrane and protect concrete from freezing with straw and polyethylene cover until at least 48 hours after concrete has been poured.

15 - Concrete slabs on grade shall be sawcut to the layout on the drawings or 5m x 5m maximum grid. Sawcuts shall be to a depth of ¼ of the slab. Sawcuts shall be made as soon as practicable without spalling the edges. Sawcuts must be made within a maximum of 24 hours of pouring (summer) and 48 hours of pouring (winter).

16 - Concrete slabs on grade shall have control joints to the layout on the drawings or 25mm maximum spacing. Control joints shall have 600mm long R16 dowels @ 600crs, 300mm of the dowel should be debonded by inserting in a PVC tube. Alternatively, a proprietary control joint product may be used (i.e. Connelly expansion joint etc).

17 - Any bolts or fasteners called up to be Chemset to concrete shall be with Chemset Epcon C6 Series epoxy into a dry hole. All cleaning, drying, etc of the drilled hole is to be undertaken as per manufacturers instructions to ensure the prescribed capacities are achieved.

18 - Epoxy Grouting of reinforcing bars into concrete holes for horizontal bars shall slope down at 15 degrees. Depth of hole and embedment to comply with the table below, unless noted otherwise.

19 - The tabulated values below apply to a deformed bar epoxy grouted into a hole with rough sides brushed clean of dust and loose material, in dry concrete.

BARSIZE	10	12	16	20	25
HOLESIZE	16	18	20	26	30
D	160	200	270	350	430
HD	270	250	450	600	750

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JOB TITLE	DRAWING TITLE	REV	AMENDMENT	DATE	BY
2020249 ST JOHNS	E0.1				

QP2228

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03/03/2021

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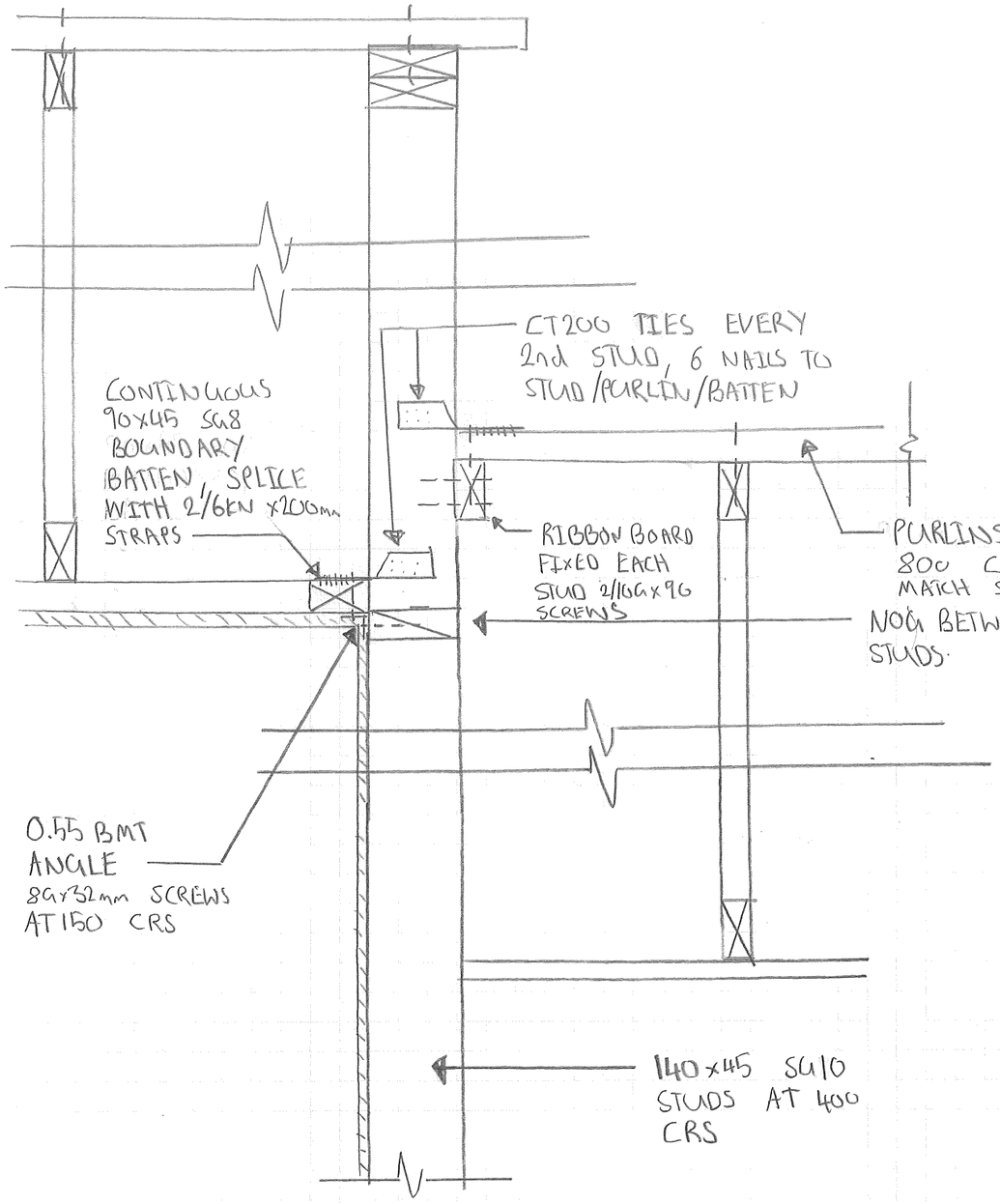
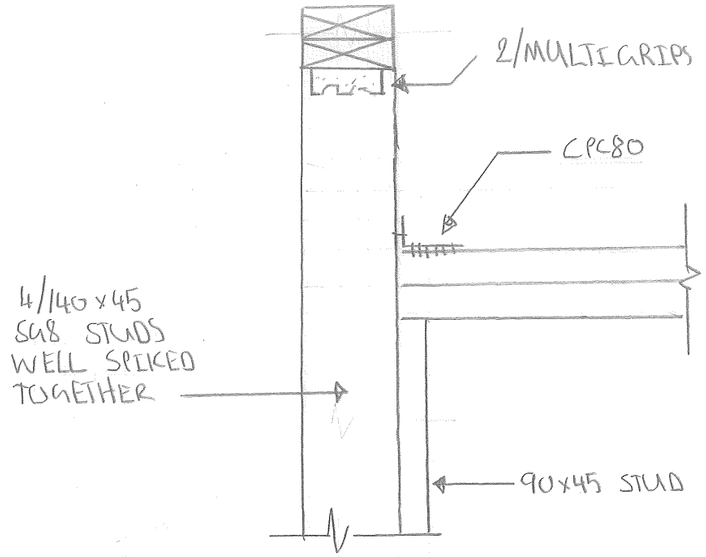
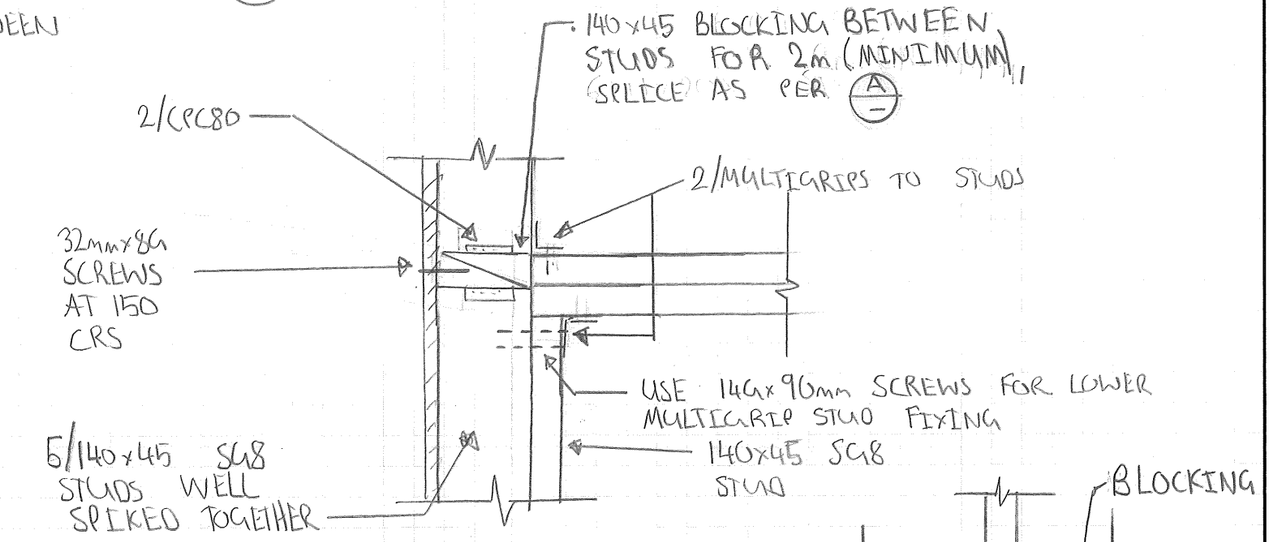


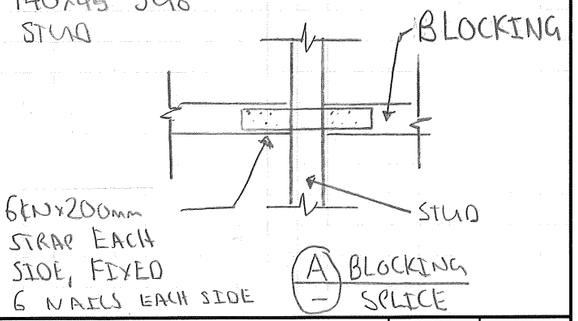
1/A104 BRACING AT STEP IN ROOF



2/A104 GARAGE TOP PLATE STEP



3/A104 BRACELINE (B) LOWER TOP PLATE CONNECTION



A/- BLOCKING SPLICE

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2020249 ST JOHNS	E2.1		CONSENT	15-12-20	

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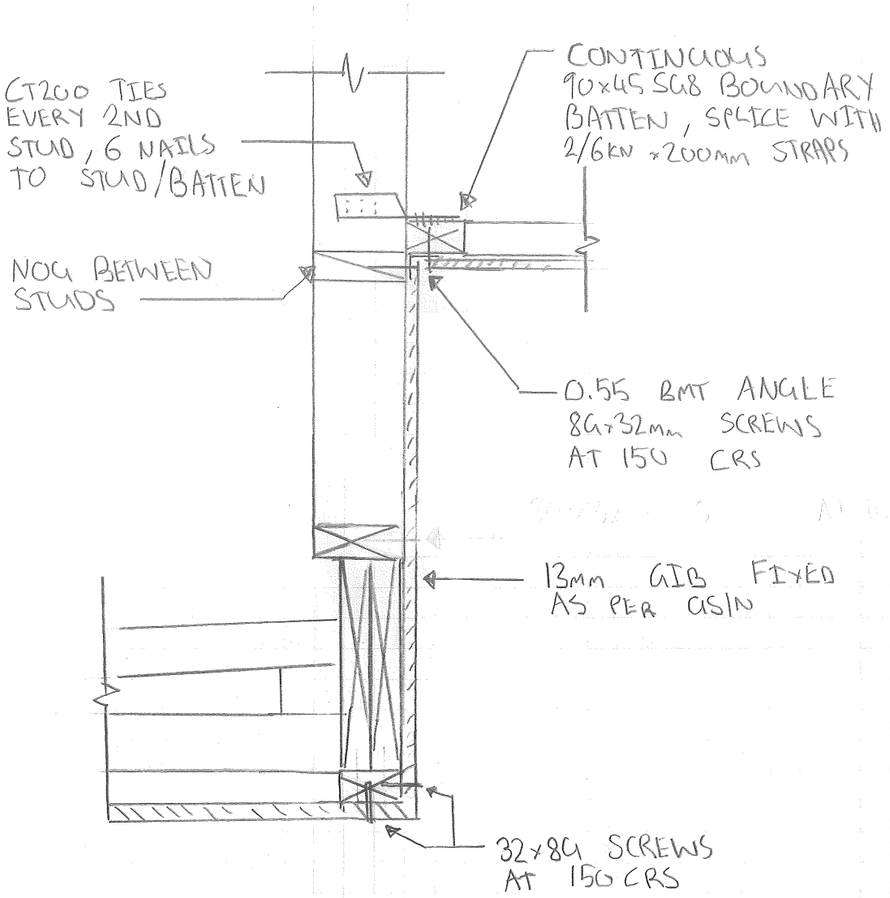

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4/A104 BRACING AT STEP IN ROOF ON BRACELINE (C)

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