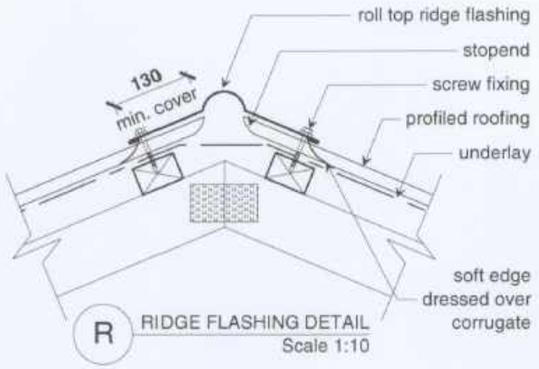
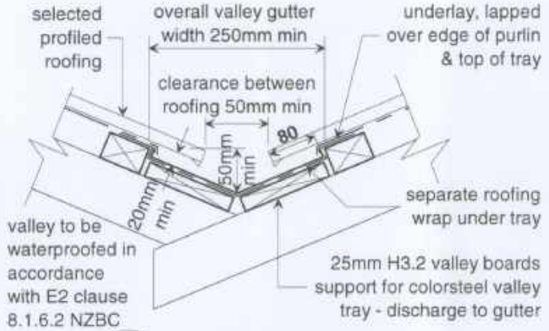
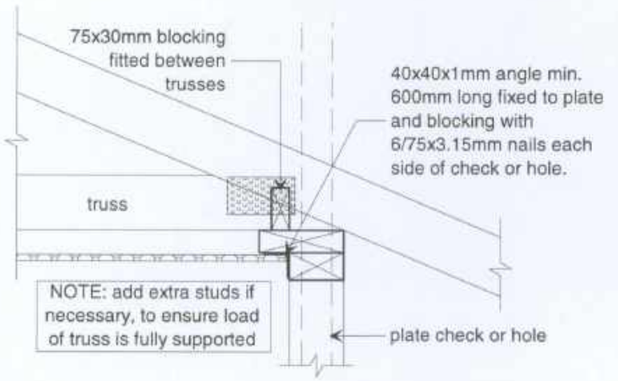


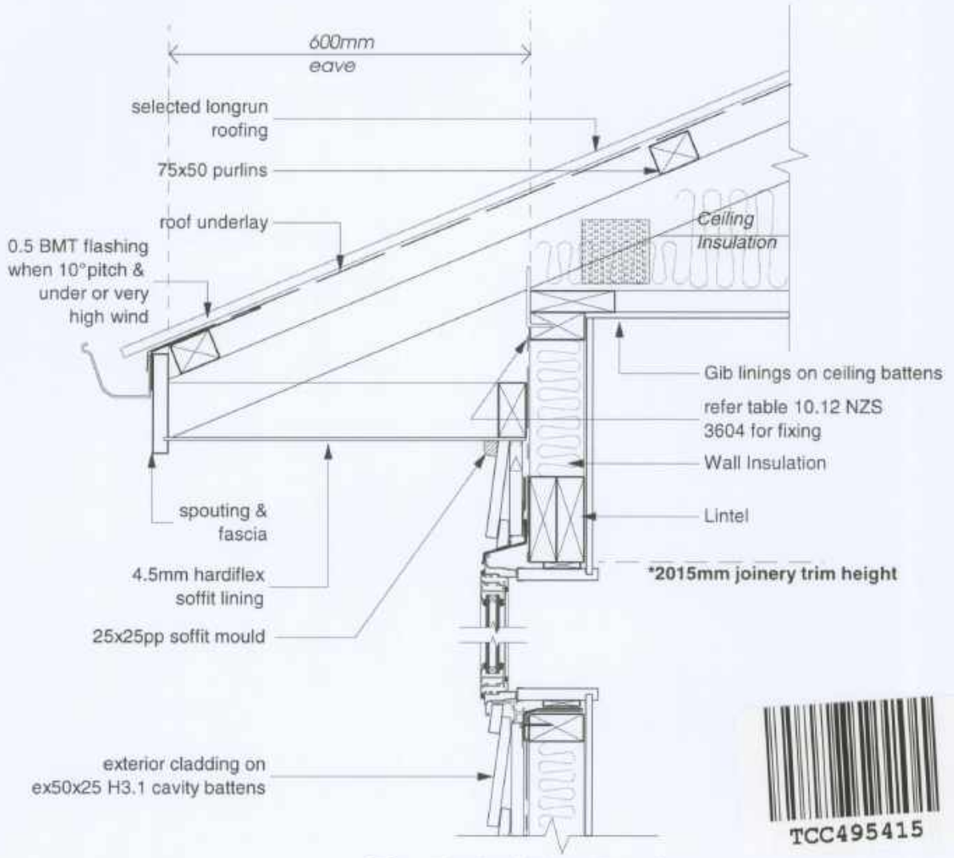
R RIDGE FLASHING DETAIL
Scale 1:10



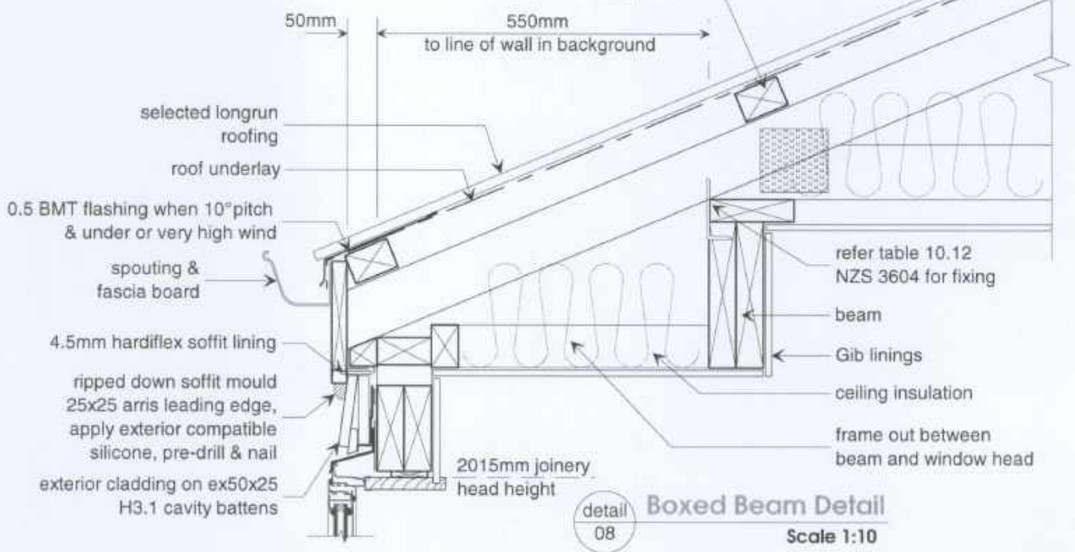
detail 07 VALLEY FLASHING DETAIL
Scale 1:10



Detail - TOP PLATE PENETRATIONS
Scale 1:10



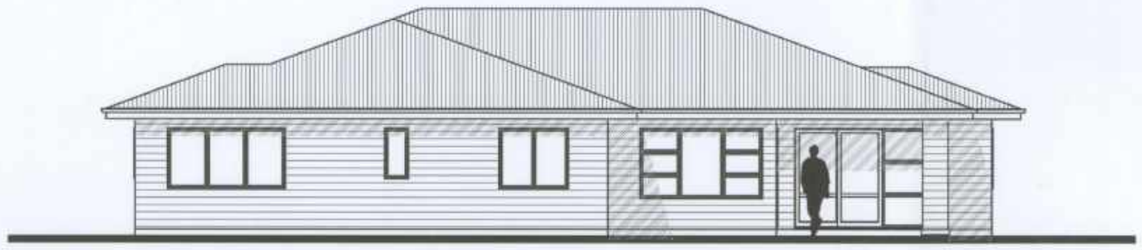
detail 29 Typical Eave Detail
Scale 1:10



detail 08 Boxed Beam Detail
Scale 1:10

Client Details : Leo Ryan Address: 30 Caldera Crescent, Pyes Pa, Tauranga	ROOF DETAILS			Plan : EH170dtl/rev	Project No: CC1048 / Sheet no : 09 of 19
	Wind: high	Date: 24.08.11	Scale: 1:10		
	Earthq: B	Rev:	Drawn: RG		
	Corrosion: C				

www.A1homes.co.nz
Call 0800 A1homes
214663



Proposed New Home For

Leo Ryan
30 Caldera Cresent, Pyes Pa
Tauranga

Contents

TCC495406

acdarchitecture.com

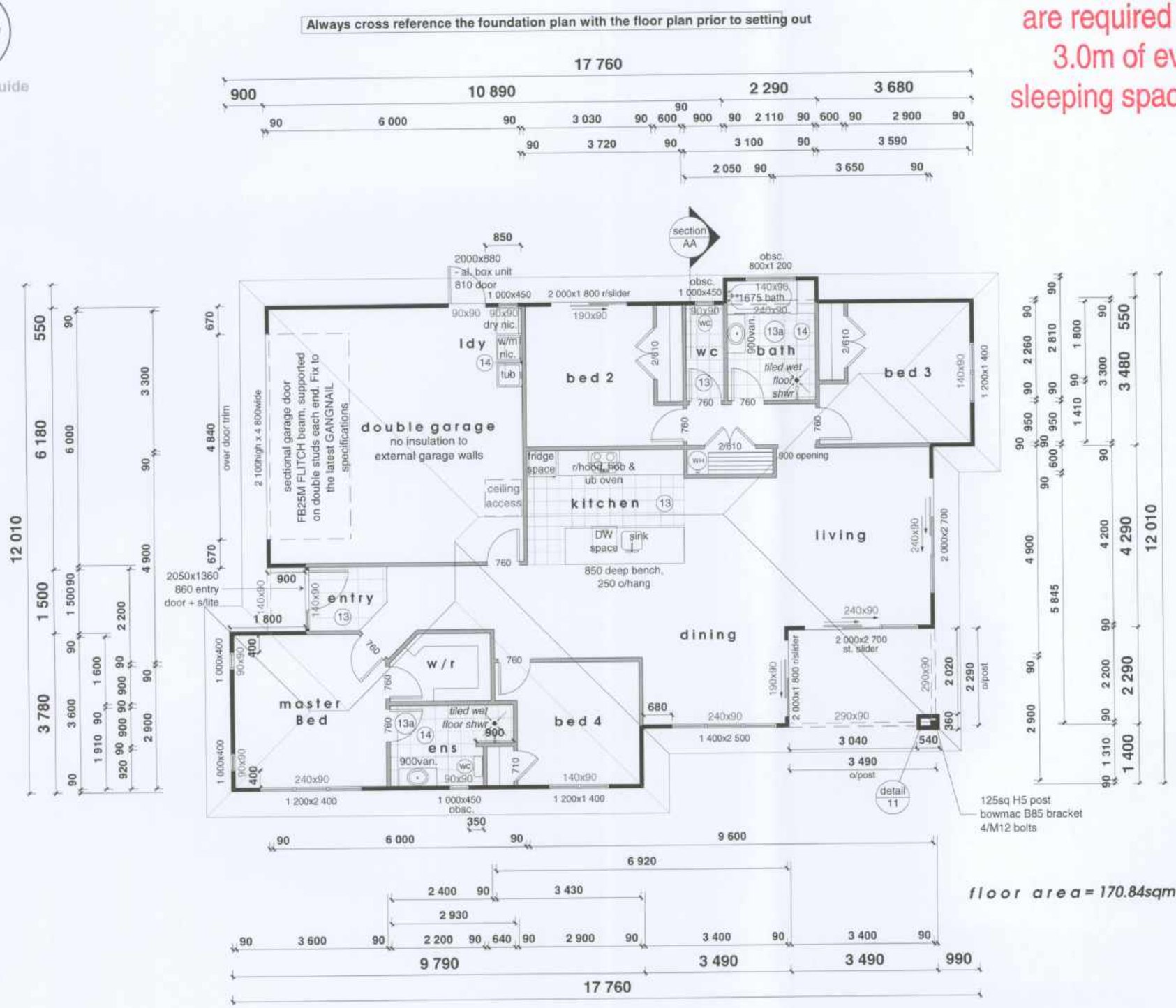
You're just a few steps away from home

Elevation Guide

Always cross reference the foundation plan with the floor plan prior to setting out

Domestic Smoke Alarms are required within 3.0m of every sleeping space door.

Essential Homes



Notes:

Mains pressure 180L HWC with tempering valve & seismic restraint in accordance with NZBC: 2004 section G12. Electric hobs with vented r/hood. Polybutylene water supply pipes. Hot water supply pipes shall be thermally insulated to comply with H1/AS1 5.0

Where there are more than 3 tapered gib ceiling sheet joins the third join shall be back blocked using gib off-cuts & GIB-Cove Bond not gib-fix glue, in accordance with winstones gib fixing site guide January 2010

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

Confirm shower tray size before commencing wall framing

CONTRACTOR TO REFER TO TRUSS MANUFACTURERS PRODUCER STATEMENTS FOR ANY INCREASED LINTEL SIZES THAT MAY BE REQUIRED TO SUPPORT ROOF LOADS

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

APPROVED

These plans are approved in accordance with The NZ Building Code.
These plans must remain on site.
TAURANGA CITY COUNCIL

TAURANGA CITY COUNCIL
PROJECT INFORMATION MEMORANDA
35842
Refer to accompanying documentation

TCC495412

A1homes

Client Details :
Leo Ryan
Address:
30 Caldera Crescent,
Pyes Pa, Tauranga

FLOOR PLAN

Plan : EH170dlf/rev | Project No: CC1048 | Sheet no : 06 of 19

Wind: high | Date: 24.08.11 | Scale: 1:100
Earthq: B | Rev: | Drawn: RG
Corrosion: C

Call 0800 A1homes 214663
www.A1homes.co.nz

Notes:

Before building is erected on site, all rubbish, noxious matter and organic matter shall be removed from the area to be covered by the building.

suspended timber construction firm turf and close-cut grass may remain provided that cleared ground level (CGL) be taken as the underside of soil containing organic matter.

Ensure final building platform & finished ground have an even fall away from building to ensure water not be allowed to accumulate in buildings subfloor.

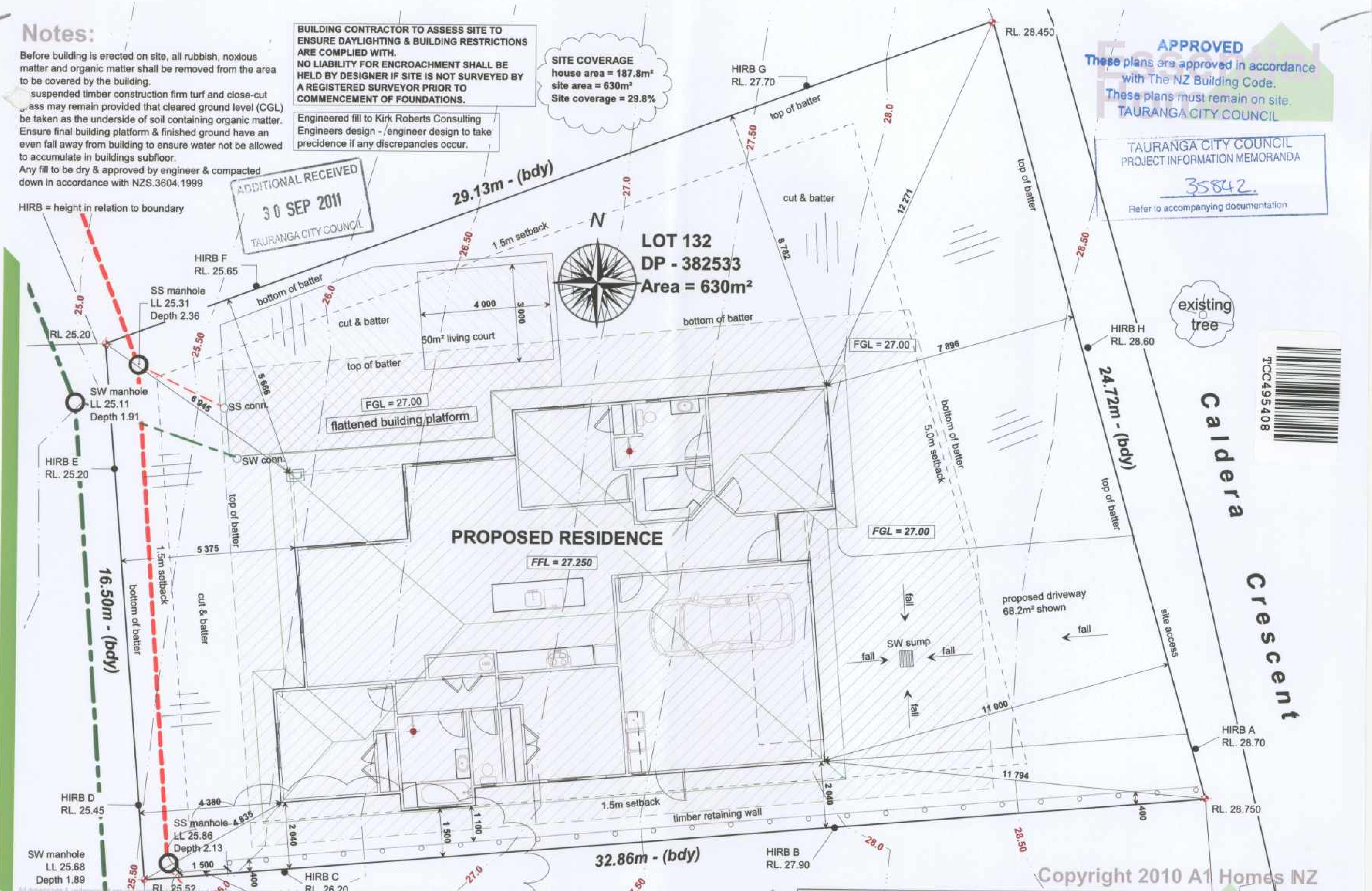
Any fill to be dry & approved by engineer & compacted down in accordance with NZS.3604.1999

HIRB = height in relation to boundary

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

Engineered fill to Kirk Roberts Consulting Engineers design - engineer design to take precidence if any discrepancies occur.

SITE COVERAGE
house area = 187.8m²
site area = 630m²
Site coverage = 29.8%



A1homes

Client Details : Leo Ryan	**SITE PLAN**		Plan: EH170all/rev	Project No: CC1048
Address: 30 Caldera Crescent, Pyes Pa, Tauranga	Wind: high	Date: 24.08.11	Scale: 1:100	Sheet no: 02 of 19
	Earthq: B	Rev: A: 29.09.11	Drawn: RG	
	Corrosion: C	acdarchitecture		

Call 0800 A1homes 214663
www.A1homes.co.nz

MiTek New Zealand Ltd.

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

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

www.miteknz.co.nz

PRODUCER STATEMENT for MiTek 20/20™ TRUSS DESIGN - Version 4.6

ISSUED BY: **MiTek New Zealand Ltd**

TO: **Tauranga Truss and Frame**

IN RESPECT OF: **GANG-NAIL Truss Designs**

This producer statement covers the MiTek 20/20™ truss design and the structural performance of the GANG-NAIL plate for the job reference **Q081118** and may be used by a Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

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

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

i) All proprietary products meeting their performance specification requirements
ii) The provision of adequate roof bracing and overall building stability
iii) Correct selection and placement of GANG-NAIL connector plates
iv) Correct input of Truss Design Data as shown in the Fabricator Design Statement for this job
v) The design being undertaken by the accredited fabricator under the terms of the software licence

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

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

On behalf of MiTek New Zealand Ltd, **Date: August 2010**

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

Job: Q081118 Client: Creative Concepts Site: Leo Ryan
Phone: 30 Caldera Crescent
Pyes Pa
Description: Tauranga
Building Consent No.: Phone:

MITEK FABRICATOR DESIGN STATEMENT

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

MiTek 20/20™ TRUSS DESIGN DATA

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

Job Details

Roof Truss					
Timber Group:	MSG8H1.2	Pitch:	20.000 deg	Nominal Overhang:	600 mm
Roof		**Ceiling**		**Wind**	
Material:	Light	Material:	Standard	Area:	High (44.0 m/s)
Dead Load:	0.250 kPa	Dead Load:	0.200 kPa	Pressure Coeff:	Cpe = varies; Cpi = -0.30, 0.20
Restraints:	1200 mm centres	Restraints:	450 mm centres		
Live Load:	Qur = 0.250 kPa Qc = 1.100 kN	Live Load:	Qc = 1.400 kN		

Importance Level : 2

Design Working Life : 50 years

The timber for these GANG-NAIL trusses shall be treated to the requirements of NZS 3602:2003 and shall be graded to the requirements of NZS 3603:1993. Unless otherwise noted, this design assumes that the steel fixings and timber connectors proposed are located in a **"closed environment"**, as defined by NZS3604:1999 Section 4.

GANG-NAIL Truss List

Legend: * = detail only, ? = input only, ~~Txx~~ = failed design, Ø = non certified, Unmarked trusses = designed successfully, LB = lateral bracing required
WB = windbeam required

Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
*HB01	2	3490	14.433	900	J05E	1	2622	20.000	900	T05B	1	6993	20.000	777
*HB02	2	7930	14.433	900	J06	1	1722	20.000	900	T06	1	10060	20.000	900
*HB03	1	1232	14.433	900	J06A	1	1722	20.000	900	T09	1	2307	20.000	827
*HB04	1	3698	14.433	900	J07A	1	2435	20.000	900	T11	2	10060	20.000	643
*HB05	1	7125	14.433	900	J08	1	1717	20.000	900	T12	1	2622	20.000	828
*HB06	1	4843	14.433	900	J08A	1	1717	20.000	900	TR01	1	7878	20.000	900
*HB07	2	3277	14.433	900	J08B	1	1717	20.000	900	TR02	1	10060	20.000	900
HT01	1	6993	20.000	900	J09	1	2307	-20.000	827	V01	1	1009	20.000	900
J01	1	1867	20.000	900	J10	1	3207	20.000	662	V02	1	1515	20.000	900
J01A	1	1867	20.000	900	J11	1	3207	20.000	662	V03	1	2291	20.000	900
J01B	1	1867	20.000	900	*R01	1	1580	20.000	900	*VALLEY	10	5400	0.000	900
J02	2	3207	20.000	900	*R01A	1	1580	20.000	900	J03	1	2307	20.000	900
J02A	2	3207	20.000	900	*R02	7	913	20.000	900	J03B	1	2307	20.000	900
J02C	1	3207	20.000	900	*R02A	7	913	20.000	900	J05D	1	2622	20.000	900
J02D	1	3207	20.000	900	*R03	2	1120	20.000	900	J07	1	2435	20.000	900
J02E	2	3207	20.000	900	*R04	1	1435	20.000	900	J02B	1	3207	20.000	900
J03A	1	2307	20.000	900	*R05	1	1430	20.000	900	T07	1	3480	20.000	900
J03C	1	2307	20.000	900	*R05A	1	1430	20.000	900	TG01	1	7878	20.000	900
J04	2	1407	20.000	900	*RIBBON	11	6000	0.000	900	TG02	1	10060	20.000	900
J04A	2	1407	20.000	900	*SB-1	80	555	0.000	900	HTG01	1	6993	20.000	900
J05	1	2622	20.000	900	*SB-2	4	1455	0.000	900	T01	1	3780	20.000	900
J05A	1	2622	20.000	900	T02	1	6993	20.000	900	T03	1	8890	20.000	900
J05B	1	2622	20.000	900	T05	1	6993	20.000	777	T04	1	10060	20.000	900
J05C	1	2622	20.000	900	T05A	2	6993	20.000	777					

Total quantity : 195

The computer design input has been carried out by:

Signed: .....

Date: 8/08/2011

Name of Detailer: **Sio Atelemo**

Qualifications and Title: **Mitek CoC**

On behalf of: **Tauranga Truss and Frame**

Tauranga Truss & Frame

Job: Q081118 Client: Creative Concepts Site: Leo Ryan
Phone: 30 Caldera Crescent
Description: Pyes Pa
Building Consent No.: Tauranga Phone:

TRUSS FIXING SELECTION REPORT - Characteristic Loads

Fixings are selected from the LUMBERLOK Brochure 03/4 (Timber Connectors Characteristic Loadings Data)

GANG-NAIL Truss List
Legend: * = detail only, ? = input only, ~~Txx~~ = failed design, Ø = non certified, Unmarked trusses = designed successfully

Truss	Qty	Span (mm)	Joint	Down (kN)	Uplift (kN)	Bearing	Fixing Qty	Fixing Selected
*HB01	2	3490						Refer NZS3604:1999 Tables 10.2 & 10.12
*HB02	2	7930						Refer NZS3604:1999 Tables 10.2 & 10.12
*HB03	1	1232						Refer NZS3604:1999 Tables 10.2 & 10.12
*HB04	1	3698						Refer NZS3604:1999 Tables 10.2 & 10.12
*HB05	1	7125						Refer NZS3604:1999 Tables 10.2 & 10.12
*HB06	1	4843						Refer NZS3604:1999 Tables 10.2 & 10.12
*HB07	2	3277						Refer NZS3604:1999 Tables 10.2 & 10.12
HT01	1	6993	B	3.616	2.442	Cross	1	Pair of Wire Dog Staples
			N	2.382	2.934	Butt	1	JH 47x90
			M	7.759	6.726	Cross	1	CT400
J01	1	1867	B	2.512	0.867	Cross	1	Pair of Wire Dog Staples
			F	1.051	0.562	Butt	1	Pair of 3.15d Nails
J01A	1	1867	B	2.512	0.867	Cross	1	Pair of Wire Dog Staples
			F	1.051	0.562	Butt	1	Pair of 3.15d Nails
J01B	1	1867	B	2.513	0.800	Cross	1	Pair of Wire Dog Staples
			D	0.555	0.055	Butt	1	Pair of 3.15d Nails
			C	0.654	0.982	Butt	1	Pair of 3.15d Nails
J02	2	3207	B	2.823	1.339	Cross	2	Pair of Wire Dog Staples
			F	1.842	1.226	Butt	2	JH 47x90
			D	0.442	0.567	Butt	2	Pair of 3.15d Nails
J02A	2	3207	B	2.794	1.160	Cross	2	Pair of Wire Dog Staples
			F	0.201	0.300	Butt	2	Pair of 3.15d Nails
			E	2.359	2.459	Cross	2	Pair of Wire Dog Staples
J02C	1	3207	B	2.794	1.160	Cross	1	Pair of Wire Dog Staples
			F	0.201	0.300	Butt	1	Pair of 3.15d Nails
			E	2.359	2.459	Cross	1	Pair of Wire Dog Staples
J02D	1	3207	B	2.779	1.346	Cross	1	Pair of Wire Dog Staples
			F	1.492	0.981	Butt	1	JH 47x90
J02E	2	3207	B	2.795	1.017	Cross	2	Pair of Wire Dog Staples
			G	0.276	0.368	Butt	2	Pair of 3.15d Nails
			E	2.271	2.394	Cross	2	Pair of Wire Dog Staples
			F	0.693	0.984	Cross	2	Pair of Wire Dog Staples
J03A	1	2307	B	2.601	0.976	Cross	1	Pair of Wire Dog Staples
			F	1.644	0.907	Cross	1	Pair of Wire Dog Staples
			D	0.316	0.378	Butt	1	Pair of 3.15d Nails
J03C	1	2307	B	2.601	0.976	Cross	1	Pair of Wire Dog Staples
			F	1.644	0.907	Butt	1	JH 47x90
			D	0.316	0.378	Butt	1	Pair of 3.15d Nails
J04	2	1407	B	2.478	0.754	Cross	2	Pair of Wire Dog Staples
			D	0.587	0.231	Butt	2	Pair of 3.15d Nails
J04A	2	1407	B	2.456	0.617	Cross	2	Pair of Wire Dog Staples
			D	0.418	0.041	Butt	2	Pair of 3.15d Nails
			C	0.450	0.735	Butt	2	Pair of 3.15d Nails
J05	1	2622	B	2.674	1.103	Cross	1	Pair of Wire Dog Staples
			F	1.701	1.012	Butt	1	JH 47x90
			D	0.364	0.452	Butt	1	Pair of 3.15d Nails
J05A	1	2622	B	2.645	0.927	Cross	1	Pair of Wire Dog Staples
			E	0.231	0.339	Butt	1	Pair of 3.15d Nails
			D	2.152	2.088	Cross	1	Pair of Wire Dog Staples
J05B	1	2622	B	2.674	1.103	Cross	1	Pair of Wire Dog Staples
			F	1.701	1.012	Butt	1	JH 47x90
			D	0.364	0.452	Butt	1	Pair of 3.15d Nails
J05C	1	2622	B	2.645	0.927	Cross	1	Pair of Wire Dog Staples
			E	0.231	0.339	Butt	1	Pair of 3.15d Nails
			D	2.152	2.088	Cross	1	Pair of Wire Dog Staples
J05E	1	2622	B	2.629	0.748	Cross	1	Pair of Wire Dog Staples
			G	0.258	0.344	Butt	1	Pair of 3.15d Nails
			E	1.850	1.994	Cross	1	Pair of Wire Dog Staples
			F	0.790	1.108	Cross	1	Pair of Wire Dog Staples
J06	1	1722	B	2.489	0.809	Cross	1	Pair of Wire Dog Staples
			F	0.937	0.480	Butt	1	Pair of 3.15d Nails
J06A	1	1722	A	1.016	0.697	Cross	1	Pair of Wire Dog Staples
			C	0.512	0.051	Butt	1	Pair of 3.15d Nails
			B	0.672	0.915	Butt	1	Pair of 3.15d Nails
J07A	1	2435	E	2.572	0.894	Butt	1	JH 47x90
			G	1.306	0.844	Butt	1	JH 47x90
			D	0.489	0.644	Butt	1	Pair of 3.15d Nails
J08	1	1717	B	2.488	0.807	Cross	1	Pair of Wire Dog Staples
			F	0.932	0.478	Butt	1	Pair of 3.15d Nails
J08A	1	1717	B	2.488	0.807	Cross	1	Pair of Wire Dog Staples
			F	0.932	0.478	Butt	1	Pair of 3.15d Nails
J08B	1	1717	B	2.489	0.740	Cross	1	Pair of Wire Dog Staples
			D	0.510	0.051	Butt	1	Pair of 3.15d Nails
			C	0.589	0.902	Butt	1	Pair of 3.15d Nails

Tauranga Truss and Frame

Job: Q081118
Description:
Building Consent No.
MiTek 20/20 Engineering 6.6.4.28

Client: Creative Concepts
Phone:

Site: Leo Ryan
30 Caldera Crescent
Pyes Pa
Tauranga

Phone:

MiTek New Zealand Ltd.

Printed: 13:49:04 08 Aug 2011

Truss	Qty	Span (mm)	Joint	Down (kN)	Uplift (kN)	Bearing	Fixing Qty	Fixing Selected
[illegible]	1	2307	F	1.762	0.691	Butt	1	JH 47x90
			E	0.227	0.194	Butt	1	Pair of 3.15d Nails
			D	2.103	1.427	Cross	1	Pair of Wire Dog Staples
J10	1	3207	B	2.356	0.186	Cross	1	Pair of Wire Dog Staples
			G	0.166	0.231	Cross	1	Pair of Wire Dog Staples
			F	1.487	1.431	Cross	1	Pair of Wire Dog Staples
			H	2.044	0.591	Cross	1	Pair of Wire Dog Staples
J11	1	3207	B	2.469	0.826	Cross	1	Pair of Wire Dog Staples
			G	0.248	0.781	Butt	1	Pair of 3.15d Nails
			E	1.856	1.792	Cross	1	Pair of Wire Dog Staples
			F	0.805	0.593	Cross	1	Pair of Wire Dog Staples
*R01	1	1580						Refer NZS3604:1999 Tables 10.2 & 10.12
*R01A	1	1580						Refer NZS3604:1999 Tables 10.2 & 10.12
*R02	7	913						Refer NZS3604:1999 Tables 10.2 & 10.12
*R02A	7	913						Refer NZS3604:1999 Tables 10.2 & 10.12
*R03	2	1120						Refer NZS3604:1999 Tables 10.2 & 10.12
*R04	1	1435						Refer NZS3604:1999 Tables 10.2 & 10.12
*R05	1	1430						Refer NZS3604:1999 Tables 10.2 & 10.12
*R05A	1	1430						Refer NZS3604:1999 Tables 10.2 & 10.12
*RIBBON	11	6000						Refer NZS3604:1999 Tables 10.2 & 10.12
*SB-1	80	555						Refer NZS3604:1999 Tables 10.2 & 10.12
*SB-2	4	1455						Refer NZS3604:1999 Tables 10.2 & 10.12
T02	1	6993	B	3.577	2.460	Cross	1	Pair of Wire Dog Staples
			N	2.588	3.270	Butt	1	JH 47x90
			M	7.903	6.914	Cross	1	CT400
T05	1	6993	B	3.897	2.863	Cross	1	Pair of Wire Dog Staples
			N	4.024	3.031	Butt	1	JH 47x90
T05A	2	6993	B	3.922	2.854	Cross	2	Pair of Wire Dog Staples
			M	3.544	3.001	Butt	2	JH 47x90
T05B	1	6993	B	3.175	2.098	Cross	1	Pair of Wire Dog Staples
			L	7.699	6.074	Cross	1	CT400
			M	2.317	2.773	Butt	1	JH 47x90
T06	1	10060	B	6.338	4.891	Cross	1	CT400
			J	6.338	4.891	Cross	1	CT400
T09	1	2307	E	1.730	1.059	Butt	1	JH 47x90
			C	2.522	1.019	Cross	1	Pair of Wire Dog Staples
T11	2	10060	B	4.525	3.492	Cross	2	CT400
			J	4.525	3.492	Cross	2	CT400
T12	1	2622	B	2.588	1.165	Cross	1	Pair of Wire Dog Staples
			F	1.776	1.194	Butt	1	JH 47x90
TR01	1	7878	I	5.212	3.859	Butt	1	JH 47x90
			G	4.619	3.794	Butt	1	JH 47x90
TR02	1	10060	B	6.338	4.892	Cross	1	CT400
			K	6.338	4.892	Cross	1	CT400
V01	1	1009	A			Wide		No fixing selected
V02	1	1515	A			Wide		No fixing selected
V03	1	2291	A			Wide		No fixing selected
*VALLEY	10	5400						Refer NZS3604:1999 Tables 10.2 & 10.12
J03	1	2307	B	2.715	1.379	Cross	1	Pair of Wire Dog Staples
			F	1.440	1.033	Butt	1	JH 47x90
J03B	1	2307	B	2.715	1.379	Cross	1	Pair of Wire Dog Staples
			F	1.440	1.033	Cross	1	Pair of Wire Dog Staples
J05D	1	2622	B	2.912	1.707	Cross	1	Pair of Wire Dog Staples
			F	1.676	1.448	Butt	1	JH 47x90
J07	1	2435	D	2.243	1.407	Butt	1	JH 47x90
			F	2.054	1.078	Butt	1	JH 47x90
J02B	1	3207	B	3.220	2.250	Cross	1	Pair of Wire Dog Staples
			H	2.549	2.343	Butt	1	JH 47x90
T07	1	3480	A	5.231	3.725	Cross	1	CT400
			E	3.882	2.915	Cross	1	Pair of Wire Dog Staples
TG01	1	7878	K	9.044	8.067	Butt	1	Pair of MultiGrips
			G	8.383	7.492	Cross	1	CT400
TG02	1	10060	B	1.907	1.713	Cross	1	Pair of Wire Dog Staples
			O	16.976	14.933	Cross	1	No fixing selected. Specific engineering design required for uplift loads.
			I	7.603	6.038	Cross	1	CT400
HTG01	1	6993	B	6.311	5.191	Cross	1	CT400
			Q	4.396	4.722	Butt	1	Pair of MultiGrips
			P	16.174	14.909	Cross	1	No fixing selected. Specific engineering design required for uplift loads.
T01	1	3780	A	13.342	11.193	Cross	1	CT200 pair
			E	6.291	5.201	Cross	1	CT400
T03	1	8890	B	2.206	0.361	Cross	1	Pair of Wire Dog Staples
			M	7.710	11.662	Butt	1	Pair of MultiGrips
			N	1.981	9.868	Cross	1	CT200 pair
T04	1	10060	A	9.229	10.044	Cross	1	CT200 pair
			T	14.436	15.397	Cross	1	No fixing selected. Specific engineering design required for uplift loads.
			K	2.424	0.124	Cross	1	Pair of Wire Dog Staples

Note:
1) Fixings have been selected based on loading only. Please check that selected fixings are practical for each situation and that appropriate nailing can be applied on site.
2) Fixings are selected from the LUMBERLOK Brochure 03/4 (Timber Connectors Characteristic Loadings Data) with down and uplift characteristic loads of at least the values shown for each joint.

Job: Q081118

Client: Creative Concepts
Phone:

Site: Leo Ryan
30 Caldera Crescent
Pyes Pa
Tauranga

Description:
Building Consent No.:

Phone:

TRUSS BEARINGS EXCEEDING 10KN REPORT - Ultimate Limit State Loads

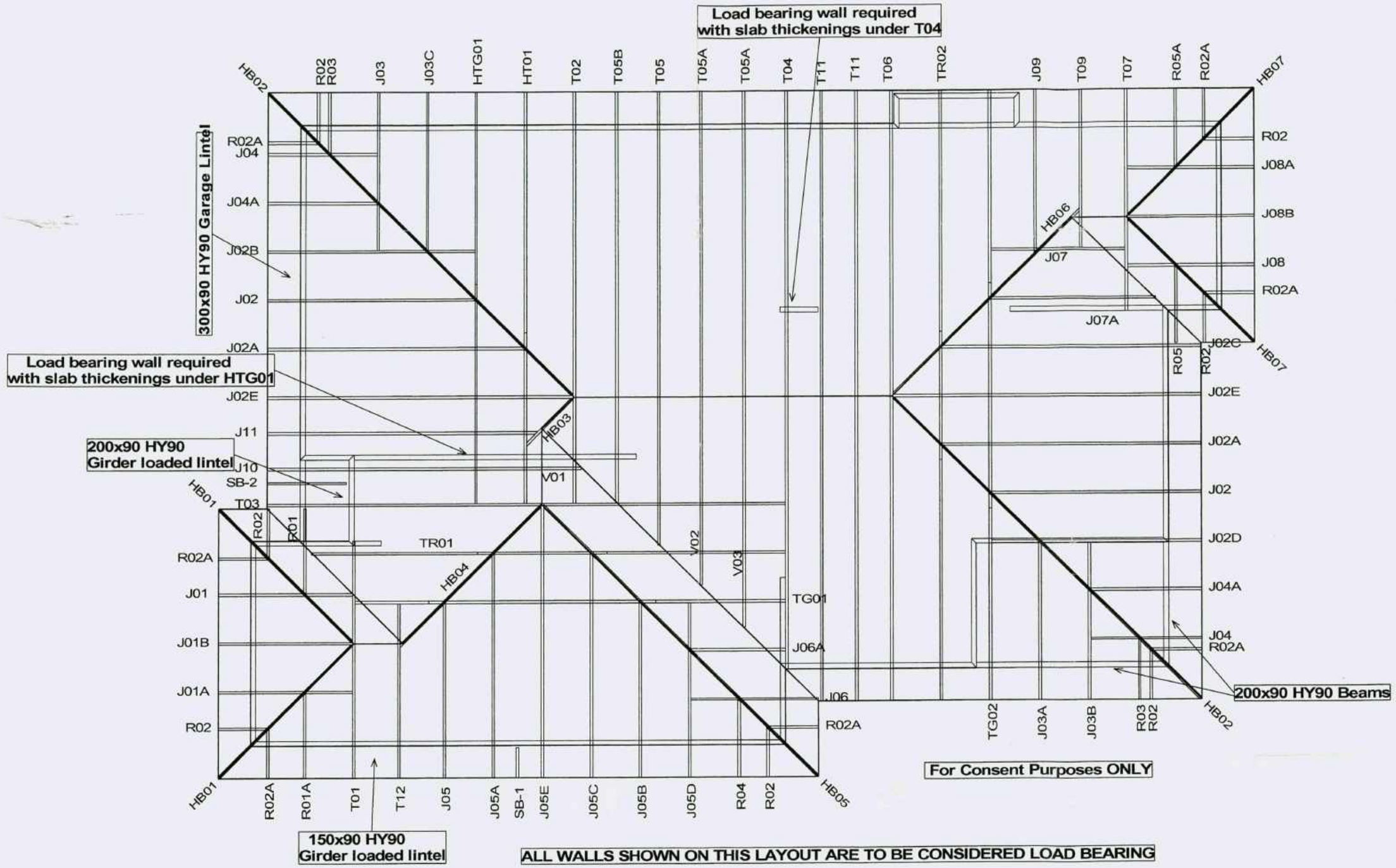
GANG-NAIL Truss List

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

Critical Trusses	Qty	Span (mm)	Joint	Bearing Reactions (kN) Down	Uplift
TG02	1	10060	O	11.722	11.946
HTG01	1	6993	P	11.269	14.038
T04	1	10060	T	10.312	12.317

Note:

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



Job Details:

Snow Zone:	0.000 ()	Snow Altitude:	0 m
Wind Area:	High	Design Wind Speed:	44.0 m/s
TC Restraints:	1200 mm	BC Restraints:	450 mm
Roof Material:	Light	Ceiling Material:	Standard
Roof Live Load:	0.250 kPa	Snow Load:	0.000 kPa
Roof Pitch:	20.000 deg	Truss Centres:	900 mm

Tauranga Truss and Frame

35 Poturi St
Tauranga
New Zealand

Telephone: 07 544 9787
Fax:

Name: Creative Concepts
Job: 30 Caldera Crescent
Address: Pyes Pa
Tauranga

Telephone:

Job: **Q081118**

Building Consent No.:

Scale: 1 : 100 | Date: 8/08/2011 | Drawn By: SA

GIB EzyBrace® 2011 Software

Demand Calculation Sheet — single storey — V06/11

Job Details

Name	Leo Ryan
Street and Number	30 Caldera Cresent
Lot and DP Number	Lot 132 DP 382533
City/Town/District	Tauranga
Designer	RG
Company Name	Acd Architecture
Date	4/08/2011

BRANZ Appraised
Appraisal No 294 [2011]

Select Lining Option: 10 or 13 mm GIB® Plasterboard

Building Specification

		Single Floor	Complete Single Floor Column only
Number of storeys	single		
Floor Loading	2kPa		
Foundation Type	slab		
Cladding Weight		light	
Roof Weight		light	
Room in Roof Space		no	
Roof Pitch (degrees)		20	
Roof height above eaves (m)		2.3	
Building height to apex (m)		4.7	
Ground to lower floor level (m)		0.3	
Stud Height (m)		2.4	
Building Length (m)		17.8	
Building Width (m)		12.0	
Building Plan Area (m2)		171	

Building Location

Wind Zone	***Medium***	**Earthquake Zone**	**Soil Type**
Select by Building Consent Authority Map		1	D&E (deep to very soft)
or Preference	Medium	**Annual exceedance probability**	
Wind Region	Preference selected	1/500 (NZS3604:2011 default)	
Lee Zone	Preference selected		
Ground Roughness	Preference selected		
Site Exposure	Preference selected		
Topographic Class	Preference selected		

Bracing Units required for Wind

Demand W (BU)		Walls single
along	slab	418
across	slab	593

Bracing Units required for Earthquake

Demand along / across E (BU)		Walls single
slab		432

Leo Ryan RG

GIB EzyBrace® 2011 Software

SINGLE OR UPPER STOREY WALLS ALONG

V06/11

Lines		*Bracing Elements*							
1	2	3	4	5	6	7	8	9	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
498	**a**	1	4.2		2.4	GS1-N	GIB®	290	252
		2	1.2		2.4	GS1-N	GIB®	83	72
		3	2.9		2.4	GS1-N	GIB®	200	174
432	**b**	1	3.7		2.4	GS1-N	GIB®	255	222
		2	3.5		2.4	GS1-N	GIB®	242	210
544	**c**	1	2.9		2.4	GS1-N	GIB®	200	174
		2	5.1		2.4	GS1-N	GIB®	352	306
		3	0.4		2.4	GS1-N	GIB®	21	23
		4	0.7		2.4	GS1-N	GIB®	41	41
165	**d**	1	0.5		2.4	GS1-N	GIB®	28	29
		2	1		2.4	GS1-N	GIB®	65	60
		3	0.7		2.4	GS1-N	GIB®	41	41
		4	0.6		2.4	GS1-N	GIB®	34	35

						Wind	Earthq.
Totals Achieved	W	443%	EQ	380%		1852	1639
Concrete Slab						*OK*	*OK*
Totals Required (from Demand)						418	432

Leo Ryan RG

GIB EzyBrace® 2011 Software

SINGLE OR UPPER STOREY WALLS ACROSS

V06/11

Lines		Bracing Elements							
1	2	3	4	5	6	7	8	9	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	Bracing Units Achieved E
309	**m**	1	0.5		2.4	BL1-H	GIB®	47	50
		2	0.5		2.4	BL1-H	GIB®	47	50
		3	2		2.4	BL1-H	GIB®	256	208
294	**n**	1	3.3		2.4	GS1-N	GIB®	228	198
		2	1.6		2.4	GS1-N	GIB®	110	96
306	**o**	1	2.2		2.4	GS1-N	GIB®	152	132
		2	2.9		2.4	GS1-N	GIB®	200	174
143	**p**	1	1.8		2.4	GS1-N	GIB®	124	108
		2	0.6		2.4	GS1-N	GIB®	34	35
189	**q**	1	0.9		2.4	GS1-N	GIB®	57	53
		2	0.9		2.4	GS1-N	GIB®	57	53
		3	0.7		2.4	GS1-N	GIB®	41	41
		4	0.7		2.4	GS1-N	GIB®	41	41

						Wind	Earthq.
Totals Achieved	W	235%	EQ	287%		1394	1241
Concrete Slab						*OK*	*OK*
Totals Required (from Demand)						593	432

H1 Insulation Calculation Method

Client:	Leo Ryan
Address:	30 Caldera Cresent, Tauranga
Climate Zone:	2
Designer:	ac-design architecture Ltd
Date:	4/08/2011

Construction Details

Roof :	Profiled metal, trusses with 90mm bottom chord, R3.2C insulation
Walls:	Fibre cement weatherboards R2.2W insulation
Studs:	90x45 @ 600crs, nogs @ 800crs
Floor:	uninsulated concrete slab
Glazing:	double glazing aluminium

Calculations

Total glazing (m²) =	31.20	Floor Area (m²) =	133.67
Total wall area (m²) =	164.45	Roof Area (m²) =	133.67
Glazing/wall area =	19%	Glazing is under 30%	

Reference (Ref) Building

$$HL_{Ref} = \frac{A_{Roof}}{2.9} + \frac{A_{Wall}}{1.9} + \frac{A_{Floor}}{1.3} + \frac{A_{30\%\ total\ wall\ area}}{0.26} + \frac{A_{Glazing} - A_{30\%\ total\ wall\ area}}{0.31}$$

$$HL_{Ref} = \frac{133.67}{2.9} + \frac{115.11}{1.9} + \frac{133.67}{1.3} + \frac{49.33}{0.26} + \frac{0.00}{0.31}$$

$$HL_{Ref} = 46.09 + 60.59 + 102.82 + 189.75 + 0.00$$

$$HL_{Ref} = 399.25$$

Proposed (Ppsd) Building

$$HL_{Ppsd} = \frac{A_{Roof}}{R_{Roof}} + \frac{A_{Wall}}{R_{Wall}} + \frac{A_{Floor}}{R_{Floor}} + \frac{A_{Glazing}}{R_{Glazing}}$$

$$HL_{Ppsd} = \frac{133.67}{3.10} + \frac{133.25}{2.10} + \frac{133.67}{1.10} + \frac{31.20}{0.26}$$

$$HL_{Ppsd} = 43.12 + 63.45 + 121.52 + 120.00$$

$$HL_{Ppsd} = 348.09$$

$$HL_{Ppsd} \leq HL_{Ref}$$

$$348.09 \leq 399.25$$

H1 Compliance achieved using	Construction R-Value Achieved
Profiled metal, trusses with 90mm bottom chord, R3.2C insulation	3.1
Fibre cement weatherboards R2.2W insulation	2.1
double glazing aluminium	0.26
uninsulated concrete slab	1.1

KIRK | ROBERTS
CONSULTING ENGINEERS LTD

IPENZ · NEW ZEALAND INSTITUTE OF ARCHITECTS INCORPORATED · ACENZ

JOB NO: 112234

ISSUE: A

PRODUCER STATEMENT – PS1 – DESIGN

ISSUED BY:	***Kirk Roberts Consulting Engineers Ltd – Damian McMillan***
TO:	***Tauranga ITM Building & Fencing Supplies Ltd trading as Ready Floor***
TO BE SUPPLIED TO:	***Tauranga City Council***
IN RESPECT OF:	***Ready Floor / Steel Fibre Concrete Floor System (items designated (*) only as shown on the attached drawings, countersigned by myself, dated 15/08/11)***
AT:	***30 Caldera Crescent, Pyes Pa, Tauranga***
LOT: 132	***DP: 382533***

Kirk Roberts Consulting Engineers Ltd has been engaged by ***Tauranga ITM Building & Fencing Supplies Ltd trading as Ready Floor*** to provide structural engineering services in respect of the requirements of Clause(s) **B1** of the Building Regulations 1992 for

☐ All ☑ Part only as specified

of the building work. The design has been prepared in accordance with **B1VM1 & B1/VM4** (respectively) of the approved documents issued by the Building Industry Authority and the work is described on ***A1 Homes*** drawings titled ***"Proposed New Home for Leo Ryan, 30 Caldera Crescent, Pyes Pa, Tauranga."*** and ***Kirk Roberts Consulting Engineers Ltd*** drawings & details titled ***"Ryan Home, 30 Caldera Crescent, Pyes Pa, Tauranga, Ref 112234"*** and the specification and other documents according to which the building is proposed to be constructed.

As an independent design professional covered by a current policy of Professional Indemnity Insurance to a minimum value of $200,000. **I BELIEVE ON REASONABLE GROUNDS** that subject to:

(i) The site verification of the following design assumptions:
Allowable foundation bearing pressure to be a minimum 100 kPa or an ultimate bearing pressure of 300 kPa in accordance with NZS 3604: 1999.

(ii) **This certificate does not cover stability or suitability of the site.**

(iii) **Unless specifically noted, compliance of the drawings to Non Specific codes such as NZS 3604 and NZS 4229 has not been checked by this practice**

(iv) **This Producer Statement - Design is valid for the application of building consent issued within 1 year from the date of issue.**

and (v) all proprietary products meeting the performance specification requirements, the drawings, specifications, and other documents according to which the building is proposed to be constructed comply with the relevant provisions of the building code.

APPROVED
These plans are approved in accordance with The N. Building C
These plans must remain on site.
TAURANGA CITY COUNCIL

Damian J. McMillan
B.E.(Hons), MIPENZ(Structural), CPEng (ID:229150)

Date 15th August 2011
MIPENZ ☑

Figure 8: **Mains Pressure Storage Water Heater System (unvented)**
Paragraphs 6.1.2 and 6.2.1 b)

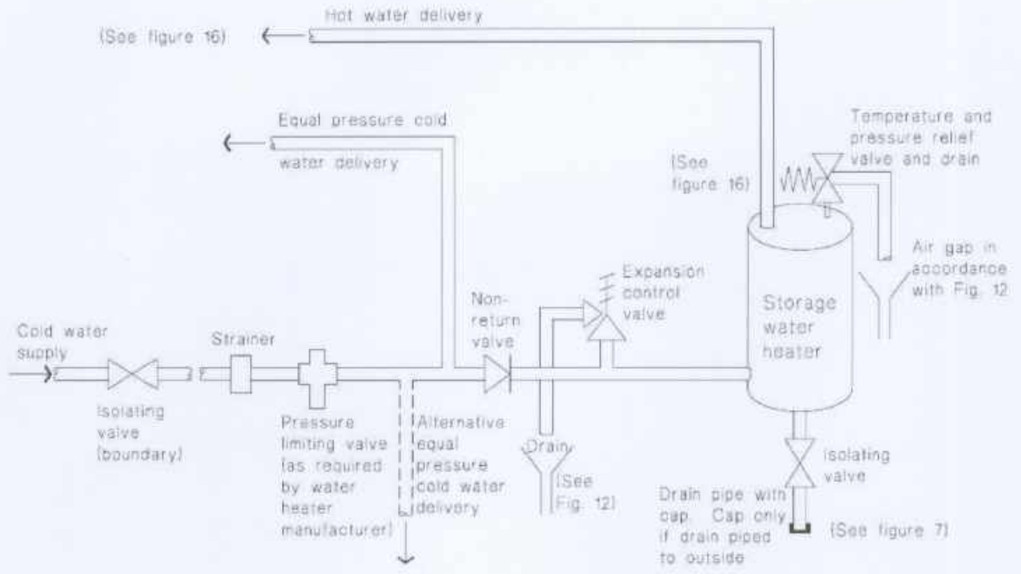


Table 4: **Tempering Valve and Nominal Pipe Diameters**
Paragraphs 5.3.1 and 6.12.1

	Low pressure (i.e. header tank supply or low pressure)	Low and medium pressure unvented (valve vented) and open vented	Mains pressure
Pressure of water at tempering valve (kPa)	20 – 30	30 – 120	over 300
Metres head (m)	2 – 3	>3 – 12	over 30
Minimum tempering valve size	25 mm	20 mm	15 mm
Pipes to tempering valve	25 mm (see **Note 3**)	20 mm	20 mm (15 mm optional) (see **Note 1**)
Pipes to shower	20 mm	20 mm (see **Note 4**)	20 mm (see **Note 5**) (15 mm optional) (see **Note 1**)
Pipes to sink/laundry (see **Note 2**)	20 mm	20 mm	15 mm
Pipes to bath (see **Note 2**)	20 mm	20 mm	15 mm
Pipes to basins (see **Note 2**)	15 mm	15 mm	10 mm

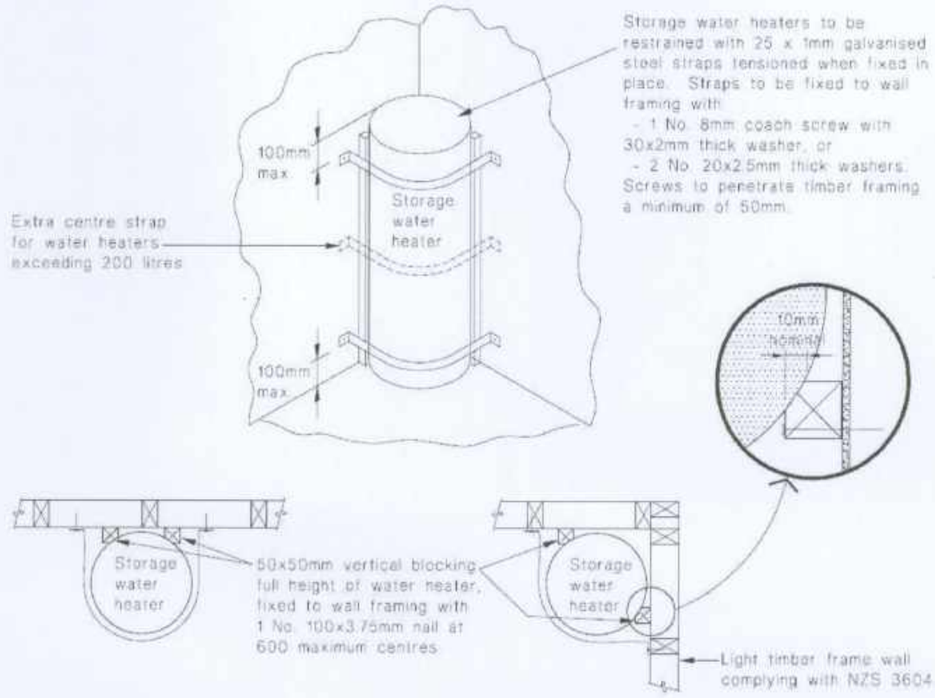
Notes:

1. If supplied by separate pipe from *storage water heater* to a single outlet.
2. This table is based on maximum pipe lengths of 20 metres.
3. 2 m maximum length from *water heater* outlet to tempering valve.
4. 15 mm if dedicated line to shower.
5. 10 mm if dedicated line to shower.
6. Table 3 pipe sizes have been calculated to deliver water simultaneously to the kitchen sink and one other *fixture*.

Table 5: **Water Heaters**
Paragraph 6.1.1

Water heater type	Standard/Regulation
Electric low pressure copper *storage water heater*	NZS 4602
Electric *storage water heater*	NZS 4606: Parts 1, 2 and 3 AS 1056: Part 1
Electric instantaneous *water heater*	NZS 6335
Gas *storage water heater*	Gas Regulations
Gas instantaneous *water heater*	Gas Regulations
Solar *storage water heater*	NZS 4613 (see G12/AS2) AS/NZS 2712 (see G12/AS2)

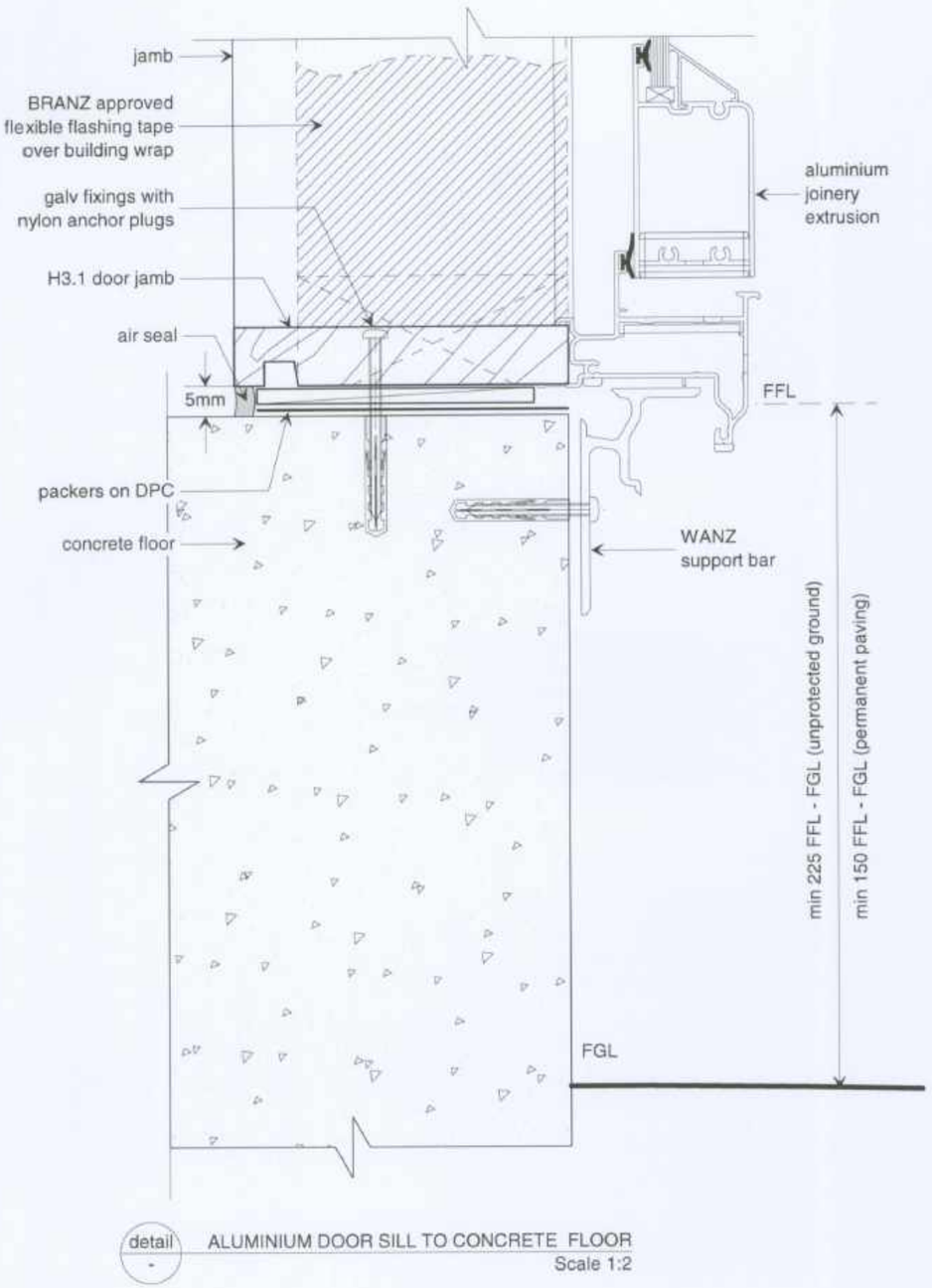
Figure 14: **Seismic Restraint of Storage Water Heaters 90 – 360 litres**
Paragraph 6.11.4



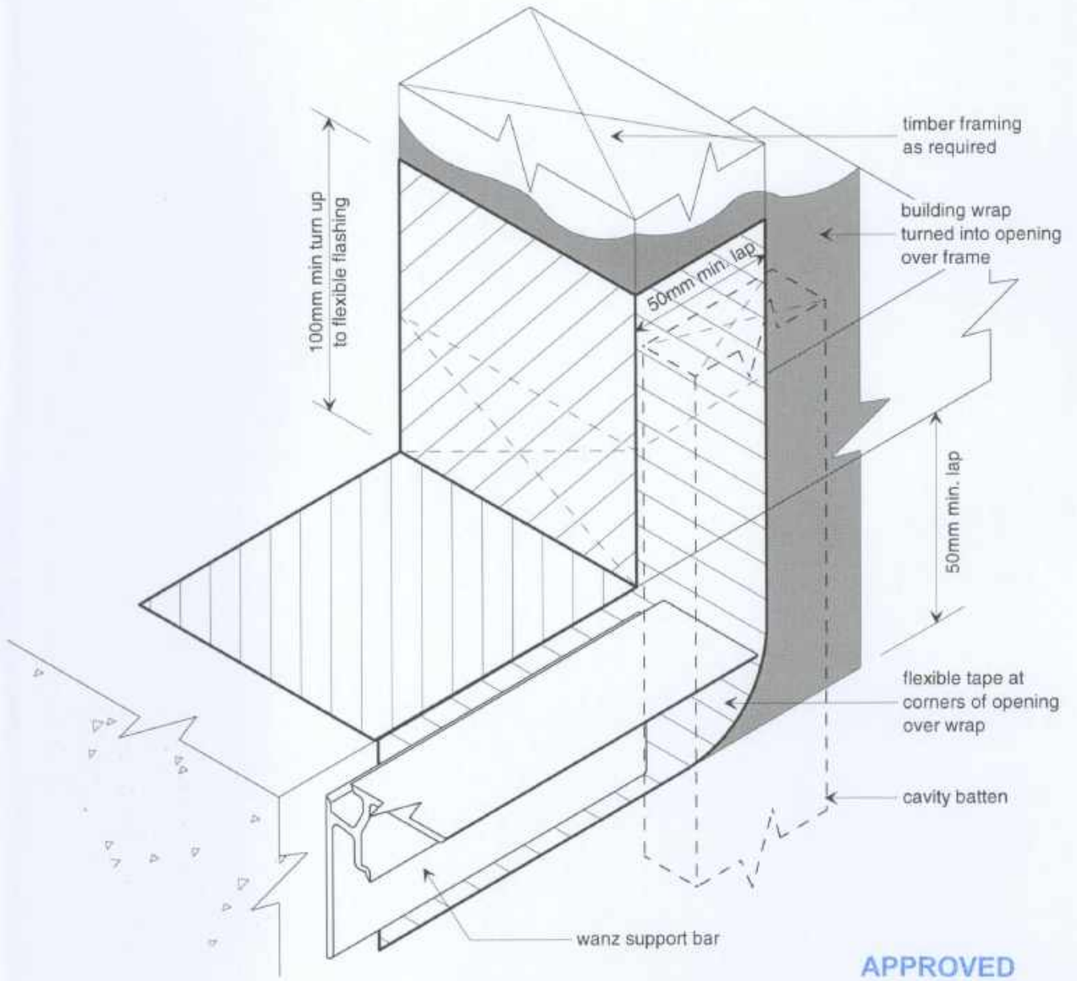
Client Details : Leo Ryan
Address: 30 Caldera Crescent, Pyes Pa, Tauranga

HWC DETAILS
Wind: high | Date: 24.08.11 | Scale: N.T.S
Earthq: B | Rev: | Drawn: RG
Corrosion: C

Plan : EH170dll/rev | Project No: CC1048 | Sheet no : 19 of 19



detail - ALUMINIUM DOOR SILL TO CONCRETE FLOOR
Scale 1:2



APPROVED
These plans are approved in accordance with The NZ Building Code.
These plans must remain on site.
TAURANGA CITY COUNCIL

TCC495423

Client Details: Leo Ryan Address: 30 Caldera Crescent, Pyes Pa, Tauranga	DOOR SILL DETAILS			Plan: EH170dlt/rev	Project No: CC1048	Sheet no: 17 of 19
	Wind: high	Date: 24.08.11	Scale: as shown	Call 0800 A1homes 214663	
	Earthq: B	Rev:	Drawn: RG	www.A1homes.co.nz	
	Corrosion: C				

Notes / Specifications

- Site Preperation: All vegetation, topsoil & other organic material or deleterious material shall be removed from the area to be covered by the building / formation area.
- Earthworks: The formation area shall be cut or filled to a level approximately 350 mm below finished floor level. Cleared ground is to be "good ground" in accordance with NZS3604:2011 "Timber Framed Building". Where fill is required to achieve this level it shall be in accordance with Clause 7.5.3 of NZS3604:2011 "Timber Framed Building" or certified by a geotechnical engineer. The formation area shall extend a minimum of 1000 mm beyond the slab perimeter.
- Plumbing & Services: Plumbing and services shall be conveyed underground to their plan location and then bought up through the system. At no stage shall any of the reinforcement bars be relocated or cut to allow for the services. Services are to be placed centrally within an opening 50 mm greater in diameter than the pipe to allow for seismic tolerances and prevent shearing of the pipe during an earthquake.
- Shear keys: Refer to drawings signed off by the engineer for building consent for number & location of shear keys.
- Concrete shall be 20 MPa
- Steel fibre shall be XOREX Steel fibres @ 18 kg/m³
- Concrete placing, finishing and curing shall be in accordance with NZS3109:1997.
- Curing of the concrete must take place immediately after finishing the concrete by ponding or continuous sprinkling of water.
- Shrinkage control joints - Refer to drawings signed by the engineer for location of shrinkage control joints (sawcuts or construction joints). Generally sawcuts are to coincide with major changes of plan, spaced at 5 m canters maximum to create bays with length: width ratio of 2:1. Supplementary reinforcing 2/D10, 1.2 m long at each internal corner.
- Ongoing Maintenance. The building owner is to ensure that the ground immediately adjacent to the system not be allowed to settle away to expose the underside of the slab.

No.	Date	Revision	By
0	15.08.11	BUILDING CONSENT	CO

KIRK | ROBERTS
CONSULTING ENGINEERS LTD
Level 1, Armagh Court, 28 Armagh Street, P O Box 36 330 - Christchurch, New Zealand, P - (03) 379 8600, F - (03) 379 8605, E - info@kirkroberts.co.nz
Level 1, 74 Grey Street, P O Box 13 054 - Tauranga, New Zealand, P - (07) 571 0950, F - (07) 571 0550, E - tauranga@kirkroberts.co.nz
www.kirkroberts.co.nz

Project
RYAN HOME
30 CALDERA CRESCENT
PYES PA, TAURANGA

Client
READY FLOOR SYSTEMS

Title
STEEL FIBRE REINFORCED CONCRETE FLOOR SYSTEM NOTES / SPECIFICATIONS

Designed by	DM	Scale	AS SHOWN
Drawn by	CO	Job No.	112234
Checked by	DM	Drawing No.	S1
Date	Aug 2011	Rev	0

IPENZ

Notes:

All works shall be undertaken & supervised by NZ qualified, registered or licensed trades people.
All works shall comply with the New Zealand Building Code and its approved documents & acceptable solutions
All works shall comply with the following documents, but not limited to;

B1/AS1 & VM1 Structure	NZS 3604: 1999 Timber framed buildings
B2/AS1 Durability	NZS 3602 Timber & wood based products for use in buildings
C2/AS1 Means of Escape	NZMP 3640: 2003 Chemical preservation of round & sawn timber
C3/AS1 Spread of fire	
D1/AS1 Access routes	NZS 4229: 1999 Concrete masonry buildings
E1/AS1 Surface water	
E2/AS1 External moisture	
E3/AS1 Internal moisture	
F4/AS1 Safety from falling	NZS.4223 Glazing in buildings
F7/AS1 Warning Systems	
G1/AS1 Personal Hygene	
G2/AS1 Laundering	
G3/AS1 Food preparation & prevention of contamination	
G4/AS1 Ventilation	
G5/AS1 Interior environment	
G7/AS1 Natural light Preservation Council	
G8/AS1 Artificial light	
G9/AS1 Electricity	AS/NZS 3000 & 3008 Electrical Installations & Electrical regulations
G11/AS1 Gas as an energy source	
G12/AS1 Water supplies	
G13/AS1 Foul water	AS/NZS 3500.2 Plumbing and drainage
H1/AS1 Energy efficiency	AS/NZS 4218: 2009 Thermal insulation

Foundation & Slab

300wide x 300deep conc. footings, 2/D12 bars,
1 D10 starters @ 600crs, 20 or 25 series masonry blocks as required, 17.5MPa blockfill, 1/D12 bond bar tied to top of starters. 90mm wide malthoid under base plates to external walls. 1/anchor plate cast into slab @ 900 crs to slab perimeter for hold-down connection plus 1/75x4mm concrete nail alongside anchor plate at no less than 70mm from the concrete edge.

2 100mm thick concrete slab 665 reinforcing mesh on 0.25 polythene. 150mm max layers of dry compacted granular hardfill in accordance with NZS 3604:1999.

3 Reinforced slab shrinkage control joints - 25mm deep saw cuts to form bays with maximum ratio of 2:1. Bays in exposed or vinyl areas 6m max

4 300x200 deep slab thickening, 2/D12 bars with R10 stirrups @ 600crs

External Walls

(SG8)

9 90x45 H1.2 frame with + 140x35 H1.2 packer plate, studs @ 600crs max, nogs @ 800crs. THERMAKRAFT Coverup building wrap taken up to top plate. 10mm gib linings to inside face of walls - level 4 paint finish

10 James Hardie 180mm LINEA weatherboards on ex50x25 H3.1 cavity battens nailed to all studs & nogs, installed, flashed and finished to the latest James Hardie specifications and in accordance with NZBC: E2/AS1 External Moisture. Merchant to include all flashings & fixings as required by cladding system

Exterior Joinery

11 Aluminium joinery installed to comply with NZBC: E2/AS1. Pre-primed jambs, 20mm grooved liners. Approved window sealing tape to all openings (see detail). Flashing tape over flashing fixings. Do not fix cladding through flashings. Glazing to comply with NZS:4223. & 2008 amendments.

Internal Walls

(SG 8)

12 90x45 H1.2 frame + 140x35 H1.2 top plate packer, studs @ 600crs max, nogs @ 800crs. Standard 10mm gib linings throughout, except wet areas. Fixed to comply with the latest Winstones Gib Manual.
Bottom plate fixing : concrete floor - Ramset HD875 drive pin (or equivalent) @ 600crs

Essential Homes

Wet Areas

BATHROOM / WC / KITCHEN / ENSUITE / ENTRY (floor finishes)
13 Non-slip vinyl lining over sealed floor. Minimum slip resistance co-efficient for level surface between 0.25 - 0.50 acceptable in accordance with NZBC: D1/AS1 Access.

Option 1 - Cove vinyl up wall 100mm, fix skirting or vinyl smooth edge to wall junction
Option 2 - Waterproof seal vinyl to edge of painted skirting, contractor to comply with NZBC: E3/AS1 Internal Moisture.

13a Non-slip tiles over waterproofed floor. Minimum slip resistance co-efficient for level surface between 0.25 - 0.50 acceptable in accordance with NZBC: D1/AS1 Access.
Tiled - Tiler to waterproof floor & wall to comply with NZBC: E3/AS1 Internal Moisture. Approved waterproofer (nominated by tiler) applied to manufacturers instructions, non-slip ceramic tiles laid over with even grout lines. Use flexible MS sealant to internal corners, wall & floor – tiller to supply producer statement for waterproofing & tiling (Contractor/Owner to confirm finish)

BATHROOM / LAUNDRY / ENSUITE (wall & ceiling finishes)

14 10mm GIB Aqualine (excluding laundry ceiling), 1/coat GIB Sealer with 2/coats semi-gloss or gloss, acrylic enamel paint

Wet Shower

Shower wall
15 Builder to fix 10mm GIB Aqualine fixed to align with gib. Tiler to waterproof floor & wall to comply with NZBC: E3/AS1 Internal Moisture. Approved waterproofer (nominated by tiler) applied to manufacturers instructions, non-slip ceramic tiles laid over with even grout lines. Use flexible MS sealant to internal corners, wall & floor – tiler to supply producer statement for waterproofing & tiling (Contractor/Owner to confirm finish)

Ceilings

18 70x35 KD ceiling battens nailed to trusses @ 450crs. Ensure battens are straight prior to lining. 10mm Gib linings with 32mm x 6g GIB® Grabber™Screws at 450mm centres. Glue daubs to be minimum of 200mm from centre screw. Do not screw where you glue. 32mm x 6g GIB® Grabber™ Screws at 200mm centres around the perimeter. Gib stopping to level 4 paint finish. 1/850sq ceiling access to roof space

Insulation

19 R3.2C pink Batts insulation to all ceilings. except garage. (R2.2 batts to house exterior wall perimeters)

20 R2.2W pink Batts insulation to all exterior wall cavities excluding garage, however including walls between house & garage, ensure snug fit not a tight fit.

APPROVED
These plans are approved in accordance with The NZ Building Code.
These plans must remain on site.
TAURANGA CITY COUNCIL

Roof

(SG8)

21 Pre-fabricated GANGNAIL 20°pitch H1.2 trusses @ 90 0crs - self supporting underlay laid vertically with min 150mm lap on 75x50 r/s H1.2 purlins (refer truss & purlin connection detail on page 08 for crs & fixing requirements)

22 Colorsteel valley trays fixed to ex 25mm H3.2 valley boards (see detail)

24 Longrun colorsteel roofing as per elevations. Roofing fixed with compatible roofing nails or screws and sealing washers, by qualified persons with flashings as required to all junctions - flashings fixed with compatible roofing screws and sealing washers

Soffit

(see details)

25 4.5mm Hardiflex soffit lining fixed to 90x45 soffit bearers & 90x45 stringer at wall.
600 eaves to all (refer roof plan), 25x19pp soffit mould.

26 COLORSTEEL fascia & spouting with MARLEY downpipe system.

TCC495419

A1homes

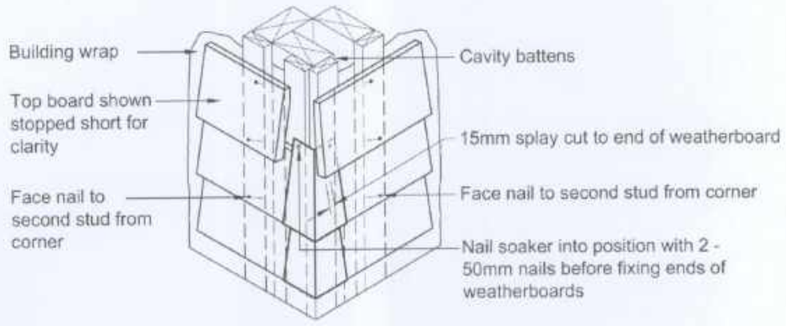
Client Details :
Leo Ryan
Address:
30 Caldera Crescent,
Pyes Pa, Tauranga

PLAN NOTES

Wind: high	Date: 24.08.11	Scale: N.T.S	
Earthq: B	Rev:	Drawn: RG	
Corrosion: C			

Plan : EH170all/rev | Project No: CC1048 | Sheet no : 13 of 19

Call 0800 A1homes 214663
www.A1homes.co.nz



Soaker material	Nail material
Copper	Copper or phosphor bronze
Aluminium	Hot dip galvanised
Stainless steel	Stainless steel

Note:
Aluminium extrusion must not be continuous over solid floor joists.

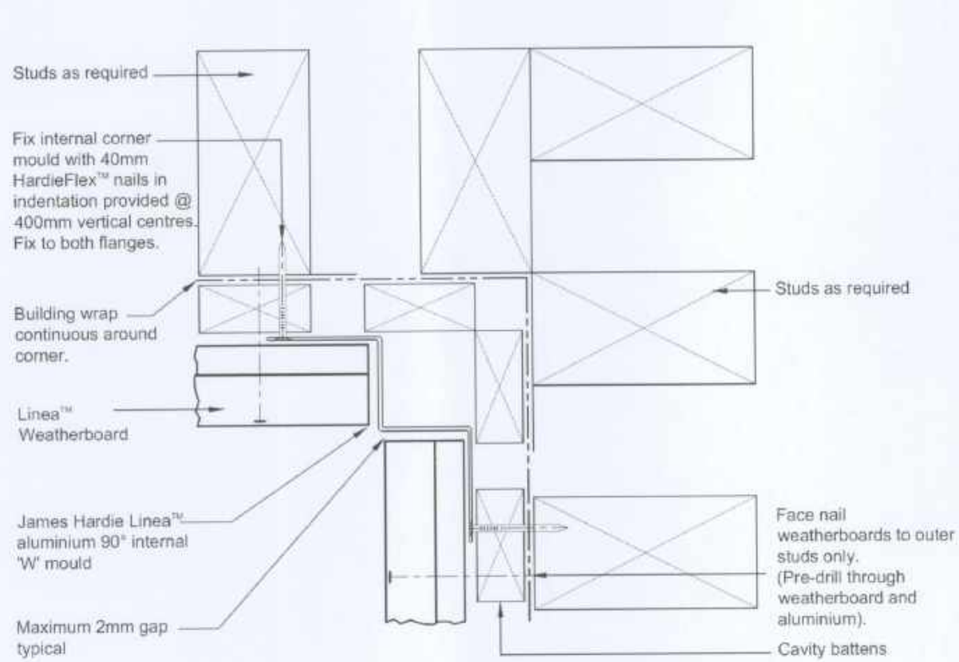


Figure 35: Cavity internal 90° aluminium 'W' mould corner

Client Details : Leo Ryan Address: 30 Caldera Crescent, Pyes Pa, Tauranga	CLADDING DETAILS	Plan : EH170alt/rev	Project No: CC1048
	Wind: high / Date: 24.08.11 / Scale: as shown		Sheet no : 15 of 19
	Earthq: B / Rev: / Drawn: RG		
	Corrosion: C		

27 February 2012

Dion Wilson
A1 Homes
PO Box 4367
Mt Maunganui 3149

Dear Sir/Madam

Additional Information Required (Two Copies)
Application for Building Consent (Reference Number 36577)

Property Situated at: 30 Caldera Crescent, Pyes Pa
Legal Description: Lot 132 DP 382533

Two hard copies of the following information are required before your building consent application can be fully processed. Please provide only the relevant plans and documentation to avoid additional consent processing charges being incurred to Council's Building Counter.

1. As the retaining walls are over 1 metre in height, please provide details to show how compliance with NZBC F4 will be met for Council's consideration.

Yours faithfully

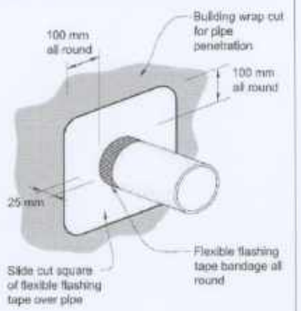
Lex Plato
Building Compliance and Inspections

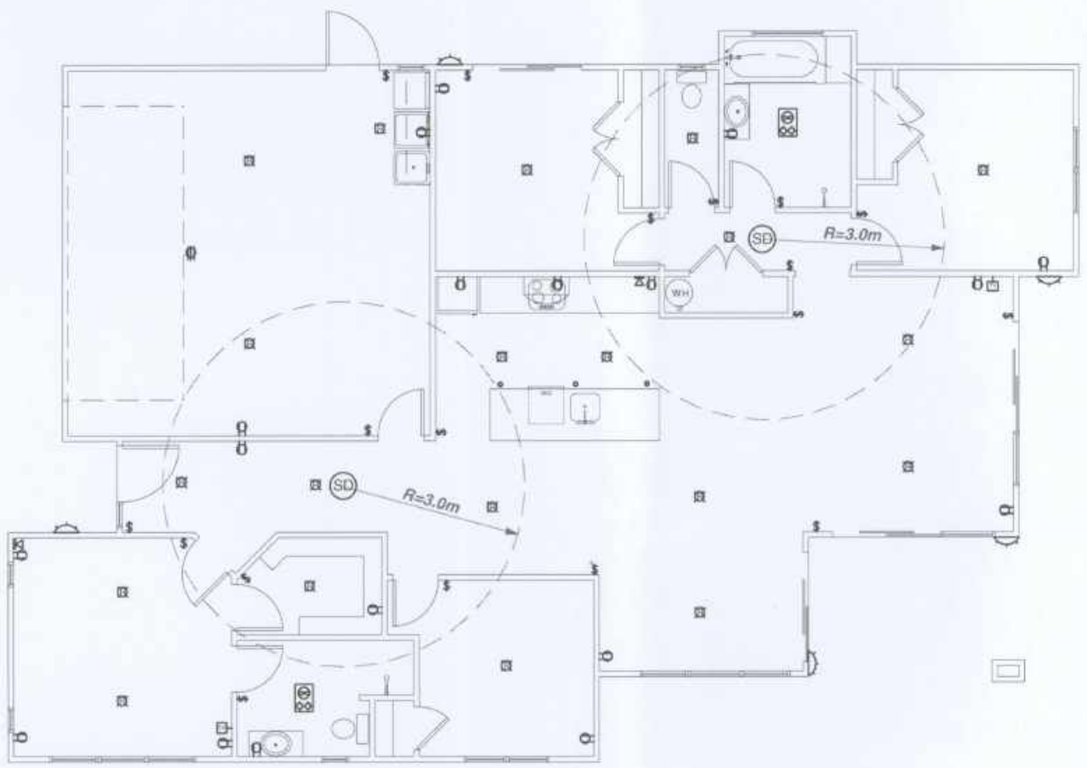
Please address all Communications to:

Manager: Building Services
Tauranga City Council
Private Bag 12022
Tauranga 3143

(**Fax:** (07) 577 7034)

Figure 68 General pipe penetration
Paragraph 9.1.9.3; Figure 129





Essential Homes

Notes:

all electrical work & items to comply with;
NZBC F7/AS1, AS/NZS 3000, AS/NZS 3008,
AS 3786, AS/NZS 5000.2: 2006

This layout is preliminary only - confirm final positioning & fitting allowance with client contract specifications

(SD) - Approved smoke detectors required within 3.0m of any sleeping space - first alert or similar

Down lights to be CA-Rated Type (max 1 per 5m²).

Ventilation system to vent ducts & r/hood to soffit outlet

APPROVED
These plans are approved in accordance with The NZ Building Code.
These plans must remain on site.
TAURANGA CITY COUNCIL

SYMBOL	ELECTRICAL LEGEND
	recessed downlight
S	switch
	feature halogen
	television outlet
	telephone jack
	double power point
	3in1 fan light
SD	smoke detector (first alert or similar)
	meter box
	wall light - external
	auto garage door opener

TCC495413

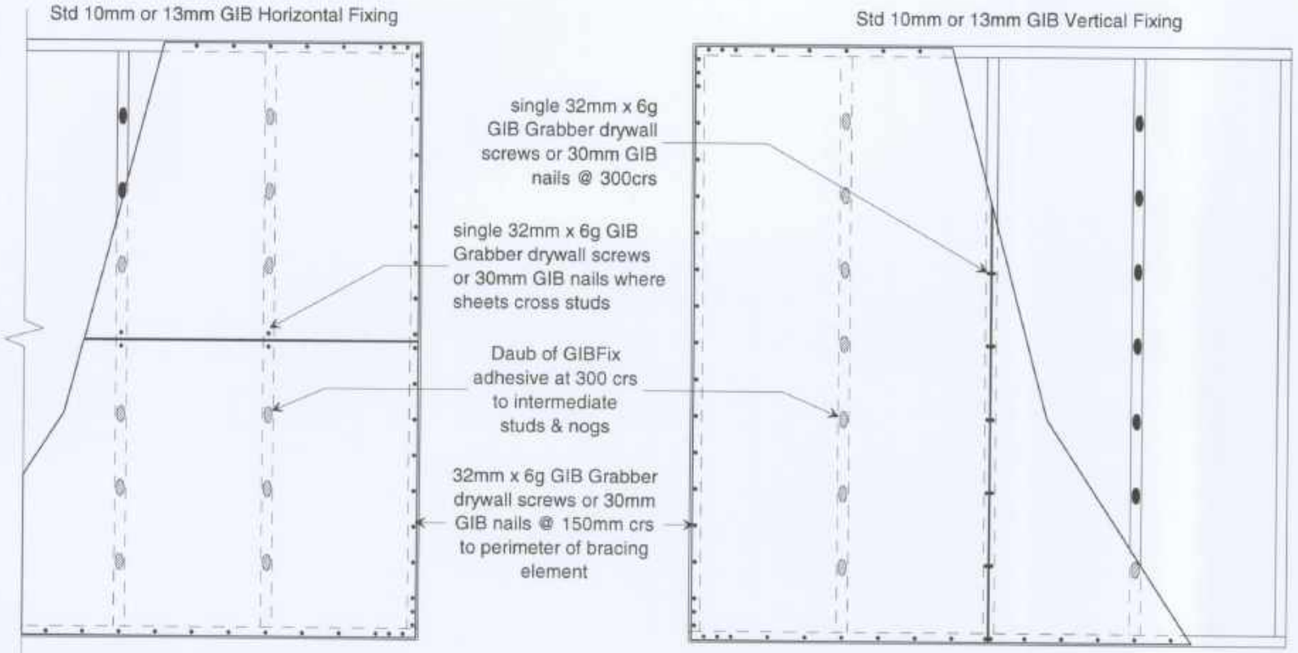
A1homes

Client Details :
Leo Ryan
Address:
30 Caldera Crescent,
Pyes Pa, Tauranga

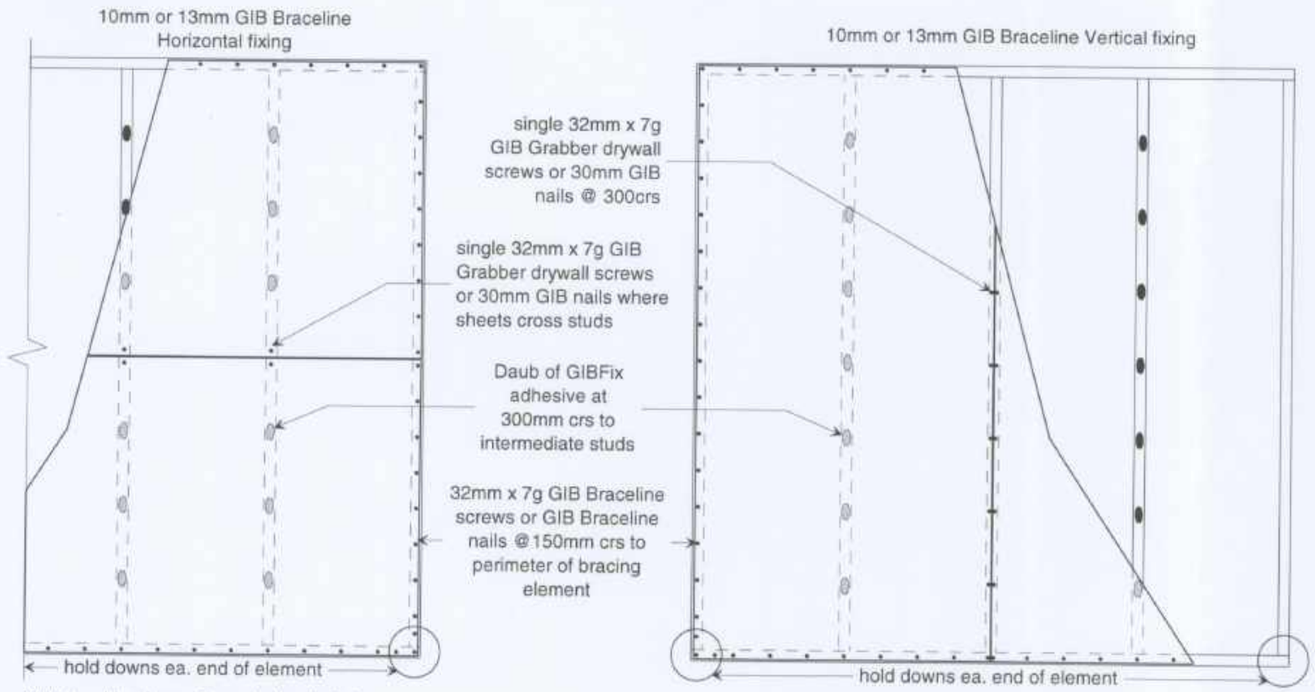
ELECTRICAL

Wind: high	Date: 24.08.11	Scale: 1:100	
Earthq: B	Rev:	Drawn: RG	
Corrosion: C			

Plan : EH170dlt/rev | Project No: CC1048 | Sheet no : 07 of 19



GS1-N - Lined one side min Length 0.4m



BL1-H - Lined one side, min length 0.4m

TCC495417

Ramset™ PRODUCT TECHNICAL STATEMENT

2011

Bottom Plate Product Technical Statement

Bottom Plate Fixing Solutions Table

Fixing Requirements				Installation		
Bottom Plate Location	Bottom Plate Fixing Requirement	Concrete Strength (min.)	Floor Edge Type	Fastener	Max Spacing	Min Edge Distance
External Wall	Proprietary Bracing Systems (15 kN)	17.5 MPa	Concrete	AS12150H[2] AS12150GH[2]	900 mm[3]	55 mm
			Masonry Block			
Internal Wall	NZS3604:1999 NZS3604:2011	17.5 MPa	N/A	121208PA[1]	900 mm	N/A
				8x75 Drive Pin & Washer	600 mm	N/A

Solutions are suitable when fixing a 90x45 Bottom Plate.
1 - To be used in conjunction with a 50x50x3 washer.
2 - To use in conjunction with a Pryda Bracing Anchor bracket.
3 - To meet NZS3604: 2011, Masonry Block floor requirements. Max spacing = 600mm.

Bottom Plate Durability

NZS3604 Table 4.1 classes bottom plates in a "closed (dry, internal location), not subjected to airborne salts or rain wetting" therefore the durability requirements can be met anywhere in New Zealand with a zinc passivated fastener.

121208PA Anchor — AS12150 Anchor — HD875 Drive Pin

Ramset has determined the suitability of the above fasteners from results in reports SR125, LTR032 2008 and evaluation by research organisations and industry recognised personnel.

Ramset™ www.ramset.co.nz
Ramset New Zealand
A division of ITW New Zealand Limited
29 Poland Road, Glenfield, Auckland
Ph: 0800 Ramset (726 738)
Email: info@ramset.co.nz
Suitability Statement / Published 01/2011

Client Details: Leo Ryan Address: 30 Caldera Crescent, Pyes Pa, Tauranga	BRACE FIXING DETAILS	Plan: EH170alt/rev	Project No: CC1048
	Wind: high; Date: 24.08.11; Scale: N.T.S Earthq: B; Rev:; Drawn: RG Corrosion: C		Sheet no: 11 of 19

Tauranga City

Asset Protection Bond: Request for Refund

ON COMPLETION OF WORKS TO TCC REQUIREMENTS

Address of Property: 30 Caldera Crescent

Name of Owner: Leo Ryan / Courtney Faass.

Name of Person/Company Claiming Refund: Leo Ryan.

Address Refund To Be Sent: 30 Caldera Crescent

Name of Contractor: _____

Receipt Number: 190855

Building Consent Number: 35842.

CUSTOMER SERVICE
17 SEP 2012
TAURANGA CITY COUNCIL

Note: Audit procedures require that the refund be made only to the receipt holder. Written authorisation is required from the receipt holder to refund monies to another party.

DECLARATION

I declare that I am/we are entitled to the refund of the above bond.

_____ _____
SIGNATURE DATE

_____

DAYTIME PHONE NUMBER AND CONTACT NAME

FORWARD TO: Manager: Asset Development
Department of City Services
Tauranga City Council
Private Bag
TAURANGA

Applicant to Complete Check List

Vehicle Xing_____

Footpath_____

Berm_____

Backflow_____

Meter Type_____

Meter No_____

Location_____

TCC Ref: 565532

As Built
Drainage Plan

Tauranga City

Tauranga City Council
Private Bag 12-022 Tauranga
Phone 07 577 7000
Fax 07 577 7034
Website www.tauranga.govt.nz

Drainage Plan for

Street Number 30 Street Name Caldera close

Lot 132 DP S 382533

Suburb The Lakes

Owner Ryan

Type of Building Dwelling

Drainlayer Plumbing Works

Date of Inspection 2.2.2012 Inspector I watson

Drainage Permit No 35842

Note : Plan to be drawn in black ballpoint on graph opposite

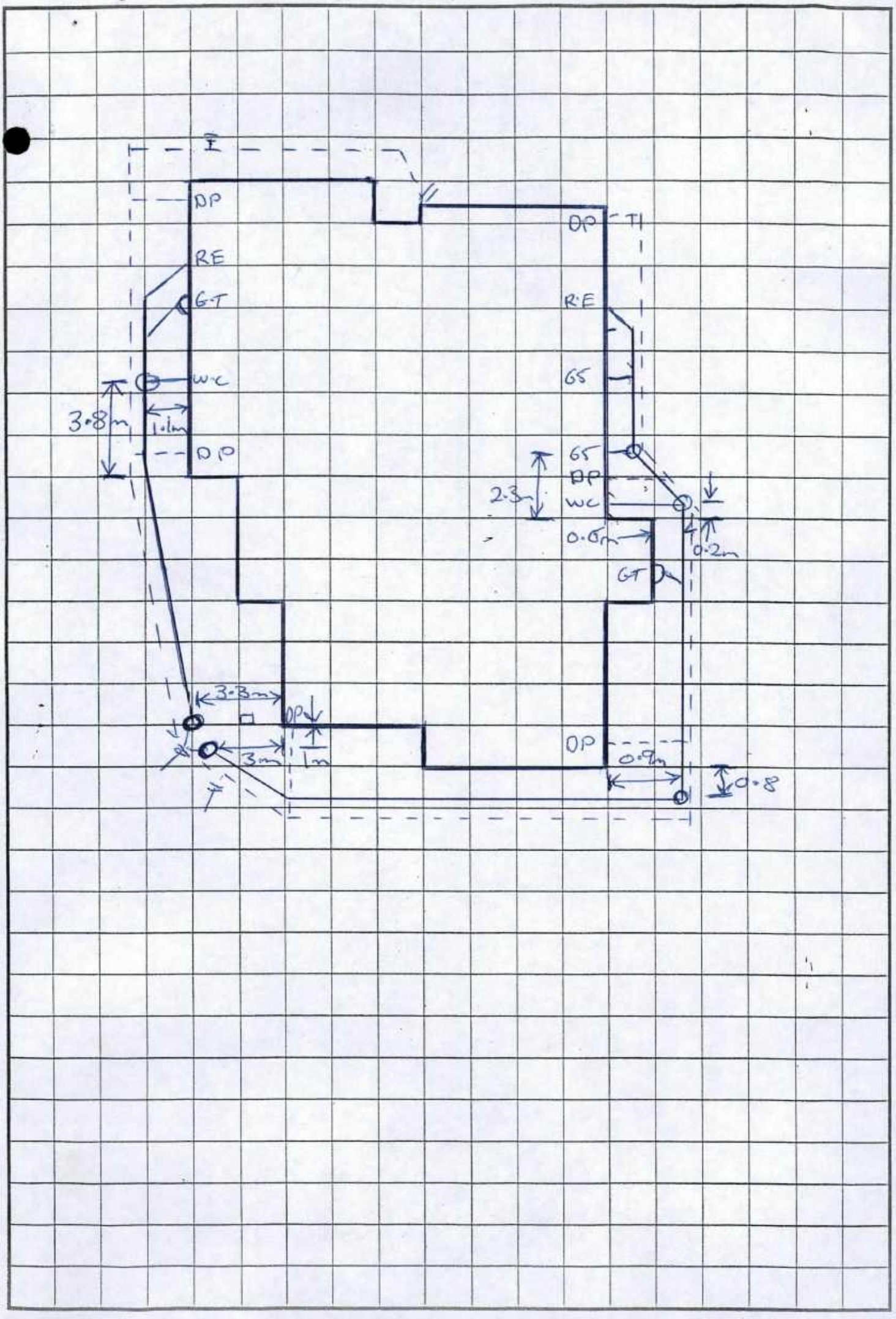
Plan to include:

1. The correct position of the drains in relation to the building and boundaries.
2. The position of the street frontage.
3. Depth of drains at connection point.
4. Both foulwater and stormwater drains to be drawn.
5. Clearly define all inspection openings, with accurate measurements from two points.
6. Clearly define all buildings and boundaries.
7. Refer to example drain plan back page.

CX 35842

30 Caldera Crescent

The Lakes


I
DP
RE
G.T
W.C
3.8m
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0.6m
0.2m
GT
3.8m
DP
3m
1m
DP
0.9m
0.8

Tauranga City

Willow Street, Tauranga
Private Bag, Tauranga
Telephone: 07 577 7000. Facsimile 07 577 7034

BUILDING CONSENT

NO: 36577

Issued By: Tauranga City Council pursuant to Section 51 of the Building Act 2004

THE OWNER	CONTACT PERSON
RYAN, LEO JOHN 18 MARSH STREET TAURANGA 3110	

THE BUILDING		BUILDING WORK
Street Address:	30 CALDERA CRESCENT	The following building work is authorised by this building consent: ERECT RETAINING WALL
Legal Description:	LOT 132 DP382533	

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

This building consent is issued subject to following conditions :

On behalf of the Tauranga City Council:

Name: _____

Position: CONSENT TECHNICIAN : BUILDING SERVICES

Date: 07 MAR 2012

Building Consent
Applications File Complete Checklist

Tauranga City Council
Building Services

Consent No. 36577	Date Issued 7/3/12	Revision No.	Version One

				Comments
Building Application Form	(Y)	N	N/A	
PIM	(Y)	N	N/A	
Resource Consent (Form 4A)	Y	N	(N/A)	
Plans – Stamped Correctly	(Y)	N	N/A	
Specifications	(Y)	N	N/A	
Design Reports	(Y)	N	N/A	
Bracing / Engineering Calculations Present	(Y)	N	N/A	
Producer Statements	Y	N	(N/A)	
Specified Systems Information	Y	N	(N/A)	
Processing Checklists	(Y)	N	N/A	
Requests for Peer Review	Y	N	(N/A)	
Requests for Additional Information	(Y)	N	N/A	
Memoranda from NZ Fire Service Commission	Y	N	(N/A)	
Advice to Applicants (Red)	Y	N	(N/A)	
Approval from NZ Historic Places Trust	Y	N	(N/A)	
Building Consent Conditions	Y	N	(N/A)	
Building Consent	(Y)	N	N/A	

Checked by: JOE	Date: 7/3/12.

Y = Yes in file	**N** = Not on file	**N/A** – Not applicable to this file

Note: If "N - Not on file" is used, reasons why will need to be added to the Comments Box.

Tauranga City

COPY

Willow Street, Tauranga
Private Bag, Tauranga
Telephone: 07 577 7000. Facsimile 07 577 7034

PROJECT INFORMATION MEMORANDUM

NO: 36577

Issued by: Tauranga City Council pursuant to Section 35 of the Building Act 2004.

APPLICANT	PROJECT
RYAN, LEO JOHN 18 MARSH STREET TAURANGA 3110	ERECT RETAINING WALL Intended Life: 50 years
PROJECT LOCATION	**LEGAL DESCRIPTION**
30 CALDERA CRESCENT	Legal Description LOT 132 DP382533

This project information memorandum is confirmation that the proposed building works **may** be undertaken subject to the provision of the Building Act 2004 and compliance with all the information provided in this document.

1. The Tauranga City Council Roading Hierarchy Plan showing the existing and proposed roading network is attached. For further information please refer to the Roading Division, Department of City Services, Tauranga City Council..

2. Should an archaeological site be found on the site during excavations, the owner must apply for authority from Historic Places Trust prior to destroying, damaging or modifying any archaeological site. Further information can be obtained by contacting the Duty Planner. Should koiwi (human remains) be uncovered during excavation, please contact the Tauranga City Council to arrange for tangata whenua to be advised, and appropriate steps taken for reburial.

3. The site is suitable for proposed building subject to confirmation of ground conditions at time of footing inspection.

4. Normal precautions adopted for excavation and filling within the Tauranga area should be observed. (Refer Councils Code of Practice for Development). Excavation faces near to boundaries or other structures, that are over 1.5 metres high should generally be retained by walls designed in accordance with the New Zealand Building Code and fill in excess of one metre deep should only be placed under the guidance of a Registered Engineer.

For a slab on grade floor where the fill exceeds a depth of 600mm from the existing building platform to the underside of the slab, it will be necessary for a geotechnical engineer to investigate the underlying soils to a depth of approximately twice the width of the fill.

A Building Consent is required for retaining walls 1.5 metres or greater in height or for any wall subject to a surcharge load, which is a load imposed by a structure; vehicle accessway or parking area or sloping ground higher than the top of the retaining wall, irrespective of the height of the wall. Excavations for the construction of retaining walls shall be contained within the legal boundaries of the lot, unless consent of the adjoining owner is obtained prior. In undertaking site earthworks care should be given to maintaining support to adjoining properties.

5. Any lease agreement, rights of way, easements or covenants that relate to the property may require the applicant to obtain the consent of other interested parties to allow this proposal to proceed. Please check the terms of your lease agreement or Certificate of Title.

6. Stormwater Pollution Prevention

The discharge to Council's STORMWATER SYSTEM of any material other than clean rainwater is PROHIBITED. For

further information please contact the Pollution Prevention Officer, Tauranga City Council on phone (07) 5777-000

7. A consent notice is registered on the Certificate of Title for:

Lots 1-12, 18-33, 40-50, 119-124 and 131-148 requiring that:

(a) The owners of such lots acknowledge that permitted farming activities are undertaken on other land in the vicinity and that any lawful management practices (including the spraying of horticultural crops) associated with the farming activities concerned may continue to be undertaken in accordance with any relevant New Zealand Standards and Codes of Practice.

(b) The design and construction of any structures requiring a Building Consent in accordance with the Building Act 2004 shall comply fully with the recommendations contained in the Geotechnical Report compiled by S & L Consultants Ltd dated January 2007, Reference 17726-1D. Any development of the property shall also be undertaken in accordance with the above report.

(c) All domestic stormwater from roofs, accessway, parking and manoeuvring areas and landscaped areas shall be collected and piped to the stormwater connection provided to ensure minimal development overland water flows between properties or is directed off site in an appropriate manner.

8. This site is located in a medium wind zone.

On behalf of the Tauranga City Council.

Name: _____

Position: CONSENT TECHNICIAN : BUILDING SERVICES

Date: 29.2.12

COPY

Tauranga City

Willow Street, Tauranga
Private Bag, Tauranga
Telephone: 07 577 7000. Facsimile 07 577 7034

BUILDING CONSENT

NO: 35842

Issued By: Tauranga City Council pursuant to Section 51 of the Building Act 2004

THE OWNER	CONTACT PERSON
FAASS, COURTNEY JANE RUTH RYAN, LEO JOHN 17 GORDON ROAD MOUNT MAUNGANUI 3116	

THE BUILDING		BUILDING WORK
Street Address:	30 CALDERA CRESCENT	ERECT DWELLING
Legal Description:	LOT 132 DP382533	

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

This building consent is issued subject to following conditions :

On behalf of the Tauranga City Council:

Name: _____

Position: CONSENT TECHNICIAN : BUILDING SERVICES

Date: 17 OCT 2011

Building Consent Applications File Complete Checklist

Tauranga City Council
Building Services

Consent No. 35842	Date Issued 17/10/11	Revision No.	Version One

				Comments
Building Application Form	(Y)	N	N/A	
PIM	(Y)	N	N/A	
Resource Consent (Form 4A)	Y	N	(N/A)	
Plans – Stamped Correctly	(Y)	N	N/A	
Specifications	(Y)	N	N/A	
Design Reports	Y	N	(N/A)	
Bracing / Engineering Calculations Present	(Y)	N	N/A	
Producer Statements	Y	N	(N/A)	
Specified Systems Information	Y	N	(N/A)	
Processing Checklists	(Y)	N	N/A	
Requests for Peer Review	Y	N	(N/A)	
Requests for Additional Information	(Y)	N	N/A	
Memoranda from NZ Fire Service Commission	Y	N	(N/A)	
Advice to Applicants (Red)	Y	N	(N/A)	
Approval from NZ Historic Places Trust	Y	N	(N/A)	
Building Consent Conditions	Y	N	(N/A)	
Building Consent	(Y)	N	N/A	

Checked by: JCE	Date: 17/10/11

Y = Yes in file	**N** = Not on file	**N/A** – Not applicable to this file

Note: If "N - Not on file" is used, reasons why will need to be added to the Comments Box.

Tauranga City

COPY

Willow Street, Tauranga
Private Bag, Tauranga
Telephone: 07 577 7000. Facsimile 07 577 7034

PROJECT INFORMATION MEMORANDUM

NO: 35842

Issued by: Tauranga City Council pursuant to Section 35 of the Building Act 2004.

APPLICANT	PROJECT
FAASS, COURTNEY JANE RUTH RYAN, LEO JOHN 17 GORDON ROAD MOUNT MAUNGANUI 3116	ERECT DWELLING Intended Life: 50 years
PROJECT LOCATION	**LEGAL DESCRIPTION**
30 CALDERA CRESCENT	Legal Description LOT 132 DP382533

This project information memorandum is confirmation that the proposed building works **may** be undertaken subject to the provision of the Building Act 2004 and compliance with all the information provided in this document.

1. Development Contribution Fee(s) together with Building Consent Fees and charges are to be paid before the Building Consent is uplifted.

2. The Tauranga City Council Roading Hierarchy Plan showing the existing and proposed roading network is attached. For further information please refer to the Roading Division, Department of City Services, Tauranga City Council..

3. Should an archaeological site be found on the site during excavations, the owner must apply for authority from Historic Places Trust prior to destroying, damaging or modifying any archaeological site. Further information can be obtained by contacting the Duty Planner. Should koiwi (human remains) be uncovered during excavation, please contact the Tauranga City Council to arrange for tangata whenua to be advised, and appropriate steps taken for reburial.

4. The site is suitable for proposed building subject to confirmation of ground conditions at time of footing inspection.

5. Normal precautions adopted for excavation and filling within the Tauranga area should be observed. (Refer Councils Code of Practice for Development). Excavation faces near to boundaries or other structures, that are over 1.5 metres high should generally be retained by walls designed in accordance with the New Zealand Building Code and fill in excess of one metre deep should only be placed under the guidance of a Registered Engineer.

For a slab on grade floor where the fill exceeds a depth of 600mm from the existing building platform to the underside of the slab, it will be necessary for a geotechnical engineer to investigate the underlying soils to a depth of approximately twice the width of the fill.

A Building Consent is required for retaining walls 1.5 metres or greater in height or for any wall subject to a surcharge load, which is a load imposed by a structure; vehicle accessway or parking area or sloping ground higher than the top of the retaining wall, irrespective of the height of the wall. Excavations for the construction of retaining walls shall be contained within the legal boundaries of the lot, unless consent of the adjoining owner is obtained prior. In undertaking site earthworks care should be given to maintaining support to adjoining properties.

6. Any lease agreement, rights of way, easements or covenants that relate to the property may require the applicant to obtain the consent of other interested parties to allow this proposal to proceed. Please check the terms of your lease agreement or Certificate of Title.

7. Prior to the commencement of building, you are advised to verify on site, the invert levels of service connections intended to be utilised. Vehicle crossings are to be located clear of Council Stormwater Sumps. The attached services plan/asbuilt plan provides the approximate location of Council mains and service connections.

8. Street Trees

Vehicle crossings are not to be constructed within 2.0 metres of the trunk or within the dripline of any street tree without the prior consent of the Tauranga City Council's City Arborist. Any costs associated with removing, replacing or relocating street trees will be at the sole expense of the applicant.

9. Stormwater Pollution Prevention

The discharge to Council's STORMWATER SYSTEM of any material other than clean rainwater is PROHIBITED. For further information please contact the Pollution Prevention Officer, Tauranga City Council on phone (07) 5777-000

10. Vehicle crossings are to be a maximum width of 4.5m at the kerb

11. A consent notice is registered on the Certificate of Title for:

Lots 1-12, 18-33, 40-50, 119-124 and 131-148 requiring that:

(a) The owners of such lots acknowledge that permitted farming activities are undertaken on other land in the vicinity and that any lawful management practices (including the spraying of horticultural crops) associated with the farming activities concerned may continue to be undertaken in accordance with any relevant New Zealand Standards and Codes of Practice.

(b) The design and construction of any structures requiring a Building Consent in accordance with the Building Act 2004 shall comply fully with the recommendations contained in the Geotechnical Report compiled by S & L Consultants Ltd dated January 2007, Reference 17726-1D. Any development of the property shall also be undertaken in accordance with the above report.

(c) All domestic stormwater from roofs, accessway, parking and manoeuvring areas and landscaped areas shall be collected and piped to the stormwater connection provided to ensure minimal development overland water flows between properties or is directed off site in an appropriate manner.

12. This site is located in a medium windzone

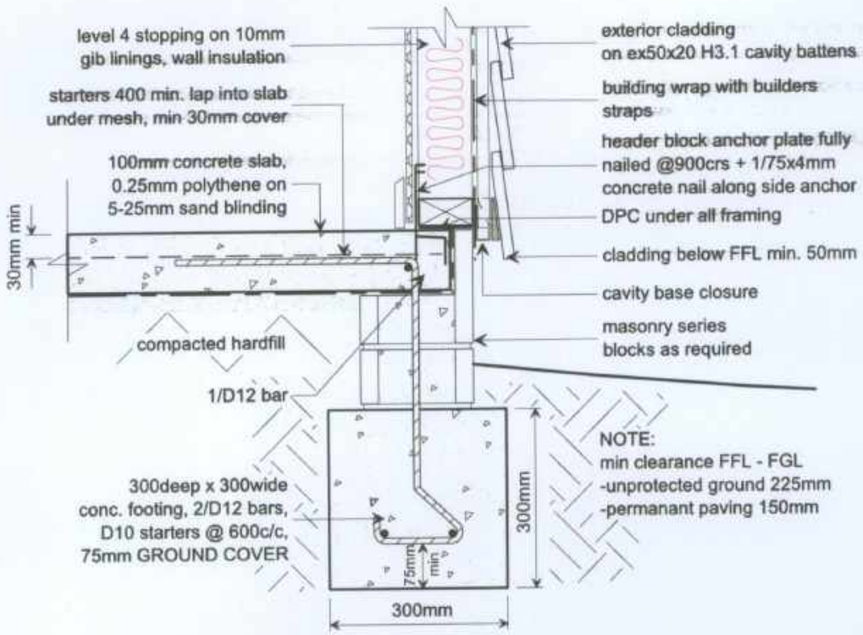
13. Sediment and runoff control shall be designed and installed by the licensed building practitioner prior to or during the earthworks for the project. The sediment controls shall be installed in accordance with the requirements of Tauranga City Council's City Plan (Chapter 4C.2) and Small Site Erosion and Sediment Control for the City of Tauranga Guideline.

On behalf of the Tauranga City Council.

Name: _____

Position: CONSENT TECHNICIAN : BUILDING SERVICES

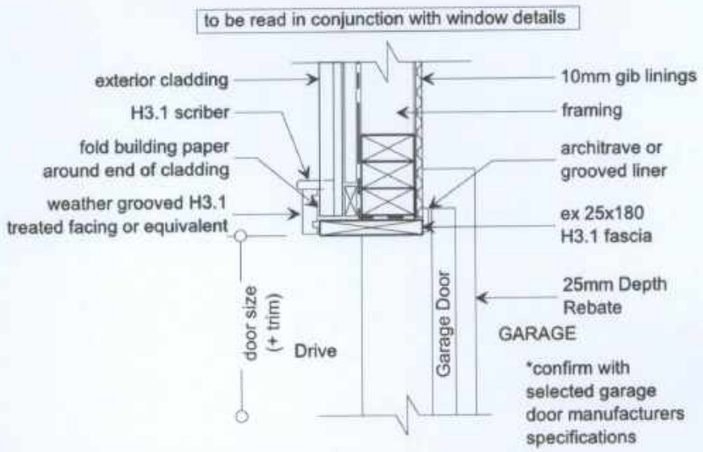
Date: 13/10/11



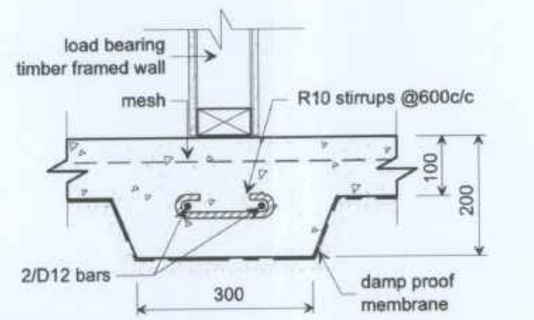
detail 01 **Footing Construction** Scale 1:10

Engineered fill to Kirk Roberts Consulting Engineers design - engineer design to take precidence if any discrepancies occur.

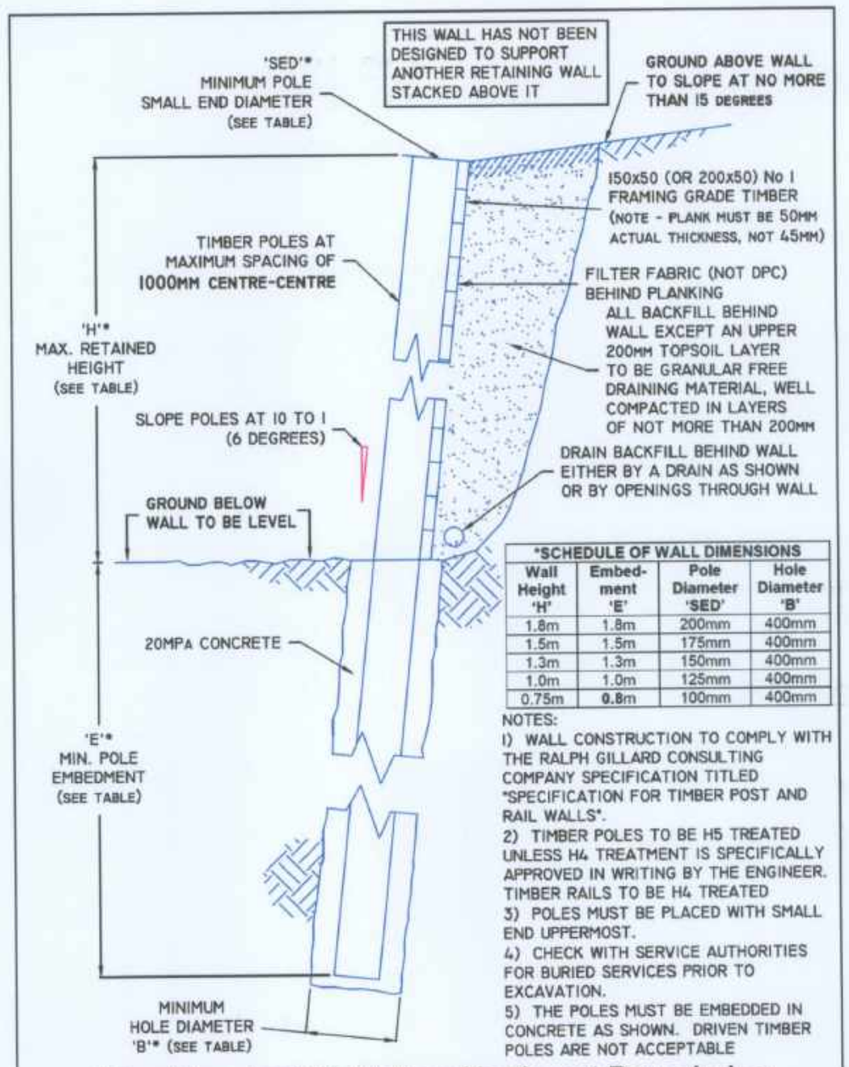
Timber retaining walls over 1.8m high to Ralph Gillard Consulting Company LTD design - engineer design to take precidence if any discrepancies occur.



Detail 03 **Garage Door Detail (plan view)** Scale 1:10



detail 02 **Slab Thickening Detail** Scale 1:10
(refer final truss design for varied location if require



*SCHEDULE OF WALL DIMENSIONS

Wall Height 'H'	Embed-ment 'E'	Pole Diameter 'SED'	Hole Diameter 'B'
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1.5m	1.5m	175mm	400mm
1.3m	1.3m	150mm	400mm
1.0m	1.0m	125mm	400mm
0.75m	0.8m	100mm	400mm

NOTES:
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5) THE POLES MUST BE EMBEDDED IN CONCRETE AS SHOWN. DRIVEN TIMBER POLES ARE NOT ACCEPTABLE

1.8m Max. Height Wall on Northeast Boundaries at Leo Ryan Dwelling, 30 Caldera Crescent

DO NOT SCALE FROM THIS DRAWING

RALPH GILLARD CONSULTING COMPANY LIMITED Date: 13/2/12 Drawing No: 2114/S1

TCC599351

Client Details: Leo Ryan
Address: 30 Caldera Crescent, Pyes Pa, Tauranga

FOUNDATION DETAILS

Wind: high | Earthq: B | Corrosion: C | Date: 24.08.11 | Rev: B: 13.02.12 | Scale: 1:10 | Drawn: RG | acdarchitecture

Plan: EH170all/rev | Project No: CC1048 | Sheet no: 05 of 19

STRUCTURAL DRAWINGS

KIRK ROBERTS CONSULTING ENGINEERS LTD

Tauranga ITM Building and Fencing Supplies Ltd, trading as: Ready Floor Systems

TCC495403

Ryan Home
30 Caldera Crescent, Pyes Pa, Tauranga
Ref. 112234

13 February 2012
Our Ref : 392114 summary

PROJECT- LEO RYAN DWELLING
ADDRESS- 30 Caldera Crescent, Tauranga

STRUCTURAL SUMMARY REPORT

RALPH GILLARD
CONSULTING COMPANY LIMITED

4 Dawn View Place
RD6 Minden, TAURANGA
PHONE : (07) 552 4476
FAX No : (07) 552 4482

The architectural drawings are to be read in conjunction with this report. Should there be conflict between the drawings and this report, then this report shall take precedence on structural matters.

Amongst many other things, the scope of work done by Ralph Gillard Consulting Company Ltd does NOT include weather tightness issues, water tightness issues, site suitability, flood risk, and ground conditions. No site inspection has been made. Ground conditions complying with all the "good ground" conditions of NZS 3604 have been assumed but not confirmed on site. Confirmation that the ground conditions comply with all the "good ground" conditions of NZS 3604, and that the site is suitable for the proposed structure remain the responsibility of others.

Only the items listed below have been designed by Ralph Gillard Consulting Company Ltd. Design of all other items remains the responsibility of others.

1.8m max. HEIGHT WALL ON NORTHEAST BOUNDARIES

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SPECIFICATIONS

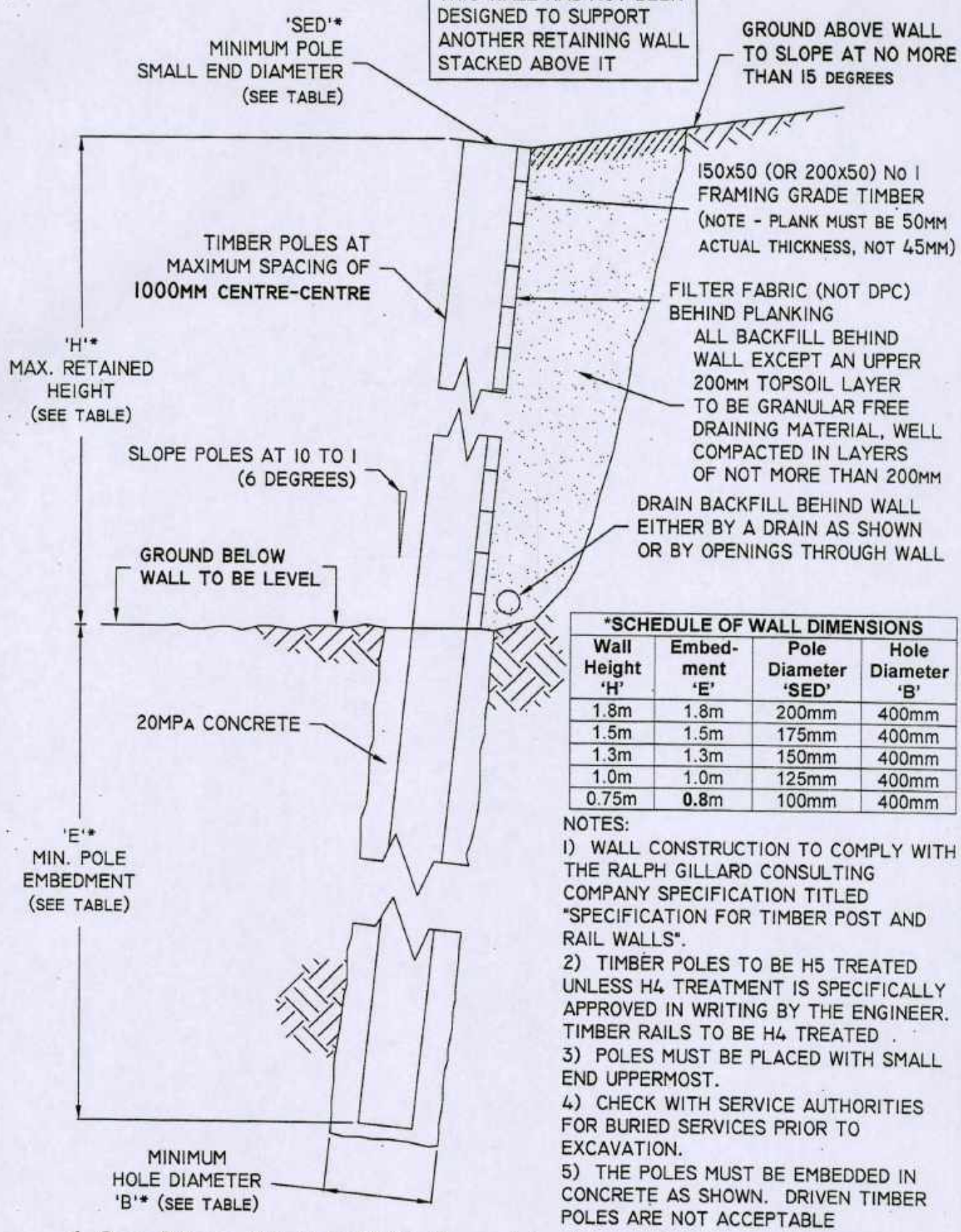
Attached is a Structural Specification for:

- Timber Post And Rail Retaining Walls

Ralph Gillard Consulting Company Limited

R Gillard
B.E. MIPENZ (Structural)
Chartered Professional Engineer

THIS WALL HAS NOT BEEN DESIGNED TO SUPPORT ANOTHER RETAINING WALL STACKED ABOVE IT



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1.8m Max. Height Wall on Northeast Boundaries at Leo Ryan Dwelling, 30 Caldera Crescent

DO NOT SCALE FROM THIS DRAWING

RALPH GILLARD CONSULTING COMPANY LIMITED

Date: 13/2/12 Drawing No: 2114/S1

13 February, 2012

RALPH GILLARD
CONSULTING COMPANY LIMITED

4 Dawn View Place
RD6, Minden, Tauranga 3176
Telephone 0-7-552 4476
Facsimile 0-7-552 4482

ac-design architecture limited
PO Box 3011
GREERTON

PRODUCER STATEMENT - DESIGN

For: items as per following "Structural Summary Report" dated 13/02/2012
In a house proposed to be erected at **30 Caldera Crescent, Tauranga**
My reference: **392114**

I, Ralph Geoffrey Gillard, being registered under the Chartered Professional Engineers Act 2002, and currently holding an Annual Practising Certificate hereby state that I have been engaged to provide structural design in accordance with the requirements of Clause B1 of the Building Regulations 1992 for the structural building elements identified above to which my calculations dated February 12 refer.

The design for these structural building elements has been prepared in accordance with section B1 / VM1 of the approved documents issued Building Industry Authority

This statement covers only those structural building elements that are described in my 'Structural Summary Report" dated February, 12 attached to this statement. Only these items have been checked by Ralph Gillard for compliance with the code. Design of all other elements remains the responsibility of others.

Amongst many other things, this statement does not cover weather tightness issues, water tightness issues, site suitability, flood risk, and ground conditions. No site inspection has been made by Ralph Gillard. Ground conditions complying with all the "good ground" conditions of NZS 3604 have been assumed but not confirmed on site. Confirmation that ground conditions comply with all the "good ground" conditions of NZS 3604 and that the site is suitable for the proposed structure remain the responsibility of others.

As an independent design professional covered by a current policy of Professional Indemnity Insurance to a minimum value of $200,000, I BELIEVE ON REASONABLE GROUNDS that subject to:

1. The verification of ground conditions and site suitability as outlined above
2. All proprietary products meeting the performance specifications requirements
3. Inspection of Construction by the Territorial Authority or Registered Building Certifier

the structural design of the elements as described in my Structural Summary Report referenced above complies with the relevant provisions of the building code.

R G Gillard
B.E. MIPENZ (Structural)
Chartered Professional Engineer

For and on behalf of:
RALPH GILLARD CONSULTING COMPANY LIMITED

13 February 2012
Our Ref : 392114 summary

PROJECT- LEO RYAN DWELLING
ADDRESS- 30 Caldera Crescent, Tauranga

STRUCTURAL SUMMARY REPORT

RALPH GILLARD
CONSULTING COMPANY LIMITED

4 Dawn View Place
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Attached is a Structural Specification for:

- Timber Post And Rail Retaining Walls

Ralph Gillard Consulting Company Limited

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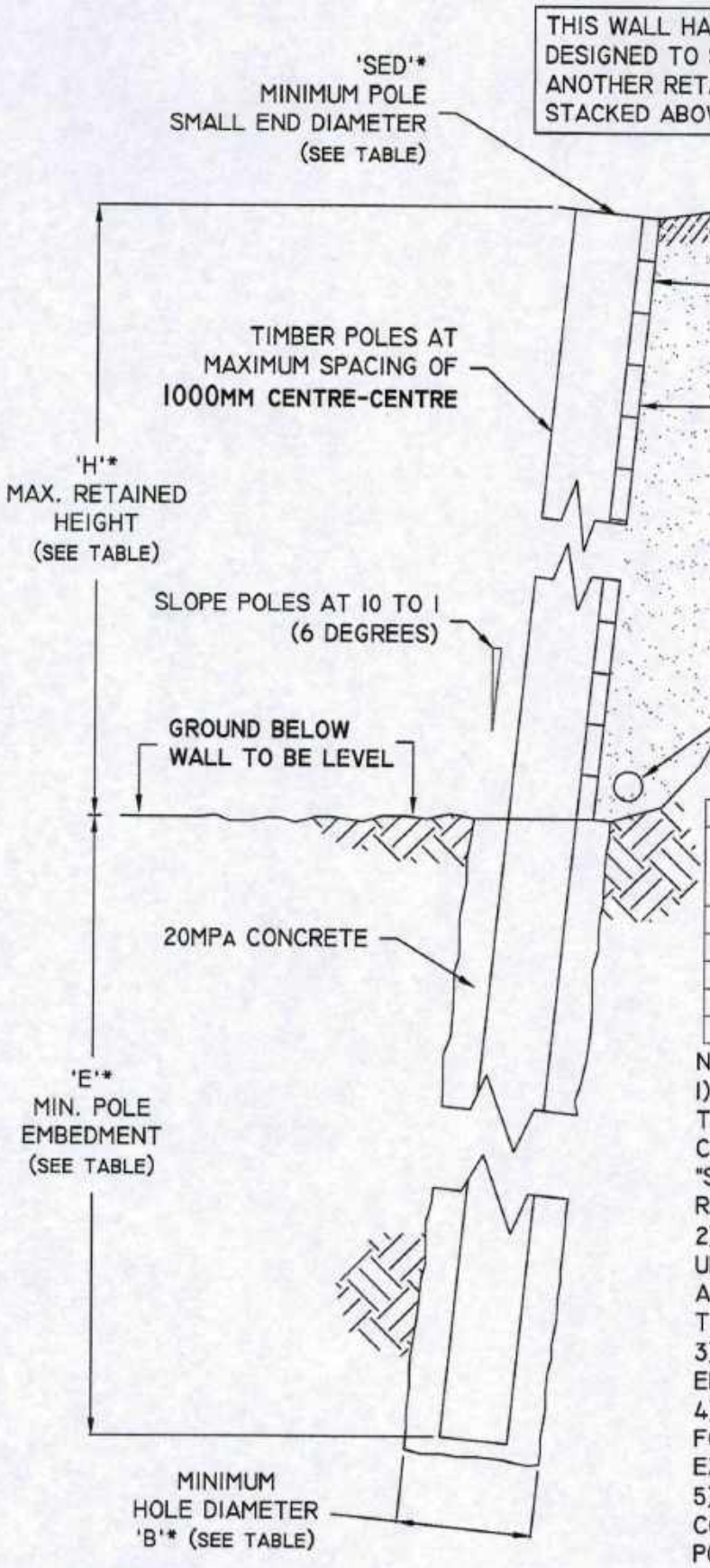

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NOTES:

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1.8m Max. Height Wall on Northeast Boundaries at Leo Ryan Dwelling, 30 Caldera Crescent

DO NOT SCALE FROM THIS DRAWING

RALPH GILLARD CONSULTING COMPANY LIMITED

Date: 13/2/12 Drawing No: 2114/S1

SPECIFICATION FOR TIMBER POST AND RAIL RETAINING WALLS at Ryan Dwelling, 30 Caldera Crescent, Tauranga

Scope

This specification covers construction of retaining walls using timber poles in accordance with details shown on Drawings or Sketches provided by Ralph Gillard Consulting Company Ltd.

Timber Specification and Preservation

1. Timber poles shall be peeled and tapering radiata pine logs complying with the requirements of NZS 3605 'Timber Piles and Poles for Use in Building', treated to the Timber Treatment Specification H5.
2. Sawn timber planks in ground contact shall be radiata pine treated to specification H5 unless H4 is shown on the Ralph Gillard Consulting Company drawings. The timber planks shall be VSG8 or G8 grade timber unless No. 1 Framing Grade is shown on the Ralph Gillard Consulting Company drawings. (In low walls (less than 1.8m high say), with the Engineer's approval in writing, the timber grade may be able to be relaxed to Number 1 Framing Grade and in those cases where plank replacement is possible, the timber treatment may be able to be relaxed to H4)
3. All timber shall have the timber treatment identification brands visible when delivered to the site, and shall be protected against damage during storage and handling.
4. Dimensions of poles are specified as minimum small end diameters. Actual diameters will be somewhat greater due to taper and timber grading.
5. Cutting of timbers shall be avoided wherever possible. If cutting is necessary the exposed surfaces shall be flooded with a copper napthenate type of wood preservative.

Excavation

1. All excavation shall be carried out in such a way that it does not remove support from adjoining properties or other structures or the road. Excavation in stages to allow for temporary support during construction or temporary shoring of excavation may be required. Excavations unsupported during construction may be hazardous.
2. Excavations shall only be carried out by adequately skilled persons and proper care shall be exercised at all times to ensure lives and property are not endangered.
3. It is the builder's responsibility to ensure that the area to be excavated is free from buried services.
4. Excavations for foundations shall be carried out by augering to the diameter and depth detailed on the drawings or sketches provided by Ralph Gillard Consulting Company Ltd. Allowance shall be made in positioning augered holes for the backward slope of the wall and for the concrete surround to the poles. Driving of poles is NOT an acceptable alternative to augering.

Pole Cutting and Placement

1. Poles shall be erected with the large end at the bottom of the hole and the small end upper most.
2. If the poles delivered to site are longer than required only the small diameter end may be shortened. Poles shall not be cut at any point which is below ground level.

Concrete

1. Concrete for foundation backfill shall be premixed concrete with a 28-day strength of 17.5 MPa.
2. Concrete shall be placed under and around poles and well compacted by tamping or a vibrator.
3. Poles shall be temporarily propped and protected against disturbances for at least 2 days after placement of concrete.

Rail Fixing

1. The minimum length of the horizontal rails shall be twice the spacing of the vertical poles.
2. The joints in the rails shall be staggered so that, at each pole, no more than every second rail is joined. Joints in the rails shall be butted closely with a square butt.
3. Horizontal timbers shall be fixed to poles with hot dip galvanized nails. 100mm minimum length nails shall be used for rails of 50mm nominal thickness. 150mm nails shall be used for rails made out of full rounds and half rounds. Timbers shall be laid in position commencing at the bottom of the wall. Care shall be taken to achieve neat straight lines of horizontal timbers.

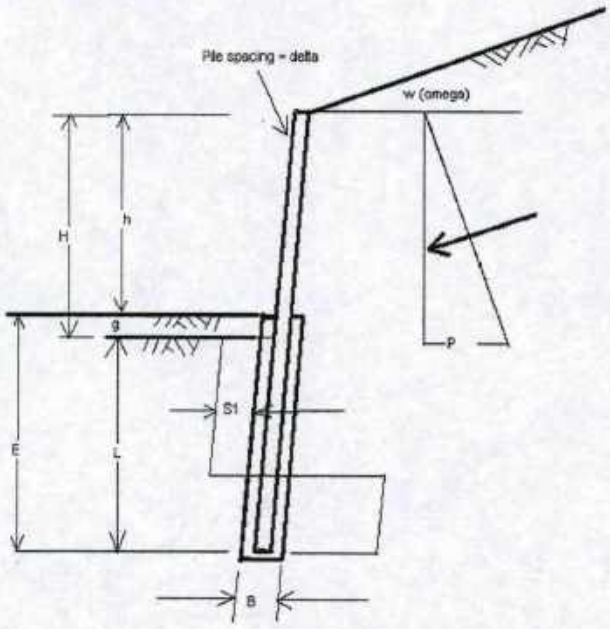
Backfilling

1. The backfill to within 200mm of finished surface level shall be granular free draining material not larger than 100mm in diameter.
2. The backfill shall be well compacted in layers of not more than 200mm as it is being placed. If there is insufficient room to get compaction equipment behind the wall use a say 100mm dia pole to compact by tamping from above.
3. The top surface shall be sealed against entry of surface water with a layer of subsoil.

1.8m TIMBER RETAINING WALL WITH 5kPA SURCHARGE AND SLOPE ABOVE OF NOT MORE THAN 15 degrees

Project = "PROPOSED LEO RYAN DWELLING AT 30 CALDERA CRESCENT, TAURANGA"

Design Method - Use earth pressures by Coulomb, and Broms (modified) for pole embedment.



PARAMETERS

Planned retained height	$h := 1.8 \cdot m$
Spacing of poles (centre-centre)	$\delta := 1.0 \cdot m$
Hole diameter for embedded pole	$B := 400 \cdot mm$
Intended embedment depth	$E_{in} := 1.8m$
Embedment depth lost due to erosion etc	$g := 0mm$
Surcharge at top of wall	$Q := 5 \cdot kPa$
Backfill slope	$\omega := 15 \cdot deg$
Wall slope (negative if wall leans towards soil as shown opposite)	$\beta := -6 \cdot deg$
Density of retained soil	$\gamma := 16 \cdot kN \cdot m^{-3}$
Angle of shearing resistance	$\phi := 30 \cdot deg$
Angle of wall friction	$\delta_f := 0.67 \cdot \phi$
Ultimate load case factor for timber design	$ULF := 1.6$

Unsupported length of pile in ground (Pg 145 of Ref suggests taking Eu = 250mm) $E_u := 250mm$

Strength reduction factor for soil resisting overturning	$\Phi := 0.5$
Undrained shear strength of soil resisting overturning	$S_u := 40kPa$
Percent of active pressures designed for: (Ref Geomechanics News Dec 93 (No 46) pg 21)	$Percent := 100\%$

Timber Properties

Characteristic stress in bending for poles	$f_{bpole} := 38 \cdot MPa$
Characteristic stress in bending for sawn timber	$f_{bsawn} := 7.5 \cdot MPa$
Modulus of Elasticity for sawn timber	$E_{timb} := 3.2 \cdot GPa$
Duration of load factor for strength	$k_1 := 0.6$
Shaving factor	$k_{20} := 0.85$
Steaming factor	$k_{21} := 0.85$
Dry use factor (=1.25 if pole are always dry)	$k_{22} := 1$
Strength reduction factor for timber & poles	$phi := 0.8$

CALCULATIONS

$H := h + g \qquad E := E_{in} - g$

equivalent surcharge height $h_e := \frac{Q}{\gamma} \cdot \frac{\cos(\beta)}{\cos(\beta - \omega)}$ $h_e = 0.333\,m$

Pressure Coefficients by Coulomb

$$k_{a\_c} := \frac{\cos(\phi - \beta)^2}{\cos(\beta)^2 \cdot \cos(\delta_f + \beta) \cdot \left(1 + \sqrt{\frac{\sin(\phi + \delta_f) \cdot \sin(\phi - \omega)}{\cos(\delta_f + \beta) \cdot \cos(\omega - \beta)}}\right)^2}$$

angle of resulting force to horizontal $\theta_c := \delta_f + \beta$ coefficients used for design $k_c := k_{a\_c} \cdot Percent$

Pressures and Forces by Coulomb

Pressures at top & base of wall $p_{top\_c} := k_c \cdot \gamma \cdot h_e$ $p_{stem\_c} := k_c \cdot \gamma \cdot (H + h_e)$

Resultant force P $P_c := \frac{p_{top\_c} + p_{stem\_c}}{2} \cdot H \cdot \delta$ $P_{stem\_c\_hz} := P_c \cdot \cos(\theta_c)$

Force perpendicular to pole $F_{perp} := P_c \cdot \cos(\delta_f)$

Distance from base to centre of force $d_{stem\_c} := \frac{H^2 \cdot \delta}{6 \cdot P_c} \cdot (2 \cdot p_{top\_c} + p_{stem\_c})$

RESULTS OF SOIL LOADS ANALYSIS

active earth pressure coefficient	$k_{a\_c} = 0.316$
earth pressure coefficient used in design	$k_c = 0.316$
angle of resulting force to horizontal	$\theta_c = 14 \cdot deg$
distance of resultant force from base	$d_{stem\_c} = 0.681\,m$

	unfactored	**ultimate**
lateral pressure at top of wall	$p_{top\_c} = 1.69 \cdot kPa$	$ULF \cdot p_{top\_c} = 2.7 \cdot kPa$
lateral pressure at base of wall	$p_{stem\_c} = 10.8 \cdot kPa$	$ULF \cdot p_{stem\_c} = 17.3 \cdot kPa$
resulting total force	$P_c = 11.2 \cdot kN$	$ULF \cdot P_c = 18 \cdot kN$
horizontal component of resulting force	$P_{stem\_c\_hz} = 10.9 \cdot kN$	$ULF \cdot P_{stem\_c\_hz} = 17.4 \cdot kN$
component of force perpendicular to pole	$F_{perp} = 10.6 \cdot kN$	$ULF \cdot F_{perp} = 16.9 \cdot kN$

CHECK ADEQUACY OF POLE EMBEDMENT

Reference: Section 7.2 of the Course Notes of the NZ Geotechnical Society, Short Course, August 2000 "Ultimate Limit State Design of Foundations" by M J Pender

For an isolated short, free head pile in material of constant Su with depth

$$F_{u\_isolated} := 9 \cdot S_u \cdot \Phi \cdot B \cdot \left[\sqrt{(E + 2 \cdot d_{stem\_c} + E_u)^2 + (E - E_u)^2} - (E + 2 \cdot d_{stem\_c} + E_u) \right]$$ (formula 7.6 of Ref)

Allowable ultimate horizontal force on an isolated pile $F_{u\_isolated} = 24.2 \cdot kN$

load reduction due to closely spaced piles (as per B1/VM4) $Spacing\_factor := \min\left(\frac{\delta - B}{3 \cdot B} \cdot 0.75 + 0.25, 1 \right)$ $Spacing\_factor = 0.625$

$$F_{u\_continuous} := 2 \cdot S_u \cdot \Phi \cdot \left[\sqrt{(E + 2 \cdot d_{stem\_c} + E_u)^2 + (E - E_u)^2} - (E + 2 \cdot d_{stem\_c} + E_u) \right] \cdot B$$ (formula 7.31 of Ref)

$$F_{u\_spaced} := F_{u\_continuous} + Spacing\_factor \cdot (F_{u\_isolated} - F_{u\_continuous})$$ (formula 7.35 of Ref)

Allowable ultimate horizontal force on piles at the given spacing $F_{u\_spaced} = 17.1 \cdot kN$

cf $ULF \cdot F_{perp} = 16.9 \cdot kN$ ***Hence*** $Hole\_size = "OK"$

VERTICAL POLE - CALCULATION OF REQUIRED DIAMETER

Take the depth below ground level to the point of maximum bending moment in the timber pole (as a percentage of embedment depth) as: $d_{M\_max} := 0\%$

Ultimate Limit State bending moment $M_{ult} := ULF \cdot F_{perp} \cdot (d_{stem\_c} + d_{M\_max} \cdot E)$ $M_{ult} = 11.5 \cdot kN \cdot m$

$z := \frac{M_{ult}}{phi \cdot f_{bpole} \cdot k_1 \cdot k_{20} \cdot k_{21} \cdot k_{22}}$ $z = 8.725 \times 10^{-4}\, m^3$ For a round, z=0.0982xdia^3. Thus: $diameter := \sqrt[3]{\frac{z}{0.0982}}$

Pole size required at point of max moment given by: $diameter = 207 \cdot mm$

Distance from top of pole to point of maximum moment given by $distance := H + d_{M\_max} \cdot E$

Pole diameter reduces by 6mm per metre therefore: $SED := diameter - 0.006 \cdot distance$

Minimum Pole Small End Diameter given by: $SED = 196 \cdot mm$

HORIZONTAL RAILS - CALCULATION OF REQUIRED SIZE

Working pressure at bottom rail $p_{stem\_c} = 10.8 \cdot kPa$

Ultimate moment in rail per m height (for multiple spans) $M_r := \frac{ULF \cdot p_{stem\_c} \cdot \delta^2}{10} \cdot \frac{H - 75mm}{H}$ $M_r = 1.656 \cdot \frac{kN \cdot m}{m}$

Case 1 - Sawn Timber Planks as Rails

Section Modulus required for sawn timber: $z_{sawn} := \frac{M_r}{phi \cdot f_{bsawn} \cdot k_1}$ $z_{sawn} = 4.6 \times 10^{-4}\, m^2$

Therefore minimum sawn timber plank rail thickness required given by: $sawn\_thickness := \sqrt{6 \cdot z_{sawn}}$ $sawn\_thickness = 52.5 \cdot mm$

will be OK

Check Deflection in 50mm nominal thickness rail Duration of load factor for defln $k_2 := 3$

Load on 150x50 rail $w := p_{stem\_c} \cdot 150mm$ $w = 1.62 \cdot kN \cdot m^{-1}$

Moment of Inertia for plank of 47mm actual thickness $I := \frac{150 \cdot mm \cdot (50 \cdot mm)^3}{12}$ $I = 1.563 \times 10^{-6}\, m^4$

Max rail deflection for rail continuous over two spans $\Delta := \frac{w \cdot \delta^4}{185 \cdot E_{timb} \cdot I}$ $k_2 \times \Delta = 5.3 \cdot mm$

CONCLUSION

1. ***Use poles of 200 mm Small End Diameter (small end uppermost)***
2. ***Space poles at a centre to centre spacing of*** δ ***where*** $\delta = 1000 \cdot mm$
3. ***Embed poles a distance E where*** $E_{in} = 1800 \cdot mm$ ***in a concrete filled hole of diameter B where*** $B = 400 \cdot mm$
4. ***Rails to be No 1 Framing Grade sawn timber.***
5. ***All backfill to be granular free draining material.***
6. ***Timber to be H5 treated for poles and H4 for rails.***
7. ***All workmanship to be in accordance with the Ralph Gillard Consulting Company specification titled "Specification for Timber Post & Rail Retaining Walls".***
8. ***Wall to be as Ralph Gillard Consulting Company*** DRAWING_No := "2114/S1"

1.5 HIGH TIMBER POST AND RAIL RETAINING WALL DESIGN

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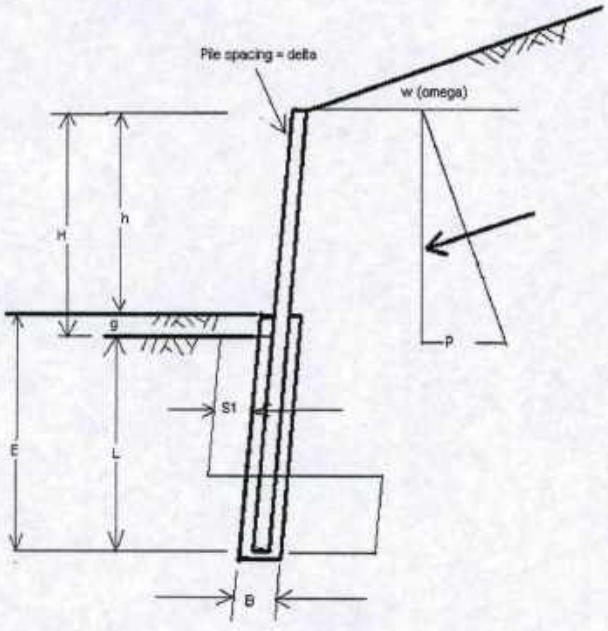
Design Method - Use earth pressures by Coulomb, and Broms (modified) for pole embedment.



PARAMETERS

Planned retained height	$h := 1.5 \cdot m$
Spacing of poles (centre-centre)	$\delta = 1\ m$
Hole diameter for embedded pole	$B = 400 \cdot mm$
Intended embedment depth	$E_{in} := 1.5m$
Embedment depth lost due to erosion etc	$g := 0mm$
Surcharge at top of wall	$Q = 5 \cdot kPa$
Backfill slope	$\omega = 15 \cdot deg$
Wall slope (negative if wall leans towards soil as shown opposite)	$\beta = -6 \cdot deg$
Density of retained soil	$\gamma = 16 \cdot kN \cdot m^{-3}$
Angle of shearing resistance	$\phi = 30 \cdot deg$
Angle of wall friction	$\delta_f = 20 \cdot deg$
Ultimate load case factor for timber design	$ULF = 1.6$

Unsupported length of pile in ground (Pg 145 of Ref suggests taking Eu = 250mm) $E_u = 250 \cdot mm$

Strength reduction factor for soil resisting overturning	$\Phi = 0.5$
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Percent of active pressures designed for: (Ref Geomechanics News Dec 93 (No 46) pg 21)	$Percent = 100 \cdot \%$

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Dry use factor (=1.25 if pole are always dry)	$k_{22} = 1$
Strength reduction factor for timber & poles	$phi = 0.8$

CALCULATIONS

$H := h + g \qquad E := E_{in} - g$

equivalent surcharge height $h_e := \frac{Q}{\gamma} \cdot \frac{\cos(\beta)}{\cos(\beta - \omega)}$ $h_e = 0.333\,m$

Pressure Coefficients by Coulomb

$$k_{a\_c} := \frac{\cos(\phi - \beta)^2}{\cos(\beta)^2 \cdot \cos(\delta_f + \beta) \cdot \left(1 + \sqrt{\frac{\sin(\phi + \delta_f) \cdot \sin(\phi - \omega)}{\cos(\delta_f + \beta) \cdot \cos(\omega - \beta)}}\right)^2}$$

angle of resulting force to horizontal $\theta_c := \delta_f + \beta$ coefficients used for design $k_c := k_{a\_c} \cdot Percent$

Pressures and Forces by Coulomb

Pressures at top & base of wall $p_{top\_c} := k_c \cdot \gamma \cdot h_e$ $p_{stem\_c} := k_c \cdot \gamma \cdot (H + h_e)$

Resultant force P $P_c := \frac{p_{top\_c} + p_{stem\_c}}{2} \cdot H \cdot \delta$ $P_{stem\_c\_hz} := P_c \cdot \cos(\theta_c)$

Force perpendicular to pole $F_{perp} := P_c \cdot \cos(\delta_f)$

Distance from base to centre of force $d_{stem\_c} := \frac{H^2 \cdot \delta}{6 \cdot P_c} \cdot (2 \cdot p_{top\_c} + p_{stem\_c})$

RESULTS OF SOIL LOADS ANALYSIS

active earth pressure coefficient	$k_{a\_c} = 0.316$
earth pressure coefficient used in design	$k_c = 0.316$
angle of resulting force to horizontal	$\theta_c = 14 \cdot deg$
distance of resultant force from base	$d_{stem\_c} = 0.577\,m$

	unfactored	**ultimate**
lateral pressure at top of wall	$p_{top\_c} = 1.69 \cdot kPa$	$ULF \cdot p_{top\_c} = 2.7 \cdot kPa$
lateral pressure at base of wall	$p_{stem\_c} = 9.3 \cdot kPa$	$ULF \cdot p_{stem\_c} = 14.9 \cdot kPa$
resulting total force	$P_c = 8.2 \cdot kN$	$ULF \cdot P_c = 13.2 \cdot kN$
horizontal component of resulting force	$P_{stem\_c\_hz} = 8 \cdot kN$	$ULF \cdot P_{stem\_c\_hz} = 12.8 \cdot kN$
component of force perpendicular to pole	$F_{perp} = 7.7 \cdot kN$	$ULF \cdot F_{perp} = 12.4 \cdot kN$

CHECK ADEQUACY OF POLE EMBEDMENT

Reference: Section 7.2 of the Course Notes of the NZ Geotechnical Society, Short Course, August 2000 "Ultimate Limit State Design of Foundations" by M J Pender

For an isolated short, free head pile in material of constant Su with depth

$$F_{u\_isolated} := 9 \cdot S_u \cdot \Phi \cdot B \cdot \left[\sqrt{(E + 2 \cdot d_{stem\_c} + E_u)^2 + (E - E_u)^2} - (E + 2 \cdot d_{stem\_c} + E_u) \right]$$ (formula 7.6 of Ref)

Allowable ultimate horizontal force on an isolated pile $F_{u\_isolated} = 18.5 \cdot kN$

load reduction due to closely spaced piles (as per B1/VM4) $Spacing\_factor := \min\left(\frac{\delta - B}{3 \cdot B} \cdot 0.75 + 0.25, 1 \right)$ $Spacing\_factor = 0.625$

$$F_{u\_continuous} := 2 \cdot S_u \cdot \Phi \cdot \left[\sqrt{(E + 2 \cdot d_{stem\_c} + E_u)^2 + (E - E_u)^2} - (E + 2 \cdot d_{stem\_c} + E_u) \right] \cdot B$$ (formula 7.31 of Ref)

$$F_{u\_spaced} := F_{u\_continuous} + Spacing\_factor \cdot (F_{u\_isolated} - F_{u\_continuous})$$ (formula 7.35 of Ref)

Allowable ultimate horizontal force on piles at the given spacing $F_{u\_spaced} = 13.1 \cdot kN$

cf $ULF \cdot F_{perp} = 12.4 \cdot kN$ ***Hence*** $Hole\_size = "OK"$

VERTICAL POLE - CALCULATION OF REQUIRED DIAMETER

Take the depth below ground level to the point of maximum bending moment in the timber pole (as a percentage of embedment depth) as: $d_{M\_max} := 0\%$

Ultimate Limit State bending moment $M_{ult} := ULF \cdot F_{perp} \cdot (d_{stem\_c} + d_{M\_max} \cdot E)$ $M_{ult} = 7.13 \cdot kN \cdot m$

$z := \frac{M_{ult}}{phi \cdot f_{bpole} \cdot k_1 \cdot k_{20} \cdot k_{21} \cdot k_{22}}$ $z = 5.41 \times 10^{-4}\, m^3$ For a round, z=0.0982xdia^3. Thus: $diameter := \sqrt[3]{\frac{z}{0.0982}}$

Pole size required at point of max moment given by: $diameter = 177 \cdot mm$

Distance from top of pole to point of maximum moment given by $distance := H + d_{M\_max} \cdot E$

Pole diameter reduces by 6mm per metre therefore: $SED := diameter - 0.006 \cdot distance$

Minimum Pole Small End Diameter given by: $SED = 168 \cdot mm$

HORIZONTAL RAILS - CALCULATION OF REQUIRED SIZE

Working pressure at bottom rail $p_{stem\_c} = 9.3 \cdot kPa$

Ultimate moment in rail per m height (for multiple spans) $M_r := \frac{ULF \cdot p_{stem\_c} \cdot \delta^2}{10}$ $M_r = 1.485 \cdot \frac{kN \cdot m}{m}$

Case 1 - Sawn Timber Planks as Rails

Section Modulus required for sawn timber: $z_{sawn} := \frac{M_r}{phi \cdot f_{bsawn} \cdot k_1}$ $z_{sawn} = 4.125 \times 10^{-4}\, m^2$

Therefore minimum sawn timber plank rail thickness required given by: $sawn\_thickness := \sqrt{6 \cdot z_{sawn}}$ $sawn\_thickness = 50 \cdot mm$

Check Deflection in 50mm nominal thickness rail Duration of load factor for defln $k_2 := 3$

Load on 150x50 rail $w := p_{stem\_c} \cdot 150mm$ $w = 1.39 \cdot kN \cdot m^{-1}$

Moment of Inertia for plank of 47mm actual thickness $I := \frac{150 \cdot mm \cdot (50 \cdot mm)^3}{12}$ $I = 1.563 \times 10^{-6}\, m^4$

Max rail deflection for rail continuous over two spans $\Delta := \frac{w \cdot \delta^4}{185 \cdot E_{timb} \cdot I}$ $k_2 \times \Delta = 4.5 \cdot mm$

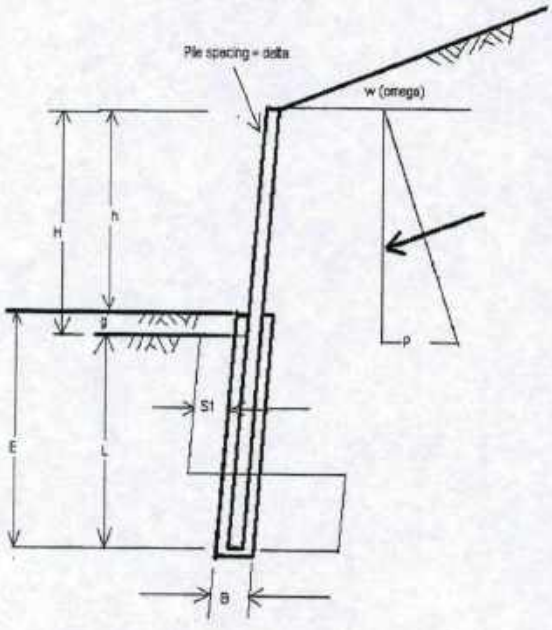
CONCLUSION

1. ***Use poles of 175 mm Small End Diameter (small end uppermost)***
2. ***Space poles at a centre to centre spacing of*** δ ***where*** $\delta = 1000 \cdot mm$
3. ***Embed poles a distance E where*** $E_{in} = 1500 \cdot mm$ ***in a concrete filled hole of diameter B where*** $B = 400 \cdot mm$
4. ***Rails to be No 1 Framing Grade sawn timber.***
5. ***All backfill to be granular free draining material.***
6. ***Timber to be H5 treated for poles and H4 for rails.***
7. ***All workmanship to be in accordance with the Ralph Gillard Consulting Company specification titled "Specification for Timber Post & Rail Retaining Walls".***
8. ***Wall to be as Ralph Gillard Consulting Company*** DRAWING_No = "2114/S1"

1.3 HIGH TIMBER POST AND RAIL RETAINING WALL DESIGN

Project = "PROPOSED LEO RYAN DWELLING AT 30 CALDERA CRESCENT, TAURANGA"

Design Method - Use earth pressures by Coulomb, and Broms (modified) for pole embedment.



PARAMETERS

Planned retained height	$h := 1.3 \cdot m$
Spacing of poles (centre-centre)	$\delta = 1\ m$
Hole diameter for embedded pole	$B = 400 \cdot mm$
Intended embedment depth	$E_{in} := 1.3m$
Embedment depth lost due to erosion etc	$g = 0 \cdot mm$
Surcharge at top of wall	$Q = 5 \cdot kPa$
Backfill slope	$\omega = 15 \cdot deg$
Wall slope (negative if wall leans towards soil as shown opposite)	$\beta = -6 \cdot deg$
Density of retained soil	$\gamma = 16 \cdot kN \cdot m^{-3}$
Angle of shearing resistance	$\phi = 30 \cdot deg$
Angle of wall friction	$\delta_f = 20 \cdot deg$
Ultimate load case factor for timber design	$ULF = 1.6$

Unsupported length of pile in ground (Pg 145 of Ref suggests taking Eu = 250mm) $E_u = 250 \cdot mm$

Strength reduction factor for soil resisting overturning	$\Phi = 0.5$
Undrained shear strength of soil resisting overturning	$S_u = 40 \cdot kPa$
Percent of active pressures designed for: (Ref Geomechanics News Dec 93 (No 46) pg 21)	$Percent = 100 \cdot \%$

Timber Properties

Characteristic stress in bending for poles	$f_{bpole} = 38 \cdot MPa$
Characteristic stress in bending for sawn timber	$f_{bsawn} = 7.5 \cdot MPa$
Modulus of Elasticity for sawn timber	$E_{timb} = 3.2 \cdot GPa$
Duration of load factor for strength	$k_1 = 0.6$
Shaving factor	$k_{20} = 0.85$
Steaming factor	$k_{21} = 0.85$
Dry use factor (=1.25 if pole are always dry)	$k_{22} = 1$
Strength reduction factor for timber & poles	$phi = 0.8$

CALCULATIONS

$H := h + g \qquad E := E_{in} - g$

equivalent surcharge height $h_e := \frac{Q}{\gamma} \cdot \frac{\cos(\beta)}{\cos(\beta - \omega)}$ $h_e = 0.333\,m$

Pressure Coefficients by Coulomb

$$k_{a\_c} := \frac{\cos(\phi - \beta)^2}{\cos(\beta)^2 \cdot \cos(\delta_f + \beta) \cdot \left(1 + \sqrt{\frac{\sin(\phi + \delta_f) \cdot \sin(\phi - \omega)}{\cos(\delta_f + \beta) \cdot \cos(\omega - \beta)}}\right)^2}$$

angle of resulting force to horizontal $\theta_c := \delta_f + \beta$ coefficients used for design $k_c := k_{a\_c} \cdot Percent$

Pressures and Forces by Coulomb

Pressures at top & base of wall $p_{top\_c} := k_c \cdot \gamma \cdot h_e$ $p_{stem\_c} := k_c \cdot \gamma \cdot (H + h_e)$

Resultant force P $P_c := \frac{p_{top\_c} + p_{stem\_c}}{2} \cdot H \cdot \delta$ $P_{stem\_c\_hz} := P_c \cdot \cos(\theta_c)$

Force perpendicular to pole $F_{perp} := P_c \cdot \cos(\delta_f)$

Distance from base to centre of force $d_{stem\_c} := \frac{H^2 \cdot \delta}{6 \cdot P_c} \cdot (2 \cdot p_{top\_c} + p_{stem\_c})$

RESULTS OF SOIL LOADS ANALYSIS

active earth pressure coefficient	$k_{a\_c} = 0.316$
earth pressure coefficient used in design	$k_c = 0.316$
angle of resulting force to horizontal	$\theta_c = 14 \cdot deg$
distance of resultant force from base	$d_{stem\_c} = 0.507\,m$

	unfactored	**ultimate**
lateral pressure at top of wall	$p_{top\_c} = 1.69 \cdot kPa$	$ULF \cdot p_{top\_c} = 2.7 \cdot kPa$
lateral pressure at base of wall	$p_{stem\_c} = 8.3 \cdot kPa$	$ULF \cdot p_{stem\_c} = 13.2 \cdot kPa$
resulting total force	$P_c = 6.5 \cdot kN$	$ULF \cdot P_c = 10.4 \cdot kN$
horizontal component of resulting force	$P_{stem\_c\_hz} = 6.3 \cdot kN$	$ULF \cdot P_{stem\_c\_hz} = 10 \cdot kN$
component of force perpendicular to pole	$F_{perp} = 6.1 \cdot kN$	$ULF \cdot F_{perp} = 9.7 \cdot kN$

CHECK ADEQUACY OF POLE EMBEDMENT

Reference: Section 7.2 of the Course Notes of the NZ Geotechnical Society, Short Course, August 2000 "Ultimate Limit State Design of Foundations" by M J Pender

For an isolated short, free head pile in material of constant Su with depth

$$F_{u\_isolated} := 9 \cdot S_u \cdot \Phi \cdot B \cdot \left[\sqrt{(E + 2 \cdot d_{stem\_c} + E_u)^2 + (E - E_u)^2} - (E + 2 \cdot d_{stem\_c} + E_u) \right]$$ (formula 7.6 of Ref)

Allowable ultimate horizontal force on an isolated pile $F_{u\_isolated} = 14.9 \cdot kN$

load reduction due to closely spaced piles (as per B1/VM4) $Spacing\_factor := \min\left(\frac{\delta - B}{3 \cdot B} \cdot 0.75 + 0.25, 1 \right)$ $Spacing\_factor = 0.625$

$$F_{u\_continuous} := 2 \cdot S_u \cdot \Phi \cdot \left[\sqrt{(E + 2 \cdot d_{stem\_c} + E_u)^2 + (E - E_u)^2} - (E + 2 \cdot d_{stem\_c} + E_u) \right] \cdot B$$ (formula 7.31 of Ref)

$$F_{u\_spaced} := F_{u\_continuous} + Spacing\_factor \cdot (F_{u\_isolated} - F_{u\_continuous})$$ (formula 7.35 of Ref)

Allowable ultimate horizontal force on piles at the given spacing $F_{u\_spaced} = 10.5 \cdot kN$

cf $ULF \cdot F_{perp} = 9.7 \cdot kN$ ***Hence*** $Hole\_size = "OK"$

VERTICAL POLE - CALCULATION OF REQUIRED DIAMETER

Take the depth below ground level to the point of maximum bending moment in the timber pole (as a percentage of embedment depth) as: $d_{M\_max} := 0\%$

Ultimate Limit State bending moment $M_{ult} := ULF \cdot F_{perp} \cdot (d_{stem\_c} + d_{M\_max} \cdot E)$ $M_{ult} = 4.93 \cdot kN \cdot m$

$z := \frac{M_{ult}}{phi \cdot f_{bpole} \cdot k_1 \cdot k_{20} \cdot k_{21} \cdot k_{22}}$ $z = 3.738 \times 10^{-4}\, m^3$ For a round, z=0.0982xdia^3. Thus: $diameter := \sqrt[3]{\frac{z}{0.0982}}$

Pole size required at point of max moment given by: $diameter = 156 \cdot mm$

Distance from top of pole to point of maximum moment given by $distance := H + d_{M\_max} \cdot E$

Pole diameter reduces by 6mm per metre therefore: $SED := diameter - 0.006 \cdot distance$

Minimum Pole Small End Diameter given by: $SED = 148 \cdot mm$

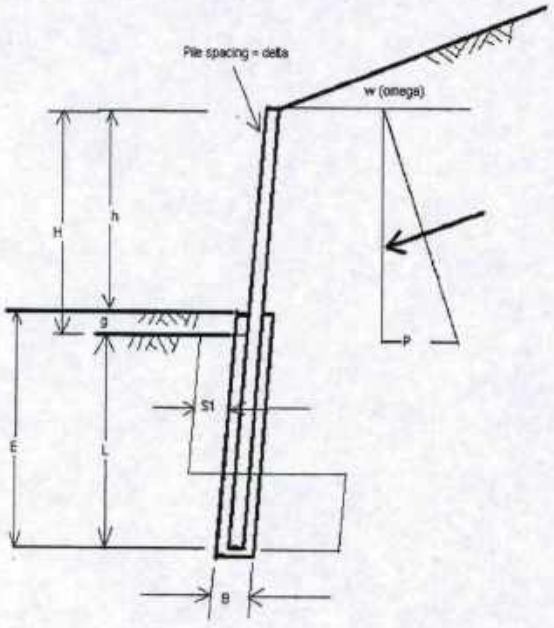
CONCLUSION

1. ***Use poles of 150 mm Small End Diameter (small end uppermost)***
2. ***Space poles at a centre to centre spacing of*** δ ***where*** $\delta = 1000 \cdot mm$
3. ***Embed poles a distance E where*** $E_{in} = 1300 \cdot mm$ ***in a concrete filled hole of diameter B where*** $B = 400 \cdot mm$
4. ***Rails to be No 1 Framing Grade sawn timber.***
5. ***All backfill to be granular free draining material.***
6. ***Timber poles to be H5 treated. Rails to be H4 or H5***
7. ***All workmanship to be in accordance with the Ralph Gillard Consulting Company specification titled "Specification for Timber Post & Rail Retaining Walls".***
8. ***Wall to be as Ralph Gillard Consulting Company*** DRAWING_No = "2114/S1"

1.0 HIGH TIMBER POST AND RAIL RETAINING WALL DESIGN

Project = "PROPOSED LEO RYAN DWELLING AT 30 CALDERA CRESCENT, TAURANGA"

Design Method - Use earth pressures by Coulomb, and Broms (modified) for pole embedment.



PARAMETERS

Planned retained height	$h := 1.0 \cdot m$
Spacing of poles (centre-centre)	$\delta = 1\ m$
Hole diameter for embedded pole	$B = 400 \cdot mm$
Intended embedment depth	$E_{in} := 1.0m$
Embedment depth lost due to erosion etc	$g = 0 \cdot mm$
Surcharge at top of wall	$Q = 5 \cdot kPa$
Backfill slope	$\omega = 15 \cdot deg$
Wall slope (negative if wall leans towards soil as shown opposite)	$\beta = -6 \cdot deg$
Density of retained soil	$\gamma = 16 \cdot kN \cdot m^{-3}$
Angle of shearing resistance	$\phi = 30 \cdot deg$
Angle of wall friction	$\delta_f = 20 \cdot deg$
Ultimate load case factor for timber design	$ULF = 1.6$

Unsupported length of pile in ground (Pg 145 of Ref suggests taking Eu = 250mm) $E_u = 250 \cdot mm$

Strength reduction factor for soil resisting overturning	$\Phi = 0.5$
Undrained shear strength of soil resisting overturning	$S_u = 40 \cdot kPa$
Percent of active pressures designed for: (Ref Geomechanics News Dec 93 (No 46) pg 21)	$Percent = 100 \cdot \%$

Timber Properties

Characteristic stress in bending for poles	$f_{bpole} = 38 \cdot MPa$
Characteristic stress in bending for sawn timber	$f_{bsawn} = 7.5 \cdot MPa$
Modulus of Elasticity for sawn timber	$E_{timb} = 3.2 \cdot GPa$
Duration of load factor for strength	$k_1 = 0.6$
Shaving factor	$k_{20} = 0.85$
Steaming factor	$k_{21} = 0.85$
Dry use factor (=1.25 if pole are always dry)	$k_{22} = 1$
Strength reduction factor for timber & poles	$phi = 0.8$

CALCULATIONS

$H := h + g \qquad E := E_{in} - g$

equivalent surcharge height $h_e := \frac{Q}{\gamma} \cdot \frac{\cos(\beta)}{\cos(\beta - \omega)}$ $h_e = 0.333\,m$

Pressure Coefficients by Coulomb

$$k_{a\_c} := \frac{\cos(\phi - \beta)^2}{\cos(\beta)^2 \cdot \cos(\delta_f + \beta) \cdot \left(1 + \sqrt{\frac{\sin(\phi + \delta_f) \cdot \sin(\phi - \omega)}{\cos(\delta_f + \beta) \cdot \cos(\omega - \beta)}}\right)^2}$$

angle of resulting force to horizontal $\theta_c := \delta_f + \beta$ coefficients used for design $k_c := k_{a\_c} \cdot Percent$

Pressures and Forces by Coulomb

Pressures at top & base of wall $p_{top\_c} := k_c \cdot \gamma \cdot h_e$ $p_{stem\_c} := k_c \cdot \gamma \cdot (H + h_e)$

Resultant force P $P_c := \frac{p_{top\_c} + p_{stem\_c}}{2} \cdot H \cdot \delta$ $P_{stem\_c\_hz} := P_c \cdot \cos(\theta_c)$

Force perpendicular to pole $F_{perp} := P_c \cdot \cos(\delta_f)$

Distance from base to centre of force $d_{stem\_c} := \frac{H^2 \cdot \delta}{6 \cdot P_c} \cdot (2 \cdot p_{top\_c} + p_{stem\_c})$

RESULTS OF SOIL LOADS ANALYSIS

active earth pressure coefficient	$k_{a\_c} = 0.316$
earth pressure coefficient used in design	$k_c = 0.316$
angle of resulting force to horizontal	$\theta_c = 14 \cdot deg$
distance of resultant force from base	$d_{stem\_c} = 0.4\,m$

	unfactored	**ultimate**
lateral pressure at top of wall	$p_{top\_c} = 1.69 \cdot kPa$	$ULF \cdot p_{top\_c} = 2.7 \cdot kPa$
lateral pressure at base of wall	$p_{stem\_c} = 6.7 \cdot kPa$	$ULF \cdot p_{stem\_c} = 10.8 \cdot kPa$
resulting total force	$P_c = 4.2 \cdot kN$	$ULF \cdot P_c = 6.7 \cdot kN$
horizontal component of resulting force	$P_{stem\_c\_hz} = 4.1 \cdot kN$	$ULF \cdot P_{stem\_c\_hz} = 6.5 \cdot kN$
component of force perpendicular to pole	$F_{perp} = 4 \cdot kN$	$ULF \cdot F_{perp} = 6.3 \cdot kN$

CHECK ADEQUACY OF POLE EMBEDMENT

Reference: Section 7.2 of the Course Notes of the NZ Geotechnical Society, Short Course, August 2000 "Ultimate Limit State Design of Foundations" by M J Pender

For an isolated short, free head pile in material of constant Su with depth

$$F_{u\_isolated} := 9 \cdot S_u \cdot \Phi \cdot B \cdot \left[\sqrt{(E + 2 \cdot d_{stem\_c} + E_u)^2 + (E - E_u)^2} - (E + 2 \cdot d_{stem\_c} + E_u) \right]$$ (formula 7.6 of Ref)

Allowable ultimate horizontal force on an isolated pile $F_{u\_isolated} = 9.6 \cdot kN$

load reduction due to closely spaced piles (as per B1/VM4) $Spacing\_factor := \min\left(\frac{\delta - B}{3 \cdot B} \cdot 0.75 + 0.25, 1\right)$ $Spacing\_factor = 0.625$

$$F_{u\_continuous} := 2 \cdot S_u \cdot \Phi \cdot \left[\sqrt{(E + 2 \cdot d_{stem\_c} + E_u)^2 + (E - E_u)^2} - (E + 2 \cdot d_{stem\_c} + E_u) \right] \cdot B$$ (formula 7.31 of Ref)

$$F_{u\_spaced} := F_{u\_continuous} + Spacing\_factor \cdot (F_{u\_isolated} - F_{u\_continuous})$$ (formula 7.35 of Ref)

Allowable ultimate horizontal force on piles at the given spacing $F_{u\_spaced} = 6.8 \cdot kN$

cf $ULF \cdot F_{perp} = 6.3 \cdot kN$ ***Hence*** $Hole\_size = "OK"$

VERTICAL POLE - CALCULATION OF REQUIRED DIAMETER

Take the depth below ground level to the point of maximum bending moment in the timber pole (as a percentage of embedment depth) as: $d_{M\_max} := 0\%$

Ultimate Limit State bending moment $M_{ult} := ULF \cdot F_{perp} \cdot (d_{stem\_c} + d_{M\_max} \cdot E)$ $M_{ult} = 2.53 \cdot kN \cdot m$

$z := \frac{M_{ult}}{phi \cdot f_{bpole} \cdot k_1 \cdot k_{20} \cdot k_{21} \cdot k_{22}}$ $z = 1.923 \times 10^{-4}\, m^3$ For a round, z=0.0982xdia^3. Thus: $diameter := \sqrt[3]{\frac{z}{0.0982}}$

Pole size required at point of max moment given by: $diameter = 125 \cdot mm$

Distance from top of pole to point of maximum moment given by $distance := H + d_{M\_max} \cdot E$

Pole diameter reduces by 6mm per metre therefore: $SED := diameter - 0.006 \cdot distance$

Minimum Pole Small End Diameter given by: $SED = 119 \cdot mm$

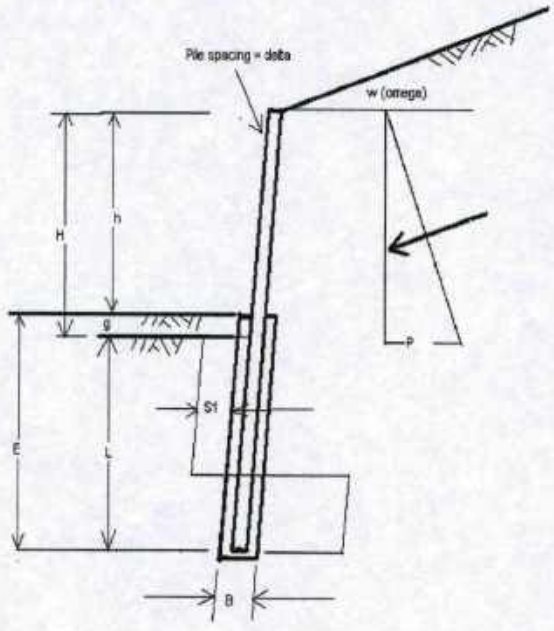
CONCLUSION

1. ***Use poles of 125 mm Small End Diameter (small end uppermost)***
2. ***Space poles at a centre to centre spacing of*** δ ***where*** $\delta = 1000 \cdot mm$
3. ***Embed poles a distance E where*** $E_{in} = 1000 \cdot mm$ ***in a concrete filled hole of diameter B where*** $B = 400 \cdot mm$
4. ***Rails to be No 1 Framing Grade sawn timber.***
5. ***All backfill to be granular free draining material.***
6. ***Timber poles to be H5 treated. Rails to be H4 or H5***
7. ***All workmanship to be in accordance with the Ralph Gillard Consulting Company specification titled "Specification for Timber Post & Rail Retaining Walls".***
8. ***Wall to be as Ralph Gillard Consulting Company*** DRAWING_No = "2114/S1"

750mm HIGH TIMBER POST AND RAIL RETAINING WALL DESIGN

Project = "PROPOSED LEO RYAN DWELLING AT 30 CALDERA CRESCENT, TAURANGA"

Design Method - Use earth pressures by Coulomb, and Broms (modified) for pole embedment.



PARAMETERS

Planned retained height	$h := 0.75 \cdot m$
Spacing of poles (centre-centre)	$\delta = 1\ m$
Hole diameter for embedded pole	$B = 400 \cdot mm$
Intended embedment depth	$E_{in} := 0.8m$
Embedment depth lost due to erosion etc	$g = 0 \cdot mm$
Surcharge at top of wall	$Q = 5 \cdot kPa$
Backfill slope	$\omega = 15 \cdot deg$
Wall slope (negative if wall leans towards soil as shown opposite)	$\beta = -6 \cdot deg$
Density of retained soil	$\gamma = 16 \cdot kN \cdot m^{-3}$
Angle of shearing resistance	$\phi = 30 \cdot deg$
Angle of wall friction	$\delta_f = 20 \cdot deg$
Ultimate load case factor for timber design	$ULF = 1.6$

Unsupported length of pile in ground (Pg 145 of Ref suggests taking Eu = 250mm) $E_u = 250 \cdot mm$

Strength reduction factor for soil resisting overturning	$\Phi = 0.5$
Undrained shear strength of soil resisting overturning	$S_u = 40 \cdot kPa$
Percent of active pressures designed for: (Ref Geomechanics News Dec 93 (No 46) pg 21)	$Percent = 100 \cdot \%$

Timber Properties

Characteristic stress in bending for poles	$f_{bpole} = 38 \cdot MPa$
Characteristic stress in bending for sawn timber	$f_{bsawn} = 7.5 \cdot MPa$
Modulus of Elasticity for sawn timber	$E_{timb} = 3.2 \cdot GPa$
Duration of load factor for strength	$k_1 = 0.6$
Shaving factor	$k_{20} = 0.85$
Steaming factor	$k_{21} = 0.85$
Dry use factor (=1.25 if pole are always dry)	$k_{22} = 1$
Strength reduction factor for timber & poles	$phi = 0.8$

CALCULATIONS

$H := h + g \qquad E := E_{in} - g$

equivalent surcharge height $h_e := \frac{Q}{\gamma} \cdot \frac{\cos(\beta)}{\cos(\beta - \omega)}$ $h_e = 0.333\,m$

Pressure Coefficients by Coulomb

$$k_{a\_c} := \frac{\cos(\phi - \beta)^2}{\cos(\beta)^2 \cdot \cos(\delta_f + \beta) \cdot \left(1 + \sqrt{\frac{\sin(\phi + \delta_f) \cdot \sin(\phi - \omega)}{\cos(\delta_f + \beta) \cdot \cos(\omega - \beta)}}\right)^2}$$

angle of resulting force to horizontal $\theta_c := \delta_f + \beta$ coefficients used for design $k_c := k_{a\_c} \cdot Percent$

Pressures and Forces by Coulomb

Pressures at top & base of wall $p_{top\_c} := k_c \cdot \gamma \cdot h_e$ $p_{stem\_c} := k_c \cdot \gamma \cdot (H + h_e)$

Resultant force P $P_c := \frac{p_{top\_c} + p_{stem\_c}}{2} \cdot H \cdot \delta$ $P_{stem\_c\_hz} := P_c \cdot \cos(\theta_c)$

Force perpendicular to pole $F_{perp} := P_c \cdot \cos(\delta_f)$

Distance from base to centre of force $d_{stem\_c} := \frac{H^2 \cdot \delta}{6 \cdot P_c} \cdot (2 \cdot p_{top\_c} + p_{stem\_c})$

RESULTS OF SOIL LOADS ANALYSIS

active earth pressure coefficient	$k_{a\_c} = 0.316$
earth pressure coefficient used in design	$k_c = 0.316$
angle of resulting force to horizontal	$\theta_c = 14 \cdot deg$
distance of resultant force from base	$d_{stem\_c} = 0.309\,m$

	unfactored	**ultimate**
lateral pressure at top of wall	$p_{top\_c} = 1.69 \cdot kPa$	$ULF \cdot p_{top\_c} = 2.7 \cdot kPa$
lateral pressure at base of wall	$p_{stem\_c} = 5.5 \cdot kPa$	$ULF \cdot p_{stem\_c} = 8.8 \cdot kPa$
resulting total force	$P_c = 2.7 \cdot kN$	$ULF \cdot P_c = 4.3 \cdot kN$
horizontal component of resulting force	$P_{stem\_c\_hz} = 2.6 \cdot kN$	$ULF \cdot P_{stem\_c\_hz} = 4.2 \cdot kN$
component of force perpendicular to pole	$F_{perp} = 2.5 \cdot kN$	$ULF \cdot F_{perp} = 4 \cdot kN$

CHECK ADEQUACY OF POLE EMBEDMENT

Reference: Section 7.2 of the Course Notes of the NZ Geotechnical Society, Short Course, August 2000 "Ultimate Limit State Design of Foundations" by M J Pender

For an isolated short, free head pile in material of constant Su with depth

$$F_{u\_isolated} := 9 \cdot S_u \cdot \Phi \cdot B \cdot \left[\sqrt{(E + 2 \cdot d_{stem\_c} + E_u)^2 + (E - E_u)^2} - (E + 2 \cdot d_{stem\_c} + E_u) \right]$$ (formula 7.6 of Ref)

Allowable ultimate horizontal force on an isolated pile $F_{u\_isolated} = 6.4 \cdot kN$

load reduction due to closely spaced piles (as per B1/VM4) $Spacing\_factor := \min\left(\frac{\delta - B}{3 \cdot B} \cdot 0.75 + 0.25, 1 \right)$ $Spacing\_factor = 0.625$

$$F_{u\_continuous} := 2 \cdot S_u \cdot \Phi \cdot \left[\sqrt{(E + 2 \cdot d_{stem\_c} + E_u)^2 + (E - E_u)^2} - (E + 2 \cdot d_{stem\_c} + E_u) \right] \cdot B$$ (formula 7.31 of Ref)

$$F_{u\_spaced} := F_{u\_continuous} + Spacing\_factor \cdot (F_{u\_isolated} - F_{u\_continuous})$$ (formula 7.35 of Ref)

Allowable ultimate horizontal force on piles at the given spacing $F_{u\_spaced} = 4.5 \cdot kN$

cf $ULF \cdot F_{perp} = 4 \cdot kN$ ***Hence*** $Hole\_size = "OK"$

VERTICAL POLE - CALCULATION OF REQUIRED DIAMETER

Take the depth below ground level to the point of maximum bending moment in the timber pole (as a percentage of embedment depth) as: $d_{M\_max} := 0\%$

Ultimate Limit State bending moment $M_{ult} := ULF \cdot F_{perp} \cdot (d_{stem\_c} + d_{M\_max} \cdot E)$ $M_{ult} = 1.25 \cdot kN \cdot m$

$z := \frac{M_{ult}}{phi \cdot f_{bpole} \cdot k_1 \cdot k_{20} \cdot k_{21} \cdot k_{22}}$ $z = 9.465 \times 10^{-5}\, m^3$ For a round, z=0.0982xdia^3. Thus: $diameter := \sqrt[3]{\frac{z}{0.0982}}$

Pole size required at point of max moment given by: $diameter = 99 \cdot mm$

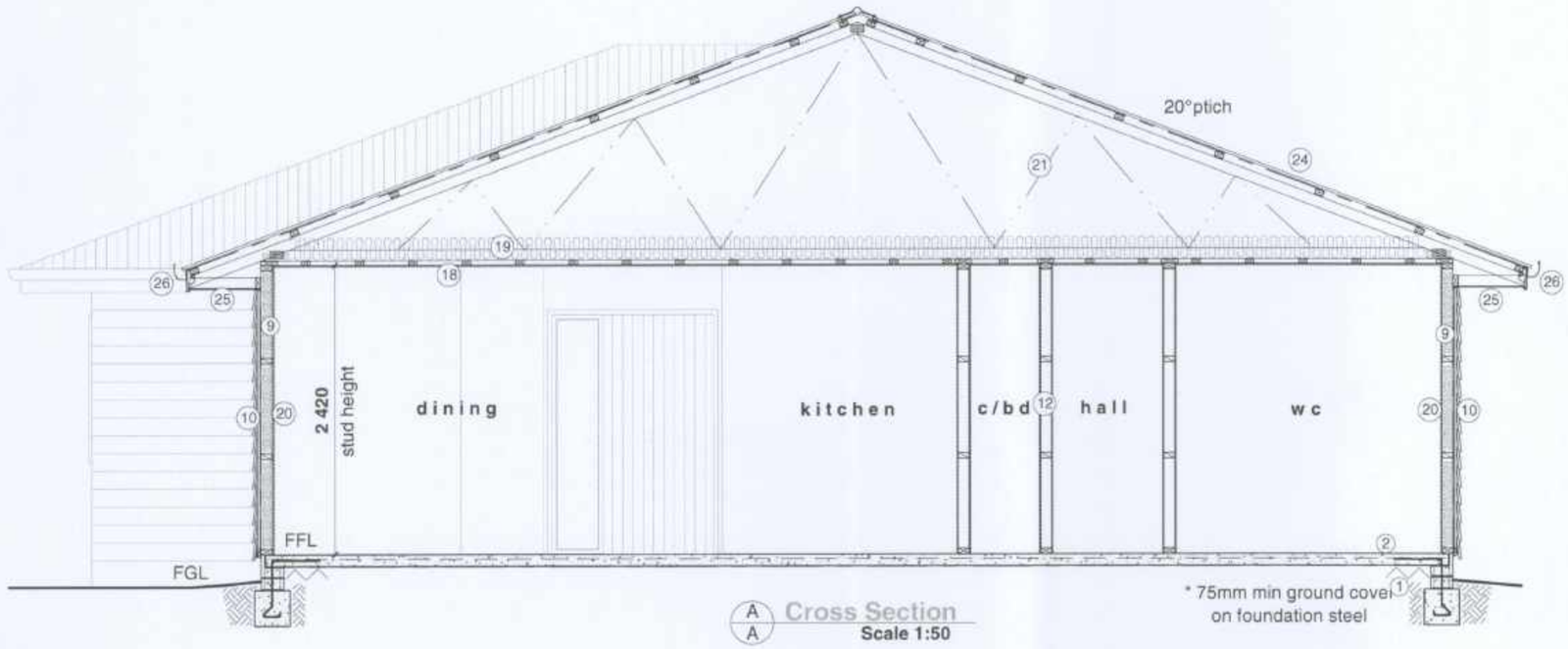
Distance from top of pole to point of maximum moment given by $distance := H + d_{M\_max} \cdot E$

Pole diameter reduces by 6mm per metre therefore: $SED := diameter - 0.006 \cdot distance$

Minimum Pole Small End Diameter given by: $SED = 94 \cdot mm$

CONCLUSION

1. ***Use poles of 100 mm Small End Diameter (small end uppermost)***
2. ***Space poles at a centre to centre spacing of*** δ ***where*** $\delta = 1000 \cdot mm$
3. ***Embed poles a distance E where*** $E_{in} = 800 \cdot mm$ ***in a concrete filled hole of diameter B where*** $B = 400 \cdot mm$
4. ***Rails to be No 1 Framing Grade sawn timber.***
5. ***All backfill to be granular free draining material.***
6. ***Timber poles to be H5 treated. Rails to be H4 or H5***
7. ***All workmanship to be in accordance with the Ralph Gillard Consulting Company specification titled "Specification for Timber Post & Rail Retaining Walls".***
8. ***Wall to be as Ralph Gillard Consulting Company*** DRAWING_No = "2114/S1"



A Cross Section
A Scale 1:50

Engineered fill to Kirk Roberts Consulting Engineers design - engineer design to take precidence if any discrepancies occur.

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

Fixings & Fastenings (excludes nails and screws):
Nail Plates - In 'closed' & 'roof space' environments - continuously coated galv. steel
Wire Dogs & Bolts - In 'closed' & 'roof space' environments - hot-dip galv. steel
All other structural fixings - In 'closed' environments - mild steel (uncoated, non-galvanized)
All other structural fixings (except fabricated brackets (1))
- In sheltered environments - hot-dip galv. steel
- In exposed environments - type 304 stainless steel (2)

*1. - "fabricated brackets" shall be made from 5mm (minimum thickness) mild steel and shall be hot-dip galv.

Nails & screws used for framing & cladding:
Structural cladding acting as bracing (50 year durability) - galv. steel (2)
Non-structural cladding (15 year durability) - galv. steel (2)
Framing in 'closed' areas including roof spaces - mild steel (3)
Framing in 'exposed or sheltered' areas - galv. steel (3)

*2. - where cladding is a corrosive timber, such as western red cedar or redwood, or is treated with copper based ACQ or CuAz preservatives, use type 304 stainless steel or silicon bronze
*3. - steel fixings and fastenings in contacts with timber treated with copper-based timber preservatives (H3.2 or higher) shall be minimum of type 304 stainless steel (exposed and Sheltered environments), and hot-dip galv. steel (all other locations)

Minimum concrete strength after 28 days shall be:
(a) 10 MPa for unreinforced concrete in mass foundations
(b) 17.5 MPa for unreinforced concrete applications & for reinforced concrete not exposed to weather
(c) 20 MPa for reinforced concrete exposed to weather

Concrete Masonry:
(a) comply with the provisions of NZS 4210
(b) Minimum cover to steel reinforcement from an uncoated masonry external face 50mm
(c) Minimum grout strength 20MPa

NZBC:EXTERNAL MOISTURE — Acceptable Solution E2/AS1

Table 2: Building Envelope Risk Matrix
Paragraph 3.1.2, Figure 1

	RISK SEVERITY				
Risk Factor	**LOW**	**MEDIUM**	**HIGH**	**VERY HIGH**	**Subtotals for each Risk Factor**
Wind zone (per NZS:3604)	0	0	(1)	2	*1*
Number of storeys	(0)	1	2	4	*0*
Roof/Wall intersection design	(0)	1	3	5	*0*
Eaves width	0	1	(2)	5	*2*
Envelope complexity	0	(1)	3	6	*1*
Deck design	(0)	2	4	6	*0*
NOTE: Risk score shown is the highest risk score for all elevations & all claddings.				Total Risk score:	(4)

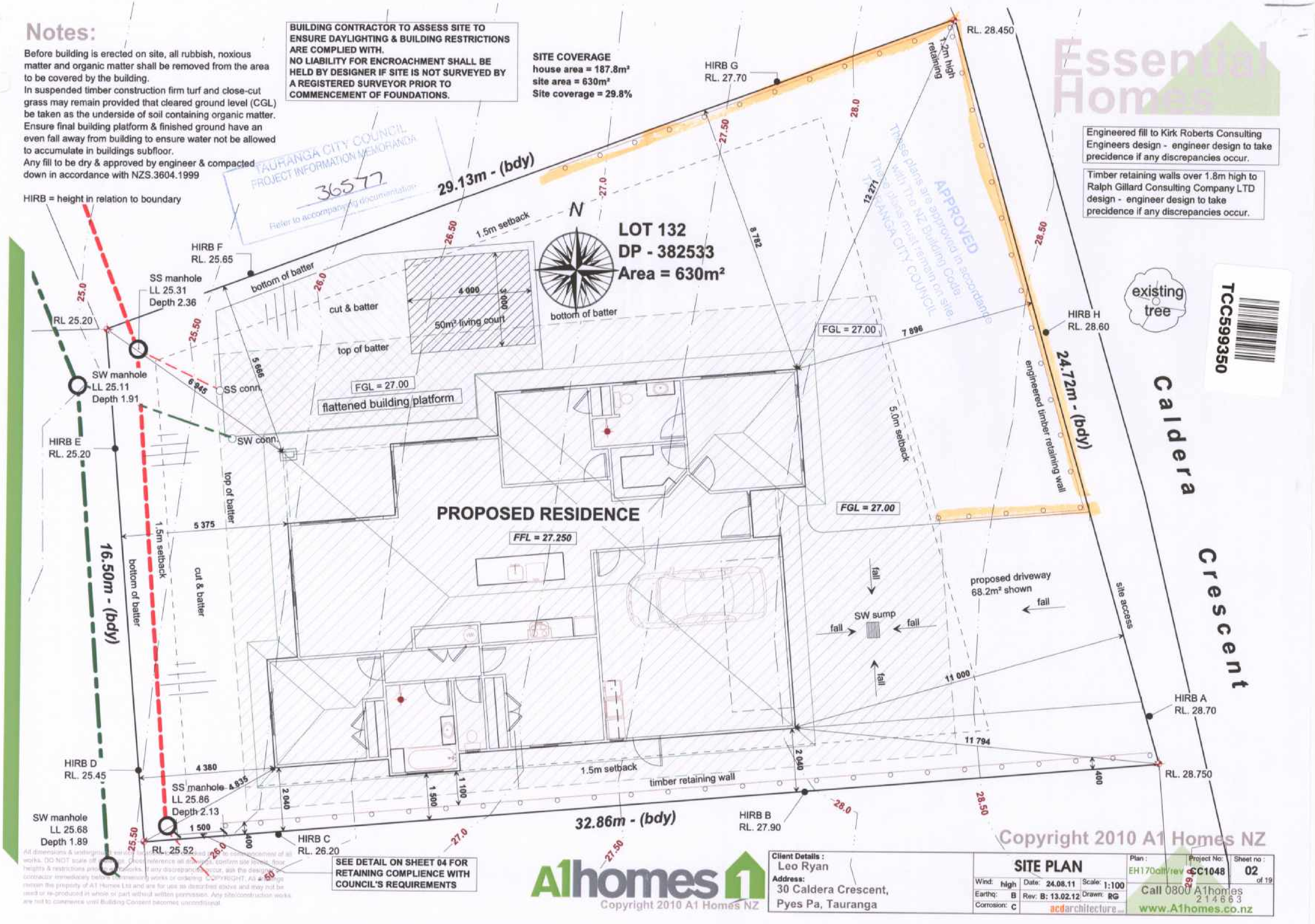
Essential Homes

TCC495418

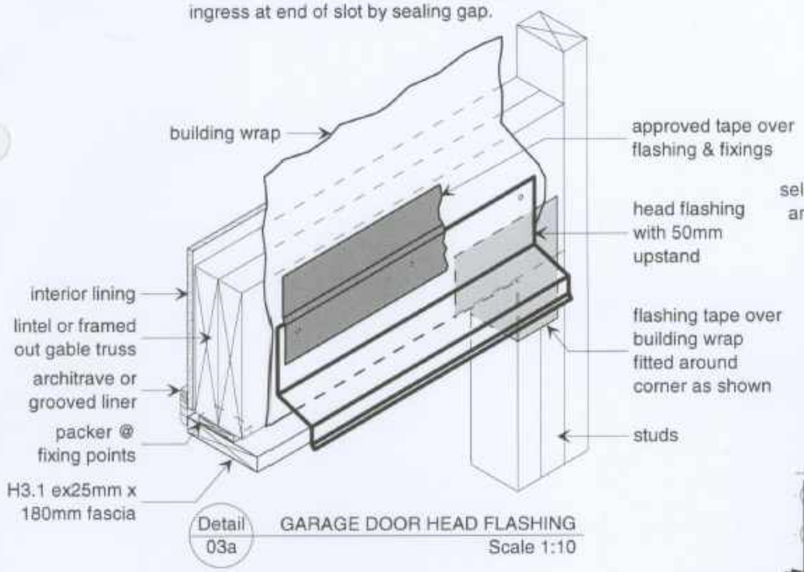
APPROVED
These plans are approved in accordance with The NZ Building Code.
These plans must remain on site.
TAURANGA CITY COUNCIL

A1homes

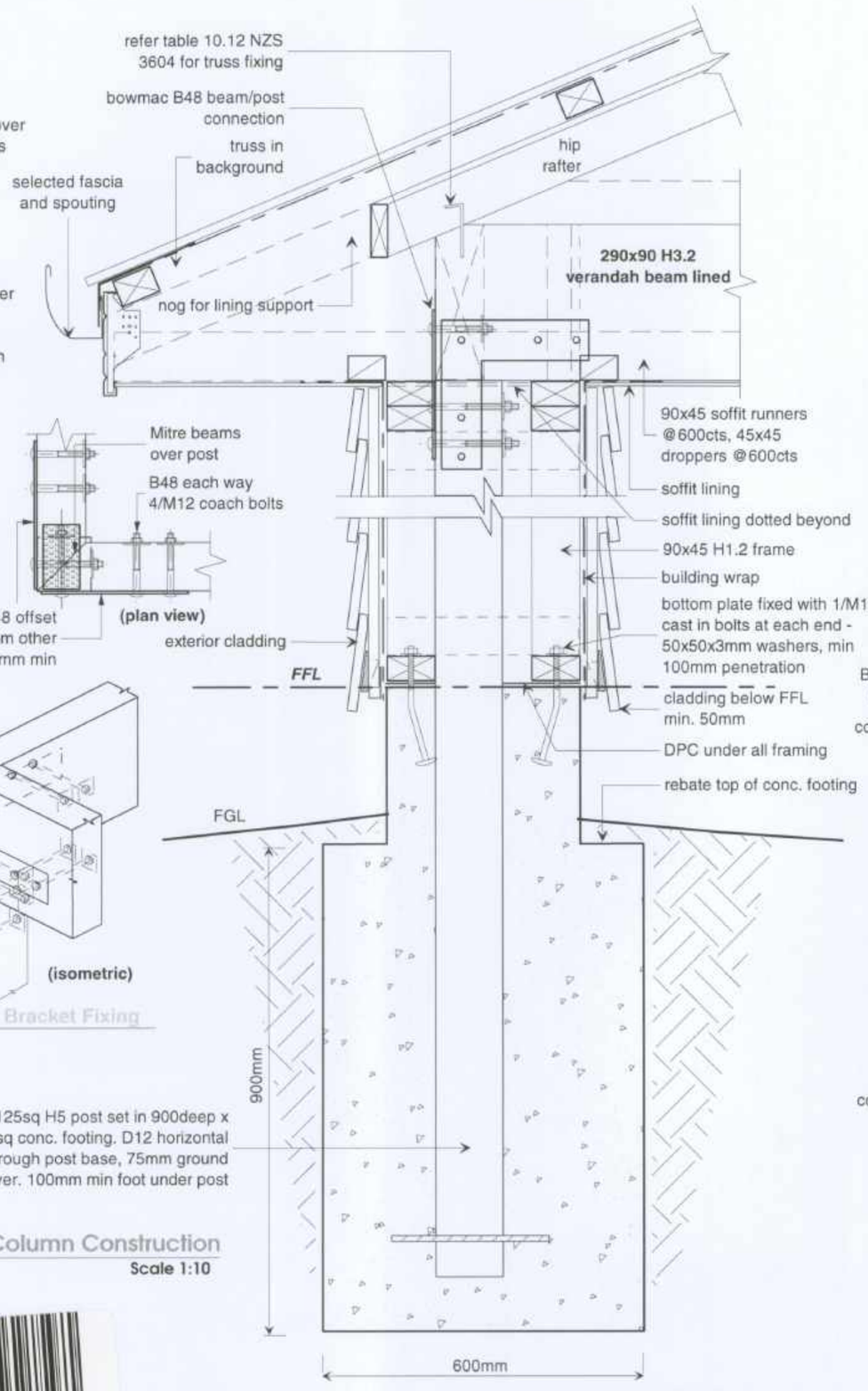
Client Details : Leo Ryan Address: 30 Caldera Crescent, Pyes Pa, Tauranga	CROSS SECTION & RISK MATRIX			Plan : EH170all/rev	Project No: CC1048
	Wind: high	Date: 24.08.11	Scale: as shown		Sheet no : 12 of 19
	Earthq: B	Rev:	Drawn: RG	Call 0800 A1homes 214663 www.A1homes.co.nz	
	Corrosion: C				


Notes:
Before building is erected on site, all rubbish, noxious matter and organic matter shall be removed from the area to be covered by the building.
In suspended timber construction firm turf and close-cut grass may remain provided that cleared ground level (CGL) be taken as the underside of soil containing organic matter.
Ensure final building platform & finished ground have an even fall away from building to ensure water not be allowed to accumulate in buildings subfloor.
Any fill to be dry & approved by engineer & compacted down in accordance with NZS.3604.1999
HIRB = height in relation to boundary
BUILDING CONTRACTOR TO ASSESS SITE TO ENSURE DAYLIGHTING & BUILDING RESTRICTIONS ARE COMPLIED WITH.
NO LIABILITY FOR ENCROACHMENT SHALL BE HELD BY DESIGNER IF SITE IS NOT SURVEYED BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF FOUNDATIONS.
SITE COVERAGE
house area = 187.8m²
site area = 630m²
Site coverage = 29.8%
TAURANGA CITY COUNCIL
PROJECT INFORMATION MEMORANDA
36577
Refer to accompanying documentation
APPROVED
These plans are approved in accordance with The NZ Building Code.
These plans must remain on site.
TAURANGA CITY COUNCIL
Essential Homes
Engineered fill to Kirk Roberts Consulting Engineers design - engineer design to take precidence if any discrepancies occur.
Timber retaining walls over 1.8m high to Ralph Gillard Consulting Company LTD design - engineer design to take precidence if any discrepancies occur.
TCC599350
LOT 132
DP - 382533
Area = 630m²
N
29.13m - (bdy)
24.72m - (bdy)
16.50m - (bdy)
32.86m - (bdy)
RL. 28.450
RL 25.20
RL. 28.750
RL. 25.52
HIRB G RL. 27.70
HIRB F RL. 25.65
HIRB E RL. 25.20
HIRB D RL. 25.45
HIRB C RL. 26.20
HIRB B RL. 27.90
HIRB A RL. 28.70
HIRB H RL. 28.60
SS manhole LL 25.31 Depth 2.36
SW manhole LL 25.11 Depth 1.91
SS manhole LL 25.86 Depth 2.13
SW manhole LL 25.68 Depth 1.89
SS conn.
SW conn.
1.2m high retaining
1.5m setback
5.0m setback
bottom of batter
top of batter
cut & batter
50m² living court
FGL = 27.00
flattened building platform
PROPOSED RESIDENCE
FFL = 27.250
engineered timber retaining wall
timber retaining wall
existing tree
proposed driveway 68.2m² shown
SW sump
fall
site access
Caldera Crescent
SEE DETAIL ON SHEET 04 FOR RETAINING COMPLIENCE WITH COUNCIL'S REQUIREMENTS
A1homes
Copyright 2010 A1 Homes NZ
Client Details : Leo Ryan
Address: 30 Caldera Crescent, Pyes Pa, Tauranga
SITE PLAN
Wind: high
Earthq: B
Corrosion: C
Date: 24.08.11
Rev: B: 13.02.12
Scale: 1:100
Drawn: RG
Plan: EH170alt/rev 4
Project No: CC1048
Sheet no: 02 of 19
Call 0800 A1homes 214663
www.A1homes.co.nz

NOTE: accurate slot to be cut in cladding to enable fit around head flashing. Prevent moisture ingress at end of slot by sealing gap.



Detail 03a — GARAGE DOOR HEAD FLASHING
Scale 1:10



detail 12 — FLITCH BEAM CONNECTION
Scale 1:10

detail - — Bracket Fixing

125sq H5 post set in 900deep x 600sq conc. footing. D12 horizontal through post base, 75mm ground cover. 100mm min foot under post

detail 11a — Patio Column Construction
Scale 1:10

detail - — METER BOX DETAIL
Scale 1:5

Essential Homes

APPROVED
These plans are approved in accordance with The NZ Building Code.
These plans must remain on site.
TAURANGA CITY COUNCIL

TCC495420

A1homes

Client Details : Leo Ryan
Address: 30 Caldera Crescent, Pyes Pa, Tauranga

CONSTRUCTION DETAILS

Wind: high	Date: 24.08.11	Scale: as shown	Plan : EH170alt/rev
Earthq: B	Rev:	Drawn: RG	Project No: CC1048
Corrosion: C			Sheet no : 14 of 19

Call 0800 A1homes 214663
www.A1homes.co.nz

Images within this category are a true representation of the original document(s).

Attempts have been made to enhance the quality of the images where possible.

Willow Street, Tauranga
Private Bag 12022, Tauranga 3143
Telephone: 07 577 7000. Facsimile 07 577 7034

CODE COMPLIANCE CERTIFICATE NO: 35842

Section 95, Building Act 2004

THE OWNER	CONTACT PERSON
RYAN, LEO JOHN 30 CALDERA CRESCENT PYES PA TAURANGA 3112	A1 HOMES PO BOX 4367 MOUNT MAUNGANUI SOUTH MOUNT MAUNGANUI 3149 Ph Fax: Email/website:

The building

Street address of building: 30 CALDERA CRESCENT

Legal description of land where building is located: LOT 132 DP382533

Building name:

Current, lawfully established, use: DWELLING

Year first constructed:

First point of contact for communications with the council/building consent authority: Tauranga City Council, Building Services, Private Bag 12002, Tauranga 3143, phone 07 5777000, fax 07 5777034, info@tauranga.govt.nz

Building work ERECT DWELLING

Building consent number: 35842

Issued by: Tauranga City Council

Code compliance

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

a) the building work complies with the building consent

Compliance Schedule: No

Signature

Manager: Building Services
On behalf of: Tauranga City Council

COPY

Date: 19 Sep 2012

Code Compliance Certificate
Applications File Complete Checklist

Tauranga City Council
Building Services

Consent No. 35842	Date Issued 19.9.12	Revision No. 2	Version One

'Statement of Compliance Received' email sent to City Waters	Date Sent:	19/9

				Comments
Drainage Plans – Stamped Correctly	(Y)	N	N/A	
Inspection Records / Sheets	(Y)	N	N/A	
Test Certificates, Energy Certificates, Other Certificates	(Y)	N	N/A	
Engineering Reports	(Y)	N	N/A	
Surveyors Reports	Y	N	(N/A)	
Producer Statement	(Y)	N	N/A	
LBP Forms	Y	N	(N/A)	
Photographs	Y	N	(N/A)	

Checked by		Date	19/9

Y = Yes in file	**N** = Not on file	**N/A** – Not applicable to this file

Note: If "N Not on file" is used, reasons why will need to be added to the Comments Box.

R

Statement of Compliance with the NZ Building Code

Consent/COA No: 35842

ISSUED BY: **Tauranga City Council Building Inspections**

PROJECT

Site Address: 30 Caldera Crescent, The Lakes
Legal Description: Lot 132 DPS 382533
Work Description: Erect dwelling
Building Category: R1

OWNER

Name(s): Ryan, Leo John & Courtney Jane Ruth Faass
Address: 18 Marsh Street, Tauranga 3110

[P] Application for CCC - Form 6 Received
[P] Required inspections completed
[NA] Failed inspections cleared
[P] Requested producer statements received
[P] Producer statements acceptable
[NA] LBP Certificates received and accepted
[NA] Consent conditions satisfied

NOTES:
Inspections prepaid 11
Inspections done 9

Tauranga City Council Building Inspections confirms that work done in relation to this project has been completed in accordance with the Building Consent/COA and the New Zealand Building Code.

Signed:
Name: Roger Bruce
Position: Building Officer

Date: 18 September 2012

R

OK TO ISSUE
C.C.C.

Signed _____ Date 19.9.12

12/190855

GoGet Job Report

Consent No	35842
Job ID	391212
Authority	TCC
Application Date	7 Sep 2011
Issue Date	17 Oct 2011
Site Address	30 Caldera Crescent, The Lakes
Legal Description	Lot 132 DPS 382533
Valuation Ref	0661802719
Parcel ID	6943898
Referred Date	20 Sep 2011
CCC Issued Date	
Cancelled Date	
Owner	Ryan, Leo John & Courtney Jane Ruth Faass
Owner Address	18 Marsh Street, Tauranga 3110
Owner Phone (Res)	
Owner Phone (Bus)	
Owner Phone	0277581297
Designer	A1 Homes Central-Ph 07 345 4411
Work Type	Residential-R1
Intended Use	Erect dwelling
Building Class	R1
Problem?	No
Disallow Bookings?	No
Restricted Building	No
Notes	

Last Inspected	Status	Inspection Type	Inspector	Notes
06/08/2012 11:27	Pass	Final Building	Malcolm Hunt	Roof = light metal corrugated long run Colorsteel. wall cladding = Linea weatherboard. Consented work appears to comply with all building code requirements and consent documents with the exception of minor boundary retaining yet to complete. General landscaping yet to complete. Ground levels and overland flow path ok at this stage. Note: Pending receipt of a signed and dated letter of acceptance from the owner of the R/H side vacant lot with regard to the minor incomplete boundary cut retaining wall. ie: Approx 5 meters long and sloping up to 1 meter high max. Complying smoke alarm installed.
06/08/2012 11:25	Pass	Final Plumbing	Malcolm Hunt	Consented work appears to comply with all building code requirements and consent documents.

17/02/2012 09:40	Pass	Pre Stopping	Malcolm Hunt	Consented work appears to comply with all building code requirements and consent documents. All brace elements as shown on consent documents. Contractor completing Garage door BLN series fixings now. OK to continue. Note: Roof on and cladding weathertight.
10/02/2012 11:59	Pass	Preline Building	Gary Cosford	Pre-line passed. Moisture ok, Windows sealed. OK to line.
08/02/2012 10:44	Pass	Preline Plumbing	Malcolm Hunt	Consented work appears to comply with all building code requirements and consent documents. Anti-rattle clips yet to be applied to all service pipes where applicable. Plumbing services Water pressure certificate required. OK to continue.
02/02/2012 08:47	Pass	Drainage	Ian Watson	Sewer completed and tested. Both branches vented and Org. on each also. Stormwater to Tcc con.
31/01/2012 08:19	Pass	Cavity	Gary Cosford	Checked cavity battens for linear w/ boards. ok to continue. Some Dan Ban still to be added.
17/01/2012 11:30	Pass	Fixing/Framing	Malcolm Hunt	Framing grade, MSG8.(NZS1748). Black identification strips. H 1.2 external wall framing. H1.2 internal framing. Company name or ID number ----- ITM, Tauranga Timber Supplies Truss Manufacturer ----- ITM, Tauranga Timber Supplies Visual inspection of load bearing timber elements found no evidence of Large knots or obvious defects, deformity particularly in lower chord or lintels. DPC in place. Bracing as per plan. Hold down provisions. Straps for braces and lintels. Trusses to plan. Uplift fixings, hangers and ties. Purlin fixings (Z'ds). Valley boards, Length and treatment. Handi Brackets for BL elements. Roof strap bracing. Ok to continue.

20/12/2011 11:34	Pass	Slab with Underfloor	Joanne Brook	Footing/slab to Kirk Roberts design including shear piles. Underfloor to plan all AS3500.5. Engineer(Damian) has checked ground and fill and provided written confirmation. Mike completed inspection on 19/12/11.

GoGet Statement of Compliance Exception Report

Consent No: 35842

Site Address: 30 Caldera Crescent, The Lakes

[redacted]nsent Instructions - Outstanding

[redacted]lease have your contractor supply a producer statement for the installation of insulation and which identifies the R Values of the materials used.	Roger Bruce	10 Sep 2012 11:39

Producer Statements - Required, Not Received

Insulation including "R" valves	John Skilleter	12 Oct 2011 07:38

NEWLINE
Bathroomware

Safety Glass Certification – Statement of Compliance

To satisfy the New Zealand Building Code Acceptable Solution F2/AS1, glass likely to come into contact with people must comply with NZS 4223:Part 3:1999 *Code of practice for glazing in buildings – Human impact safety requirements.*

NZS 4223:Part 3:1999 requires Grade A safety glass to be used in shower doors, shower screens and bath enclosures.

Newline Bathroomware confirms glass used in our shower doors and bath screens has been produced to one or more of the following standards as outlined in Appendix 3.B of NZS 4223:Part 3:1999 :

AS/NZS 2208 Grade A
BS 6206 Grade A
ANSI Z97.1

DATE: 17. 9. 2012

Newline Bathroomware Ltd
62A Diana Drive, Glenfield
PO Box 100 820 NSMC
Auckland, New Zealand
info@newline.co.nz
www.newline.co.nz
Phone 09 444 2053
Fax 09 443 0044

PRODUCER STATEMENT

I Paul Oldham (Director)
(Full Name)

of BOP Commercial Builders Ltd
(Full address)

being an approved installer/~~applicator~~ of: Insulation
(Identify system)

Confirm that I have applied.. Pink batts
(Identify plaster system)

at: 39 Cabera Crescent.
The Lakes Pyes Pa.
(Address)

on January 2012
(Date)

in accordance with all of the manufacturers installation/application requirements and clause E2 of the NZ Building Code.

I am satisfied that the substrate over which the system has been applied had been suitably prepared for the application of that system and that the required flashings had been properly installed

Signed P Oldham Date 2/9/12.

Author Not Verified

DATE: 17. 9. 2012 am

prodstat.doc

Phoned Paul Oldham
Confirms R3.2 ceiling and R2.2 walls
18/9/12

Tauranga City

Application for Code Compliance Certificate
Section 92, Building Act 2004

- 7 AUG 2012

The Building Consent

Building Consent number: 35842 Project Address: 30 Caldera Crescent

Issued by: Tauranga City Council

	The Owner	The Agent
Name: (*if an individual, include preferred form of address, eg, Mr, Miss, Dr*)	MR LEO RYAN	/ N/A
Contact Person:	LEO RYAN	
Mailing Address:	30 CALDERA CRESCENT	
Street Address / Registered Office:	30 CALDERA CRESCENT	
Telephone (work):	07 5784609	
Telephone (home):	07	
Telephone (mobile):	027 7581297	
Fax:	07 5784485	
Email address:	leorcamungahotmail.com.	
Website address:		

ENTERED

I request that you issue a code compliance certificate for this work under section 95 of the Building Act 2004.

The code compliance certificate should be sent to: (state which address, and whether owner or agent

Above Address Please!

Application

All building work carried out under the above building consent was completed on *(insert date)*: 24.4.12.

Key Personnel Information

Designer(s):	N/A.	Telephone Number:	
		Registration Number:	
Builder(s):	Paul Oldham / Stu Keelan.	Telephone Number:	027499028
		Registration Number:	
Registered Drain Layer:	Plumbingworks LTD	Telephone Number:	0274738190
		Registration Number:	10551
Registered Plumber:	Plumbingwork LTD	Telephone Number:	0274738190
		Registration Number:	10551
Registered Gasfitter:	N/A.	Telephone Number:	
		Registration Number:	
Registered Electrician:	BRENT ADLER - AMPI Electrical	Telephone Number:	0272224737
		Registration Number:	E245972
Other:		Telephone Number:	
		Registration Number:	

Compliance Schedule

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

The specified systems for the building are as follows:

Signature

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

Name of person signing (please print): LEO J. RYAN Date: 30/4/12.

Attachments

The following documents are attached to this application:

- ☑ certificates from the personnel who carried out the work
- ☐ certificates that relate to the energy work
- ☑ compliance schedule application form
- ☑ evidence that the specified systems are capable of performing to the performance standards set out in the building consent.

PRIVACY INFORMATION

Pursuant to the Privacy Act 1993 the following information is brought to your attention.

This document collects personal information about you and is collected pursuant to Section 33 and/or Section 45 of the Building Act 2004. Pursuant to Section 216 of the Building Act 2004, the Information contained in this document will be made available and passed on to the public on request.

The information contained in the document is being collected and held by the Tauranga City Council. You do have the right of access to and correction of this information subject to the provisions of the Privacy Act 1993.

Pursuant to Section 217 of the Building Act 2004, the building owner may request the plans and specifications be marked confidential for the purposes of security. Such a request must be in writing and addressed to:

Group Manager Customer and Environmental Services
Tauranga City Council
Private Bag 12 022
Tauranga 3143

Electrical Certificate of Compliance

For a low voltage installation if prescribed electrical work has been done on any part of it and the prescribed electrical work involved placing, replacing, or repositioning conductors or fittings attached to conductors.

To be completed whether or not an inspection is required.

No. 3565335

No. of attachments

RECEIVED
- 7 AUG 2012

ENTERED

Safety • Competency

CUSTOMER INFORMATION - PLEASE PRINT CLEARLY

Name of customer: [illegible]

Phone: 027 758 1977

Address of installation: 38 [illegible] – The Lakes Tauranga

Postal address of customer (if not as above): Same as above

DECLARATION OF CONFORMITY (Please tick (✓) appropriate boxes)

In accordance with Regulation 58 of the Electricity (Safety) Regulations 2010, the design of the installation or part of the installation to which this certificate applies

(a) complies with either Part 2 of AS/NZS 3000:2007 ✓ or Part 1 of AS/NZS3000:2007 and Regulation 59 __ and

(b) the supply system of the installation or part of the installation to which this certificate applies is 230V/400 V MEN ✓ or attached other system __

WORK DETAILS

44 No. of lighting outlets — No. of ranges

24 No. of socket outlets — No. of water heaters

Was any installation work carried out by the homeowner? Yes ✓ No

Please tick (✓) as appropriate where work includes:

✓ Mains — ✓ Main earthing system

✓ MEN Switchboard closest to point of supply — Electric lines

Description of work carried out (if necessary attach any pages with work done): [illegible] house according to [illegible] tests, [illegible] MEN [illegible] New [illegible] N/S [illegible] cable [illegible] New RCD protected switchboard

CERTIFICATION OF WORK (Please tick (✓) appropriate boxes)

I certify that the completed installation or part of the installation to which this certificate applies:

✓ has been installed in accordance with the design detailed in the Declaration of Conformity section above

✓ has had tests which are required by the Electricity (Safety) Regulations 2010 satisfactorily completed

✓ has an earthing system that is correctly rated

✓ contains fittings which are safe to connect to a power supply

☐ is safe to connect to a power supply

ELECTRICAL WORKER DETAILS

Name	Brent Ad[illegible]	Registration No.	E 245772
Company	[illegible] Electrical Limited	Contact Ph No.	027 322 4737
Signature	[signature]	Date	07.04.2012

INSPECTION DETAILS

Electrical work requiring inspection by a registered electrical inspector

✓ Mains work (mains, MEN switchboards closest to the point of supply, or main earthing systems)

✓ Attached / other

✓ Work carried out in accordance with Part 1 of AS/NZS 3000:2007

I certify that the [illegible] inspected [illegible] safe and that the inspection has been carried out [illegible] with the Electricity (Safety) Regulations 2010

Name	C [illegible]	Registration No.	I 25[illegible]7
Signature	[signature]	Date	2/4/12
		Contact Ph No.	027 2[illegible] 7732

CUSTOMER COPY – THIS IS AN IMPORTANT DOCUMENT AND SHOULD BE RETAINED

TO BE RETAINED BY THE WORKER RESPONSIBLE FOR CERTIFYING THE WORK

Site Report

KIRK | ROBERTS
CONSULTING ENGINEERS LTD

Level One
Rydal House
74 Grey Street
Tauranga

P +64 7 571 0950
F +64 7 571 0550

TO:	Chief Inspector	FROM:	Damian McMillan
COMPANY:	Bay Building Certifiers	JOB NO:	112234
FAX NO:	(07) 578 5395	DATE:	12th December 2011
COPY TO:	Leo Ryan (By email)		
PAGES:	1 of 2		
SUBJECT:	Ryan Residence, 30 Caldera Close, Tauranga Building Consent No. 35842		

Dear Sir / Madam

I confirm that we have carried out the following geo-technical investigations to the prepared house site at the above mentioned address on the 9th of December 2011. At the time of our inspection a level building platform had been created by cutting into the front of the section and the placement of fill to the front of the section.

- Three Scala Penetrometer Tests (SPT) to the compacted fill. Test results indicated an allowable bearing pressure of at least 100 kPa to the compacted fill which is acceptable for the proposed new house.
- I confirm that we inspected the site prior to the placement of any fill to confirm that all topsoil had been removed..

In my professional opinion, not to be inferred as a guarantee, I believe that the ground bearing capacity and underlying soils are satisfactory for the proposed new house.

Regards,

Damian McMillan
BE(Hons), MIPENZ, Chartered Professional Engineer, CPEng (229150)

PLUMBING WORKS LTD

Phone 07-571 5558
Fax 07-552 6572
Mobile 027-473 8190
A/Hrs 07-552 5572
PO Box 97, Tauranga
www.plumbingworks.co.nz

TEST RECORD – SEWER & STORMWATER

DESCRIPTION OF THE INSTALLATION

Address:	32 Caldear Cresent, Tauranga	
Type of Installation:	Domestic Dwelling	
Type of Drain:	Sewer :	PVC Marley
	Stormwater:	PVC Marley
Date:	15 February 2012	
Time Testing Started:	2.00pm	
Time Testing finished:	3.00pm	
Test Pressure:	1m Static Head	
Test Period:	60 mins	
Client:	Leo & Courtney Ryan Consent No. 35842	
Contractor:	Plumbing Works Ltd, P O Box 97, Tauranga	
Tester's Name:	Craig Coxhead	

Declaration:
I declare that I have installed the above product in accordance with ***Marley*** *specifications with no brand mixing.*

Signature: _____

Craig Coxhead
Registration No: 10551

NEWLINE
Bathroomware

Safety Glass Certification – Statement of Compliance

To satisfy the New Zealand Building Code Acceptable Solution F2/AS1, glass likely to come into contact with people must comply with NZS 4223:Part 3:1999 *Code of practice for glazing in buildings – Human impact safety requirements.*

NZS 4223:Part 3:1999 requires Grade A safety glass to be used in shower doors, shower screens and bath enclosures.

Newline Bathroomware confirms glass used in our shower doors and bath screens has been produced to one or more of the following standards as outlined in Appendix 3.B of NZS 4223:Part 3:1999 :

AS/NZS 2208 Grade A
BS 6206 Grade A
ANSI Z97.1

Newline Bathroomware Ltd
62A Diana Drive, Glenfield
PO Box 100 820 NSMC
Auckland, New Zealand
info@newline.co.nz
www.newline.co.nz
Phone 09 444 2053
Fax 09 443 0044

PLUMBING WORKS LTD

Phone 07-571 5558
Fax 07-552 6572
Mobile 0274 738 190
A/Hrs 07-552 5572
PO Box 97, Tauranga

TEST RECORD

DESCRIPTION OF THE INSTALLATION

Address:	32 Calder Cres, The Lakes
Type of Installation:	Potable water supply
Type of Pipe:	Kembla water piping
Date:	19.01.12
Time Testing Started:	2.30 pm
Time Testing finished:	3.15 pm
Test Pressure:	1500 KPA
Test Period:	45 minutes
Client:	Leo Ryan
Contractor:	Plumbing Works Ltd, P O Box 97, Tauranga
Tester's Name:	Rodney Williams

Declaration:

I declare that I have installed the above product in accordance with manufacturers' specifications.

Signature: R G Williams .....

APPLICATOR'S PRODUCER STATEMENT

RECEIVED
- 7 AUG 2012

owner

I/We Leo Ryan

Of Tilewarehouse Ltd 13 Marsh Street (Address)

Being an Applicator NZ1572 Reg-No.

Confirm that we have applied Hydrathane (Product)

At 30 Caldera Crescent Tauranga

Completed ______ for A1 Homes.
L & C Ryan

in accordance with the manufacturers written application instructions, AS3740-2004 and clauses E2, E3 and B2 of the current NZ Building Code.

I/We are satisfied that the substrate over which this system has been applied has been suitably prepared, and the materials have been correctly installed, including 50mm wide Bond Breaking Tape, Reinforcing Tape 140mm minimum and Reinforcing Matting 970mm as required.

I/We have completed the Installation Check Sheet and retain a copy of this document

This work has been certified by Construction Chemicals (NZ) Ltd

Signed

Steve Plester

Steve Plester

Date

ENTERED

Author Not Verified

DATE: 7/8/12 gwB

Accepted but S Plester confirming approved as an applicator 10/8/12

PLUMBING WORKS Ltd

Phone 07-571 5558
Fax 07-552 6572
Mobile 027-473 8190
A/Hrs 07-552 5572
PO Box 97, Tauranga
www.plumbingworks.co.nz

PRODUCER STATEMENT - CONSTRUCTION

Issued by: Plumbing Works Ltd

To: Leo & Courtney Ryan

In respect of Plumbing / Sewer & Storm Water Drainage

Address: 32 Caldear Crescent, The Lakes, Tauranga

Legal: Lot:132 DP:382533

T A: Tauranga City Council

Consent No: 35842

Plumbing Works Ltd warrants that the Sewer and Storm Water Services have been installed and completed to NZBC G13/AS1 (sewer) and NZBC E1/AS1 (stormwater) for the subject property as described above - services as per the Plans & Specifications.

Plumbing Works Ltd warrants that the Plumbing Water supply and waste services have been installed and completed to AS/NZS 3500 Part 1 (water supply) & Part 2 (waste water services) for the subject property as described above- Services as per the Plans & Specifications

Signed:

Craig Coxhead
10551

Dated: 6 April 2012

Damian - 02147 4375.

KIRK | ROBERTS

RECEIVED
- 7 AUG 2012

JOB NO: 112234

ISSUE: B

PRODUCER STATEMENT – PS1 – DESIGN

ISSUED BY:	*Kirk Roberts Consulting Engineers Ltd – Damian McMillan*
TO:	*Leo Ryan*
TO BE SUPPLIED TO:	*Tauranga City Council*
IN RESPECT OF:	*Timber Pole Retaining Wall (items designated (*) only as shown on the attached drawings, countersigned by myself, dated 1/11/11)*
AT:	*30 Caldera Crescent, Pyes Pa, Tauranga*
LOT: 132	*DP: 382533*

Kirk Roberts Consulting Engineers Ltd has been engaged by ***Tauranga ITM Building & Fencing Supplies Ltd trading as Ready Floor*** to provide structural engineering services in respect of the requirements of Clause(s) **B1** of the Building Regulations 1992 for

☐ All ☑ Part only as specified

of the building work. The design has been prepared in accordance with **B1VM1 & B1/VM4** (respectively) of the approved documents issued by the Building Industry Authority and the work is described on ***A1 Homes*** drawings titled ***"Leo Ryan, 30 Caldera Crescent, Pyes Pa, Tauranga."*** and ***Kirk Roberts Consulting Engineers Ltd*** details titled ***"Ryan Home, 30 Caldera Crescent, Pyes Pa, Tauranga, Ref 112234"*** and the specification and other documents according to which the building is proposed to be constructed.

As an independent design professional covered by a current policy of Professional Indemnity Insurance to a minimum value of $200,000. **I BELIEVE ON REASONABLE GROUNDS** that subject to:

ENTERED

(i) The site verification of the following design assumptions:
Allowable foundation bearing pressure to be a minimum 100 kPa or an ultimate bearing pressure of 300 kPa in accordance with NZS 3604: 1999.

(ii) **This certificate does not cover stability or suitability of the site.**

(iii) **Unless specifically noted, compliance of the drawings to Non Specific codes such as NZS 3604 and NZS 4229 has not been checked by this practice**

(iv) **This Producer Statement - Design is valid for the application of building consent issued within 1 year from the date of issue.**

and (v) all proprietary products meeting the performance specification requirements, the drawings, specifications, and other documents according to which the building is proposed to be constructed comply with the relevant provisions of the building code.

Damian J. McMillan
B.E.(Hons), MIPENZ(Structural), CPEng (ID:229150)

Date 1st November 2011
MIPENZ ☑

KIRK ROBERTS	JOB TITLE	Ryan Residence			PAGE	1
	ADDRESS	30 Caldera Crescent				
	JOB No.	112234	DATE	2/11/11	BY	DJM

TIMBER POLE RETAINING WALL

(a) GENERAL

SURCHARGE

VEHICLE SURCHARGE (Qv) = 2.5 kPa

SOIL PROPERTIES

γ = 16 kN/m^3

ϕ_{SOIL} = 30 °

K_a = 0.33

LOAD COMBINATIONS ULTIMATE - 1.6G

- 1.6G + 1.6Q

(b) POLE SIZE

$M^* = \{1.6(K_a\ \gamma\ H_r^3)/6 + 1.6(K_a\ Q\ H_r^2)/2\}\ S$

WHERE - Hr = HEIGHT RETAINED

- S = SPACING

FOR TIMBER POLES $\phi M_n = \phi\ k_1\ k_{20}\ k_{21}\ f_b\ z$

WHERE ϕ_{POLE} = 0.8 k_{21} = 0.85

k_1 = 0.6 f_b = 38 MPa

k_{20} = 1.00 $z = \pi D^3/32$

THEREFORE $D > \{32 \times M^*/(\phi\ k_1\ k_{20}\ k_{21}\ f_b\ \pi)\}^{1/3}$

Hr	S	$M^*_{1.6G}$	$M^*_{1.6G+1.6Q}$	M^*_{DESIGN}	D	SED
(m)	(m)	(kNm)	(kNm)	(kNm)	REQ (mm)	DIA(mm)
0.6	1.20	0.36	0.65	0.65	72	150
1.3	1.20	3.71	5.05	5.05	141	150
1.5	1.20	5.70	7.48	7.48	161	175
1.8	1.20	9.85	12.42	12.42	191	200
1.8	1.20	9.85	12.42	12.42	191	200
1.8	1.20	9.85	12.42	12.42	191	200

Note: Allows for 6 mm / m increase in diameter

(C) EMBEDMENT

USE BROHMS "LATERAL RESISTANCEFOR SHORT PILES IN COHESIVE SOIL"

NOTE: BROHMS USES "ULTIMATE STRENGTH" (q_{ult}) WHICH EQUATES TO LIMIT STATE "IDEAL STRENGTH" (q_d)

WHERE $f = P^* / (\Phi 9 c_u D)$

$M_{max} = P^* (e + 1.5 D + 0.5 f)$

$L = f + g + 1.5 D$

e = ECCENTRICITY OF LOAD (M^*/P^*)

D = EFFECTIVE DIAMETER OF HOLE GOVERNED BY 0.25 X PILE SPACING

$g = \sqrt{\frac{M_{max}}{2.25 c_u B}}$

ϕ_{EMBED} = 0.5

S_u = 60 kPa

H_r	D	Spacing	Adjusted Su	P*	f	M_{max}	g	L
(m)	(m)	(m)	(kPa)	(kN)	(m)	(kNm)	(m)	(m)
0.6	0.4	1.2	59.8	2.78	0.026	2.35	0.209	0.90
1.3	0.4	1.2	59.8	10.63	0.099	11.95	0.471	1.30
1.5	0.4	1.2	59.8	13.78	0.128	16.63	0.556	1.50
1.8	0.4	1.2	59.8	19.27	0.179	25.71	0.691	1.80
1.8	0.4	1.2	59.8	19.27	0.179	25.71	0.691	1.80
1.8	0.4	1.2	59.8	19.27	0.179	25.71	0.691	1.80

(d) **RAILS**

Note: - DESIGN RAILS FOR MAXIMUM FORCE AT THE BASE OF THE WALL
- ASSUME RAILS ARE SIMPLY SUPPORTED BETWEEN THE POLES

$w^* = \{1.6 (K_a \gamma h_r) + 1.6 (K_a Q)\} h_{board}$

$M^* = w^* S^2 / 8$

$\phi M_i = \phi \times k_2 \times z \times f_b$

TRY 200 x 50 RS TIMBER WHERE b = 50 mm
d = 190 mm
f_b = 14.0 MPa

$Z = d\ b^2 / 6$ = 79200 mm^3

ϕM_i = 0.53 kNm

Hr (m)	S (m)	w* (kN)	M* (kNm)	
0.6	1.20	1.21	0.22	<Mi OK
1.3	1.20	2.34	0.42	<Mi OK
1.5	1.20	2.66	0.48	<Mi OK
1.8	1.20	3.14	0.57	TOO SMALL USE 2 BOTTOM RAILS
1.8	1.20	3.14	0.57	TOO SMALL USE 2 BOTTOM RAILS
1.8	1.20	3.14	0.57	TOO SMALL USE 2 BOTTOM RAILS

OPTION TRY TIMBER HALF ROUNDS

SIZE (SED) = 150 mm

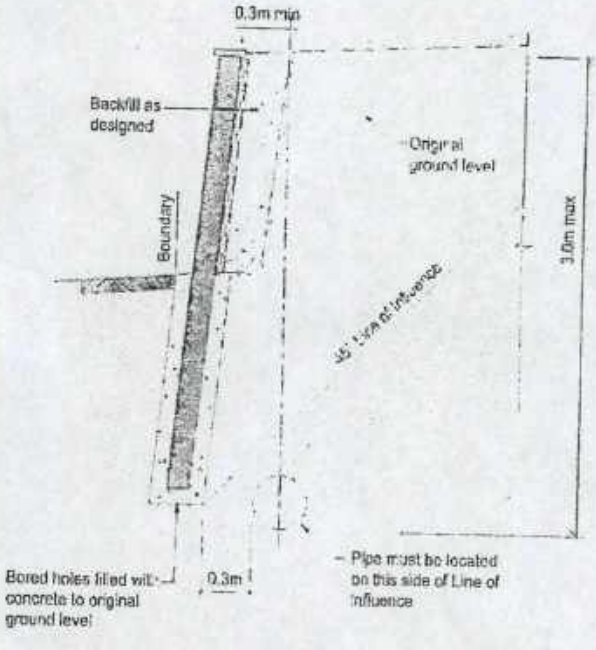
$Z = \pi r^3 / 11$ = 120000 mm^3 > PREVIOUS Z OK

(e) **TIMBER POLE RETAINING WALL SUMMARY (2.5kPa VEHICLE SURCHARGE)**

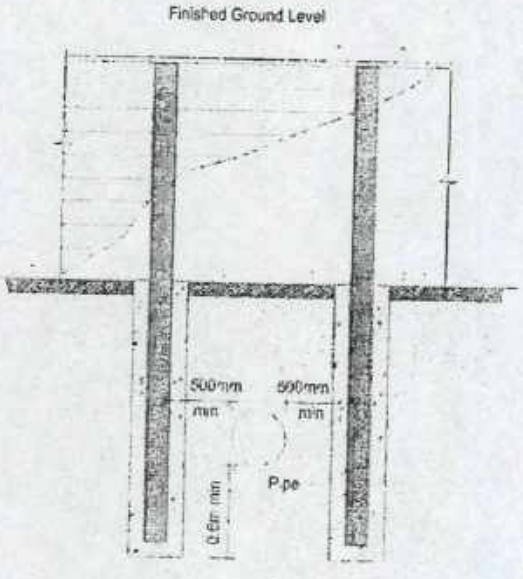
WALL HEIGHT	TIMBER POLES			HOLE	
	SIZE SED	SPACING	LENGTH	DIA	DEPTH
	mm	m	m	mm	m
0.6	150	1.20	1.5	400	0.9
1.3	150	1.20	2.6	400	1.3
1.5	175	1.20	3.0	400	1.5
1.8	200	1.20	3.6	400	1.8
1.8	200	1.20	3.6	400	1.8
1.8	200	1.20	3.6	400	1.8

NOTES:

1. PROVIDE DRAINAGE LAYER BEHIND WALL (20-50mm FREE DRAINING ROCK OR EQUIVALENT)
2. ALL POLES TO BE H5 TREATED AND RAILS H4
3. RAILS SHALL BE EITHER 150 x 50 OR 200 X 50 , 50 mm MINIMUM THICK
4. THE DESIGN ASSUMES LEVEL STIFF NATURAL GROUND AT THE BASE OF THE WALL
5. SECURE RAILS TO POLES WITH GALV NAILS
6. GROUT POLES WITH 17.5MPa CONCRETE
7. ALL POLES TO BE PLACED LARGE END INTO FOOTING
8. ANY QUERIES OR DISCREPANCIES CONTACT THE ENGINEER
9. REFER DRAWING FOR OTHER DETAILS



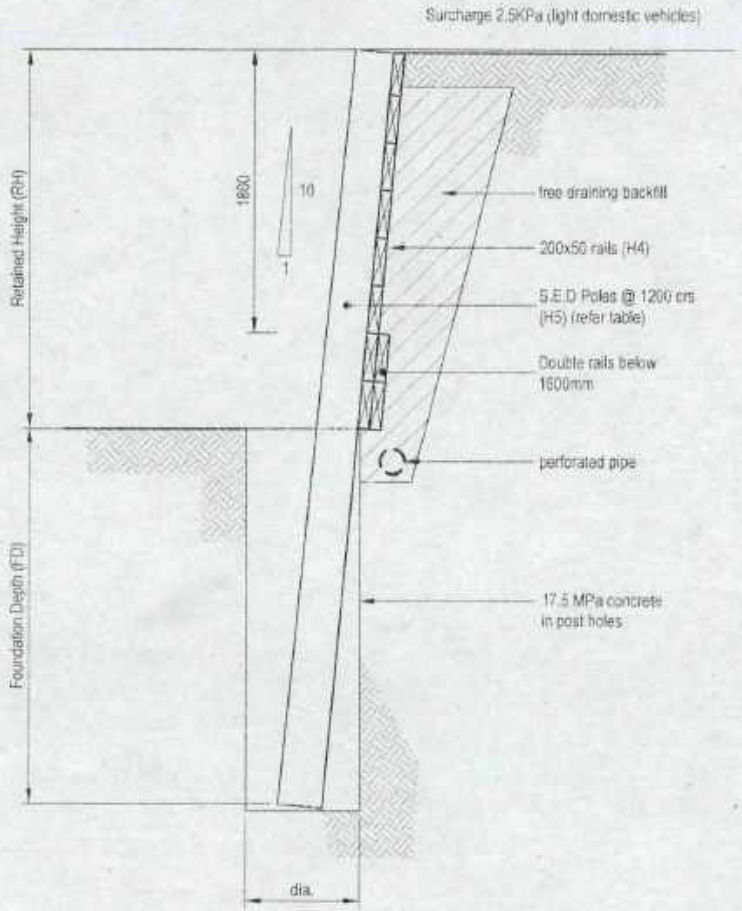
SECTION
Pipe parallel to retaining wall



SECTION
Pipe perpendicular to retaining wa

NOTES:

1. Contractor to verify:
   - All structural drawings are the latest construction issue
   - All dimensions on site prior to commencing any work



NOTES:

Rails are to be continuous over two or more spans - stagger location of joints.

Refer to T.C.C 'close proximity retaining wall restrictions' for retaining wall detail adjacent to service pipe.

RETAINING WALL TABLE				
Retained Height (RH)	Post diameter	Post spacing	Foundations	
			Diameter	depth (FD)
1200 max	150 SED	1200	400	RH + 100
1800 max	175 SED	1200	400	RH + 100
1800 max	200 SED	1200	400	RH + 100

TIMBER RETAINING WALL DETAIL

1:20

No	Date	Issued	By
0	2011.11	ISSUED FOR BUILDING CONSENT	MP

KIRK ROBERTS

www.kirkroberts.co.nz

Status: BUILDING CONSENT

Project: NEW RESIDENCE FOR
LEO RYAN
30 CALDERA CRESCENT, PYES PA
TAURANGA

Client: LEO RYAN

Title: TIMBER RETAINING WALL

Designed by:	DM	Scale:	AS SHOWN (A3)
Drawn by:	BM	Job no:	112234
Checked by:	DM	Drawing no:	Rev:
Date:	NOV 2011	S1	0

RECEIVED
- 7 AUG 2012

17/08/2012

Re: Retaining wall post between 30 caldera and 28 caldera crescent's boundary.

To Whom It May Concern,

When Leo's contractor was completing his retaining wall closest to Caldera Crescent he called us and asked whether he could put a retaining wall post between our boundary. (knowing that we would be erecting a retaining wall as well) We felt this was a good option so we **AGREED** and **ALLOWED** him to place the retaining wall post in between our boundary so that when we did ours we would attach our retaining wall to his post.

Regards

Jamie Rose

28 Caldera Crescent

Tauranga City

1booked

SITE NOTICE

CONSENT NO: 35842 OWNER: Ryan. DATE: 19/12/11

SITE: 30 Caldera Cres.

WORK TYPE: new dwg INSPECTION TYPE: Ftgs/slab/u/floor

PASS/FAIL (Circle) INSPECTOR: Mike Montgomery

Ftgs/slab to Kirk Roberts design including shear piles

Under floor to plan - all AS 3500.5

Engineer (Damian) has checked ground fill and provided written confirmation.

ENTERED

KEEP ON SITE FOR RECHECK

MVM 5458

Joanne Brook

From: Roger Bruce
Sent: Tuesday, 11 September 2012 8:09 a.m.
To: Joanne Brook
Subject: FW: 35842_Consent_Instruction_20120910
Attachments: Glass Compliance Statement.pdf

From: leonidis ryan [mailto:leoroaming@hotmail.com]
Sent: Monday, 10 September 2012 4:41 p.m.
To: Roger Bruce; foldham@xtra.co.nz; Tilewarehouse Tauranga
Subject: RE: 35842_Consent_Instruction_20120910

Hi Roger,

I have requested this and am still waiting to receive.

The lady at the council said that you also require a site report and one for the glass, is this correct? I can not find the site report but it was with the documents originally and has been acknowledged to be provided on the job report by Joanne Brook at the first inspection. Attached is the Glass producer statement if required.

I am eager to get COC as it is holding up bank payments and insurances etc so lease let me know if this is all that is required.

Kind Regards,

Leo

From: Roger.Bruce@tauranga.govt.nz
To: Zoe.Scholfield@tauranga.govt.nz
CC: leoroaming@hotmail.com
Subject: 35842_Consent_Instruction_20120910
Date: Sun, 9 Sep 2012 23:58:56 +0000

10 September 2012
Leo John Ryan & Courtney Jane Ruth Faass 18 Marsh Street Tauranga 3110

Dear Sir/Madam

Final Inspection of Building Work

Building Consent 35842
Property Situated at: 30 Caldera Crescent, The Lakes
Legal Description: Lot 132 DPS 382533

The following items are required to be provided by you before we can recommend that a Code Compliance Certificate can be issued:

1. **Please have your contractor supply a producer statement for the installation of insulation and which identifies the R Values of the materials used.**

Yours faithfully

Roger Bruce
Building Compliance and Inspections

Please address all Communications to:
Manager: Building Inspections
Tauranga City Council
Private Bag 12022
Tauranga 3143
(**Fax:** (07) 578 5395)

Tauranga City

Willow Street, Tauranga
Private Bag 12022, Tauranga 3143
Telephone: 07 577 7000. Facsimile 07 577 7034

CODE COMPLIANCE CERTIFICATE NO: 36577

Section 95, Building Act 2004

THE OWNER	CONTACT PERSON
RYAN, LEO JOHN 18 MARSH STREET TAURANGA 3110	A1 HOMES PO BOX 4367 MOUNT MAUNGANUI SOUTH MOUNT MAUNGANUI 3149 Ph Fax: Email/website:

The building

Street address of building: 30 CALDERA CRESCENT

Legal description of land where building is located: LOT 132 DP382533

Building name:

Current, lawfully established, use: RETAINING WALLS

Year first constructed:

First point of contact for communications with the council/building consent authority: Tauranga City Council, Building Services, Private Bag 12002, Tauranga 3143, phone 07 5777000, fax 07 5777034, info@tauranga.govt.nz

Building work ERECT RETAINING WALL

Building consent number: 36577

Issued by: Tauranga City Council

Code compliance

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

a) the building work complies with the building consent

Compliance Schedule: No

Signature

Manager: Building Services
On behalf of: Tauranga City Council

COPY

Date: 13 Apr 2012

Code Compliance Certificate
Applications File Complete Checklist

Tauranga City Council
Building Services

Consent No. 36577	Date Issued 13.4.12	Revision No. 2	Version One

'Statement of Compliance Received' email sent to City Waters	Date Sent:	13/4

				Comments
Drainage Plans – Stamped Correctly	Y	N	(N/A)	
Inspection Records / Sheets	(Y)	N	N/A	
Test Certificates, Energy Certificates, Other Certificates	Y	N	(N/A)	
Engineering Reports	Y	N	N/A	
Surveyors Reports	Y	N	N/A	
Producer Statement	Y	N	N/A	

Checked by	[signature]	Date	13/4

Y = Yes in file	**N** = Not on file	**N/A** – Not applicable to this file

Note: If "N Not on file" is used, reasons why will need to be added to the Comments Box.

Statement of Compliance with the NZ Building Code

Consent/COA No: 36577

ISSUED BY: **Tauranga City Council Building Inspections**

PROJECT

Site Address: 30 Caldera Crescent, Pyes Pa
Legal Description: Lot 132 SP 382533
Work Description: Erect retaining wall
Building Category: RMW2

OWNER

Name(s): Ryan, Leo John
Address: 18 Marsh Street, Tauranga 3110

[P] Required inspections completed
[NA] Failed inspections cleared
[NA] Requested producer statements received
[NA] Producer statements acceptable
[NA] Consent conditions satisfied
[NA] Technical queries attached and complete

NOTES:
Inspections required 2
Inspections done 2

Tauranga City Council Building Inspections confirms that work done in relation to this project has been completed in accordance with the Building Consent/COA and the New Zealand Building Code.

Signed:
Name: Steve Ferguson
Position: Building Officer

Date: 13 April 2012

OK TO ISSUE
C.C.C.

Signed _____ Date 13·4·12

GoGet Job Report

Consent No	36577
Job ID	391212
Authority	TCC
Application Date	15/02/2012
Issue Date	7/03/2012
Site Address	30 Caldera Crescent, Pyes Pa
Legal Description	Lot 132 SP 382533
Owner	Ryan, Leo John
Owner Address	18 Marsh Street, Tauranga 3110
Owner Phone (Res)	
Owner Phone (Bus)	
Owner Phone	
Designer	ACD Architecture-Ph 541 3133
Work Type	Residential-RMW2
Intended Use	Erect retaining wall
Building Class	RMW2
Problem?	No
Disallow Bookings?	No
Restricted Building	No
Notes	

Last Inspected	Status	Inspection Type	Inspector	Notes
23/03/2012 08:43	Pass	Retaining Walls	Gary Cosford	Front retaining wall Completed and to plan.neighbour will be cutting into site so side retaining not required.
13/03/2012 08:08	Pass	Retaining Walls	Malcolm Hunt	Part Footings for proposed timber retaining wall road frontage boundary only, excluding footing encroaching on lot 133. All to RG Design. Note: R/H boundary retaining yet to install and inspect. OK to continue.

GIS RECORDED

TAURANGA CITY COUNCIL
APPROVED "AS BUILT" PLAN
08/02/2007 – TERESA MCDONNELL

SUB 5748

RC 1375

12340

Future Stage 1E

CUT

FILL

CUT

FILL

FILL

FILL

CUT

FILL

Gyle Place

Caldera Crescent

Tarn Close

Caldera Close

Hastings Road

Lakes Boulevard

GRAPHIC SCALE 0 50 100 150 200 250 300 mm

Key

FILL / CUT — Subdivision Cut and Fill Areas

	Rev. No.	Description	DATE
checked by:	1	224 Application	01/07

	NAME	DATE	SIGNED
Surveyed			
Designed	CH	01/07	
Drawn	GR	01/07	
Checked			
Approved			

REFERENCES

S&L
SHRIMPTON & LIPINSKI

S & L CONSULTANTS LTD
SURVEYORS - ENGINEERS - PLANNERS

111 Cameron Road, Tauranga, New Zealand
P.O Box 231 Ph.(07)577-6069
Fax(07)577-6065
Email: slconsultants@sltga.co.nz

TITLE

THE LAKES
BUILDING COMMUNITIES

Stage 1D

Earthworks Asbuilts
Depth of Cut/Fill

ORIGINAL SCALES	DATE
1:500 @ A1	01/07

DRAWING No
17726 - AB21

Revision: 1

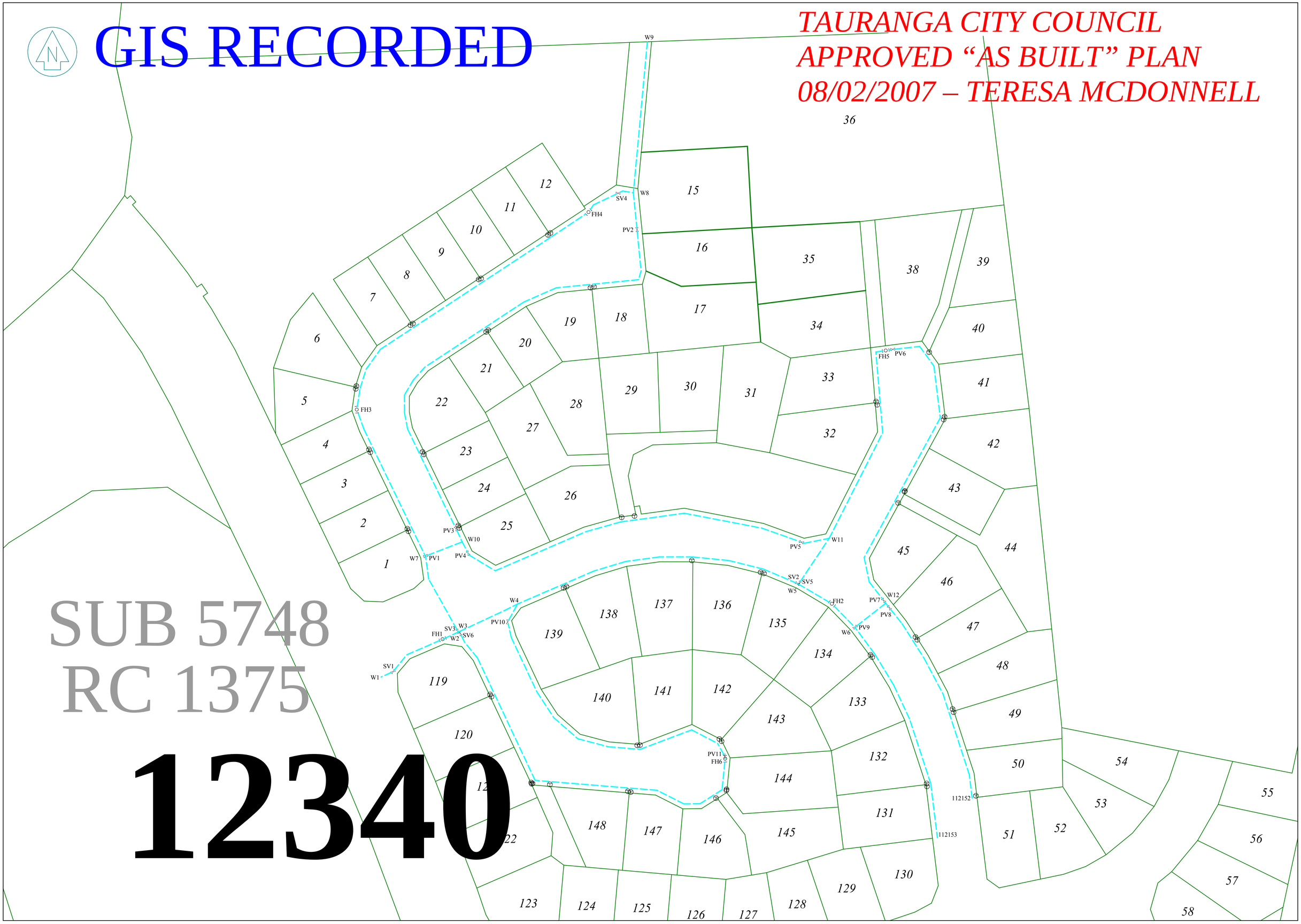
METRIC DESIGN

GIS RECORDED

TAURANGA CITY COUNCIL
APPROVED "AS BUILT" PLAN
08/02/2007 – TERESA MCDONNELL

SUB 5748
RC 1375

12340



Date Stamp

ADDITIONAL RECEIVED
2 8 FEB 2012

BC # 36577

ADDITIONAL INFORMATION REQUEST CHECKLIST

TO BE USED ONLY FOR BC's NOT ISSUED

Address: 30 Caldera Crescent

☑ **VETTING (CSC Staff)** – REQUESTED INFORMATION
- ☑ **TWO** copies provided (attach letter) — email
- ☐ Plans etc date stamped — Accepted by (name)
- ☐ Part / All queries answered
- ☐ Verbal request from _____ detail _____

☐ **VETTING (CSC Staff)** – CHANGES TO BC APPLICATION AT OWNER'S REQUEST
- ☐ **TWO** copies provided
- ☐ Plans etc date stamped — _____
- ☐ Covering letter with Scope of Works — Accepted by (name)

☐ **PLANNING** — _____

☐ **DEVELOPMENT ENGINEER** — _____

☑ **BUILDING** LP — _____

☐ **PLUMBING & DRAINAGE** — _____

☐ **STRUCTURAL** — _____

CODE COMPLIANCE CERTIFICATES

☐ **PRODUCER STATEMENTS**

☐ **OTHER DOCUMENTS**

TCC Ref: 2519657

Helen Marshall

Subject: FW: CC1048 Ryan
Attachments: CC1048 Ryan PERMIT Rev C 28.02.12 RG.pdf

From: Dion Wilson A1 Homes [mailto:dion.wilson@a1homes.co.nz]
Sent: [redacted] February 2012 12:16 p.m.
To: Zoe Scholfield
Subject: FW: CC1048 Ryan

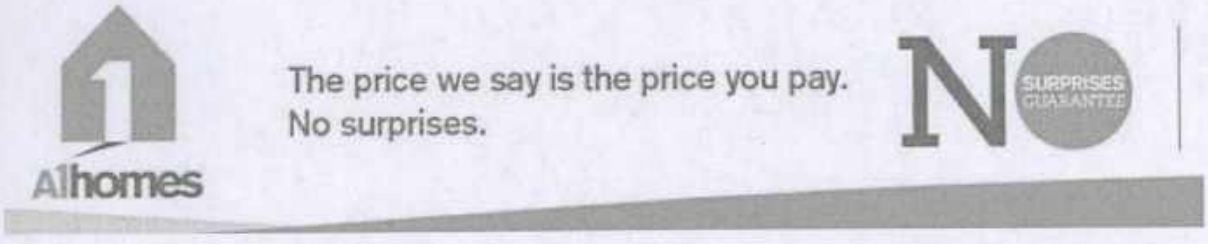
Hi Zoe,

Please see attached additional info required for Leo ryan consent. Also see ACD Design comments below.

Thank you

Dion Wilson
Sales

A1 Homes Central
Licence Holder : Creative Concept Homes Limited
2 Sunrise Avenue, Rotorua
P O Box 4367, Mount Maunganui, 3116
T: 07 345 4411 F: 07 345 4412 M: 027 222 4853
www.a1homes.co.nz



From: Tania Gilmore [mailto:tania@acdarchitecture.com]
Sent: Tuesday, 28 February 2012 11:01 a.m.
To: dion.wilson@a1homes.co.nz
Subject: CC1048 Ryan

Hi Dion

Please find attached CC1048 Council requirement, Reference Number 36577.

1. Refer Sheet 01, Note added to comply with NZBC F4.

Thanks

Kind regards,
Tania Gilmore
Architectural Designer

P 07 541 3133
E tania@acdarchitecture.com

acdarchitecture.com

28/02/2012

TAURANGA CITY COUNCIL BUILDING INSPECTIONS

Consent No: 36577 **Building Category: RMW2**

Site Address: 30 Caldera Crescent, Pyes Pa

Owner/Agent: Ryan, Leo John

Inspections Required

The inspections below will need to be completed to the satisfaction of our inspectors before a Code Compliance Certificate can be issued. The inspections listed have been paid for. Payment for additional inspections may be required before the issuing of the Code Compliance Certificate.

To call for inspections please phone 578 6666.

Keep the full set of stamped approved plans and specifications on site, including the fire design where appicable, and engineers designs. Inspections will not be done where plans are not available.
Call for inspections well ahead of time to secure an appointment. At least 2 clear working days notice is the minimum requirement.

Request a final inspection once the building work has been completed and all documents requested are in your possession. Remember that it is an offence to occupy a public building that has not had a CCC issued or hand over possession of a dwelling.

Inspection Types	
1 Final Building	On completion of all works and collection of documents
1 Retaining Walls	To check siting and hole size depth etc
2 Total Inspections	

GoGet Consent Time Report

Consent No: 36577

Date	Processing/Inspection Type	Status	Inspector	Time
Processing				
27/02/2012	Processing	On	Lex Plato	60
29/02/2012	Processing	Off	Lex Plato	30
	SUBTOTAL:			1:30
	TOTALS:			1:30

Procedure: Processing Consents
Version: 4

Record No: 28
Date: 2.9.10
Issued by (RB)
Indefinite: By Council

TAURANGA CITY COUNCIL BUILDING INSPECTIONS

SCHEDULE OF ATTACHMENTS TO CONSENT APPLICATION FILES

Consent No: 36577 **Address:** 30 Caldera Cres

DOCUMENT	DATE	BY:
Checklist		
Record of Inspections	23/2/2012	
Requests for Information		
Responses (Not Supplied by Building Services)		
Requests for Peer Review Form		
Schedule of Documents for Review		
Responses by Reviewer		
Producer Statements Required Form		
Others (List)		

PIM/ BCAN DEVLOPMENT ENGINEERING CHECKLIST

Property Address: 30 Caldera Cres **NO:** 36577

.....

CHECKLIST

Land Feature (FE) Register (Ozone)	YES/NO
Consent Notice	YES/NO
Others..... Swale retic	
Technical Library (Soils Report) Number	TL 3943
Site inspection required	YES/NO
Site visit carried out	Date:.....
Slope of site excessive (20° or more)	YES/NO/NA
Evidence of slippage	YES/NO/NA
Evidence of subsidence or poor bearing capacity	YES/NO/NA
Site affected by inundation (sea level rise, flooding)	YES/NO/NA
Site affected by erosion	YES/NO/NA
Site affected by falling debris	YES/NO/NA
Site affected by exceptional wind effects (windzone)	YES/NO/NA
Soakhole decommissioning zone	YES/NO/NA
Earthquake Prone Building register (at risk if assessed below 33%) refer dataworks activity Building – Earthquake	YES/NO/NA
Close Proximity to Council Main – sewer, water, stormwater (circle applicable service(s))	
Easement in Gross (requires CE approval)	YES/NO/NA
Complies with Code of Practice	YES/NO/NA
Sec 72 Building Act 2004 required	YES/NO/NA

NOTES:

.....

.....

.....

.....

CONCLUSION

Geotechnical report required?	YES/NO/NA
Owner notified	Date:.....
Specific design foundation required?	YES/NO/NA
Owner notified:	Date:.....
From information currently held by Council the site is suitable for conventional development?	YES/NO/NA

SE Rust ..... 23/2/12.

DEVELOPMENT ENGINEER **DATE**

Checksheet

☑ PIM and / or	☑ Building Consent	☐ Certificate of Acceptance	☒ Drainage/Water Connection Application (note fees)

Received Date 15.2.12	Lodgement $ 300 —	Receipt No. 370551	Receipt Date 15.2.12

PIM No. 36577	Issued 7/3/12	BC No. 36577	Issued 7/3/12	COA No.	Issued

Officer	Approved to Issue	Date Approved	Date Information Requested	Date Information Received	Processing Time
Vetting	Heb	16/2/12	15.2.12		
Administration	Cindy	17/2/12			0
Planning	88	23/2/12			4
Development Engineer					0
Health					
Trade Waste					
Hazardous Substances					
Building	LP	29/2/12	27/2/12		2+
Plumbing					
Structural					
Consultant					
Administration	Jess	29.2.12			0
				Total Processing Time	6+

Administration Use Only

				Fees (GST incl.)
Easement	**Yes / No**	Issue B/C	IBC	$ 59.85
		Issue PIM/Issue Advice Note	IPI/IAN	$ 71 —
		Issue CCC	CCC	$ 90.60
Plan Processing Fee	$	Plan Processing Fee	BIN	$ 280.80
Building Inspection Fee	$	Inspection Fee 2	BEX	$ 244 —
		Inspection Fee Commercial	BEC	$
Compliance Schedule	**Yes / No**	Compliance Schedule	COM	$
		Copy of CCC to Agent	CopyCCC	$
		Asset Bond	VCB	$ —
PIM Planning Fee	$ 68.50	Asset Development Inspection Fee	ADIF	$ —
PIM Dev. Eng Fee	$ 61.00	Water or Drainage Connection Application Fee	I06	$ —
Total PIM Fee	$ 129.50	Process PIM/Plan Development Eng Assessment	PIM/PDE	$ 129.50
Building Impact Fees		BIF Wastewater	BIFW	$
		BIF Water Supply	BIWS	$
		BIF Com Infrastructure	BICI	$
		BIF Reserves	BIRC	$
		BIF Roading	BIRD	$
Government Levies		BRANZ Levy	I03	$
		BIA Levy	BIA	$
		BCA Accreditation Levy	BCA	$ 28.75
		Drainage Pollution Prevention	DPP	$ —
		Earthworks Monitoring	EMON	$ —
		Total		$
SIF Fees *(PTO for Codes)*		Additional Fee		$
		Total Fee		$ 904.50
BC Conditions	**Yes / No**	Less Lodgement	LOD	$ 300 —
		Balance Owing		$ 604.50

Invoice Number	8H6932	Date 29.2.12	Amount $ 604.50
Receipt Number	437372	Date 6.3.12	Amount $ 604.50

Bethlehem

		x No.	$
BHH20	Water		
BHWW	Wastewater		
BHSW	Stormwater		
BHRD	Roading		
BHCI	Com Infrastructure		
BHFR	Reserves		
	Total (inc GST)		

Pyes Pa

		x No.	$
PYH2O	Water		
PYWW	Wastewater		
PYSW	Stormwater		
PYRD	Roading		
PYCI	Com Infrastructure		
PYFR	Reserves		
	Total (inc GST)		

Ohauiti

		x No.	$
OHH2O	Water		
OHWW	Wastewater		
OHSW	Stormwater		
OHRD	Roading		
OHCI	Com Infrastructure		
OHFR	Reserves		
	Total (inc GST)		

Welcome Bay

		x No.	$
WAIH2O	Water		
WAIWW	Wastewater		
WAISW	Stormwater		
WAIRD	Roading		
WAICI	Com Infrastructure		
WAIFR	Reserves		
	Total (inc GST)		

Papamoa

		x No.	$
PAPH2O	Water		
PAPWW	Wastewater		
PAPSW	Stormwater		
PAPRD	Roading		
PAPCI	Com Infrastructure		
PAPFR	Reserves		
	Total (inc GST)		

Landscaping Impact Fees

		$
LIFJ	Judea	
LIFM	Mt Maunganui	
	Total (inc GST)	

West Bethlehem

		x No.	$
WBHH2O	Water		
WBHWW	Wastewater		
WBHSW	Stormwater		
WBHRD	Roading		
WBHCI	Com Infrastructure		
WBHFR	Reserves		
	Total (inc GST)		

West Pyes Pa

		x No.	$
WPYH2O	Water		
WPYWW	Wastewater		
WPYSW	Stormwater		
WPYRD	Roading		
WPYCI	Com Infrastructure		
WPYFR	Reserves		
	Total (inc GST)		

Wairakei

		x No.	$
WRKCI	Com Infrastructure		
WRKH20	Water		
WRKWW	Wastewater		
WRKSW	Stormwater		
WRKRD	Roading		
WRKFR	Reserves		
	Total (inc GST)		

Tauriko

		x No.	$
TKOH2O	Water		
TKOWW	Wastewater		
TKOSW	Stormwater		
TKORD	Roading		
	Total (inc GST)		

Mount Maunganui Infill

		x No.	$
MTH2O	Water		
MTWW	Wastewater		
MTCI	Com Infrastructure		
MTFR	Reserves		
	Total (incl GST)		

Tauranga Infill

		x No.	$
TGH2O	Water		
TGWW	Wastewater		
TGCI	Com Infrastructure		
TGFR	Reserves		
	Total (inc GST)		

Southern Pipeline Wastewater

		$
SPWW	Wastewater	

Project Information Memorandum Checksheet

PIM No. 36577

Vetting Officer: If the proposed building work is of minor nature, please provide standard information and complete process in readiness for the PIM to be issued.

- Are any other consents required? Yes / No
- Details of authorisations which have been granted Yes / No
- Historic Places Trust has been notified Yes / No **Date Notified** ...../...../.....

Circle if applicable / **Cross** if not applicable

PIMA A REGISTERED SURVEYOR, EMPLOYED BY THE APPLICANT AT THE APPLICANT'S EXPENSE WILL BE REQUIRED TO DEMONSTRATE THAT THE BUILDING COMPLIES WITH THE MAXIMUM HEIGHT AND OVERSHADOWING REQUIREMENTS OF THE DISTRICT PLAN.

WRITTEN CONFIRMATION IS REQUIRED PRIOR TO THE CLOSING IN OF THE BUILDING.

A RESOURCE CONSENT WILL BE REQUIRED FOR ANY ENCROACHMENT INTO OVERSHADOWING AND/OR YARD REQUIREMENTS IDENTIFIED AFTER THE ISSUE OF THE BUILDING CONSENT.

PIM2A The building as depicted in the attached plans **does not** comply with the District Plan. Therefore, if the project is to proceed the following authorisations are required:

A Resource Consent for:

Therefore, the following restrictions under Section 37 Building Act 2004 will apply until the Resource Consent has been obtained:

- ☐ No building work to which the above consent relates may be undertaken.
- ☐ Building work to which the above consent relates may be undertaken only to the extent specified herein:

PIM2B An Outline Plan Approval (Resource Management Act 1991) application is required.

PIM3 The building is to be erected and used in accordance with the attached Resource Consent conditions.

PIM4 Development Contribution Fee(s) together with Building Consent Fees and charges are to be paid before the Building Consent is uplifted.

PIM5 The Tauranga City Council Roading Hierarchy Plan showing the existing and proposed roading network is attached. For further information, please refer to the City Transportation Group, Tauranga City Council.

PIM6 Should an archaeological site be found on the site during excavations, the owner must apply for authority from Historic Places Trust prior to destroying, damaging, or modifying any archaeological site. Further information can be obtained by contacting the duty planner. Should koiwi (human remains) be uncovered during excavation, please contact the Tauranga City Council to arrange for tangata whenua to be advised and appropriate steps taken for reburial.

PIM7 Site is suitable for proposed building subject to confirmation of ground conditions at time of footing inspection.

PIM8 Normal precautions adopted for excavation and filling within the Tauranga area should be observed. Excavation faces near to boundaries or other structures, which are over 1.5 metres high, should generally be retained by walls designed in accordance with the New Zealand Building Code and fill, in excess of one metre deep, should only be placed under the guidance of a Registered Engineer. For a slab on grade floor where the fill exceeds a depth of 600mm from the existing building platform to the underside of the slab, it will be necessary for a geotechnical engineer to investigate the underlying soils to a depth of approximately twice the width of the fill. A Building Consent is required for retaining walls 1.5 metres in height or greater or irrespective of the height where there is likelihood of surcharge from buildings or vehicles. Excavations for the construction of retaining walls shall be contained within the legal boundaries of the lot, unless consent of the adjoining owners is obtained prior.

PIM10 The on-site effluent treatment system shall be designed, constructed and maintained to comply with the requirements of Environment Bay of Plenty, under their "On-site Effluent Treatment Regional Plan". A reserve area shall be set aside on each lot for installing an alternative soakage bed system in the event of failure of the original. For further advice on the matter, please contact Environment Bay of Plenty on telephone 0800 368 267.

☒ **PIM11** Standard guidelines for the disposal of stormwater by ground soakage on residential lots at Mount Maunganui and Papamoa (exclusive of Bayfair Estate and Matapihi) are attached. In summary, these guidelines recommend that soakpits shall be constructed of three 600mm diameter perforated rings, unless ground water conditions dictate otherwise, which shall not service more than 30 square metres of roof area. Such soakage may be duplicated and inter-connected in parallel if more than 30 square metres of roof is served by a downpipe dropper.

During construction, the drainlayer shall examine the soils present and, after consideration of ground water levels and soil compaction present, make a judgement on whether good soakage is present to proceed with construction.

☒ **STAND1** Any lease agreement, rights of way and/or easement that relates to the property may require the applicant to obtain the consent of other interested parties to allow this proposal to proceed. Please check the terms of your lease agreement or Certificate of Title.

☒ **STAND2** Prior to the commencement of building, you are advised to locate and verify on site, the invert levels of service connections intended to be utilised and any Council pipelines and manholes that are in close proximity (as defined in Council's Infrastructure Development Code) to any building. Vehicle crossings are to be located clear of Council Stormwater Sumps. The attached services plan/asbuilt plan provides the approximate location of Council mains and service connections.

☒ **STAND3** Any works associated with public utilities, ie, sewer/stormwater/water which are required outside the legal boundaries of the site require prior approval from the Asset Development Division of the Tauranga City Council. For further details, please telephone (07) 577 7000.

Any work on Council utilities must be inspected by the Tauranga City Council's City Development staff prior to backfilling.

A SEPARATE FEE WILL BE CHARGED FOR INSPECTIONS.

☒ **STAND4** **Street Trees** - Vehicle crossings are not to be constructed within 2.0 metres of the trunk or within the dripline of any street tree without the prior consent of the Tauranga City Council's City Arborist. Any costs associated with removing or relocating street trees will be at the sole expense of the applicant.

☒ **LISTEDTREE** This site or an adjoining site contains a Landscape or Notable Tree identified in the Tauranga District Plan. The Tauranga District Plan contains specific requirements for works undertaken within the dripline of these trees. Please refer to the attached summary.

☒ **POLLUTION** **Stormwater Pollution Prevention** - The discharge to Council's STORMWATER SYSTEM of any material other than clean rainwater is **prohibited.** For further information, please contact the Pollution Prevention Officer, Tauranga City Council on phone (07) 577 7000.

☒ **TRADEWASTE** **Trade Waste** - The discharge to Council's WASTEWATER SYSTEM of wastewater arising from any trade activity or process may require a Trade Waste Consent. Please contact Glenn Coates, Trade Waste Officer, Tauranga City Council on phone (07) 577 7074 or (0274) 992 784 for further information.

☒ **HAZSUB** **Hazardous Substances** - Any storage or use of hazardous substances shall comply with the Hazardous Substances and New Organisms Act 1996 and Chapter 18 of the Tauranga District Plan. A resource consent may also be required. Please contact Tauranga City Council on phone (07) 577 7000 for further information.

☒ **HEALTH** The work is to comply with the Food Hygiene Regulations 1974 and the premises are to be registered with the Tauranga City Council prior to commencing operation.

☒ **BLDGCON** Building Consent will be issued with conditions. Please refer to the Building Consent for specific details of the conditions.

☒ **EARTHQUAKE** The existence of an entry under Section 74 of the Building Act 2004 may limit statutory natural disaster insurance. Refer Clause 3(d) of the Third Schedule to the Earthquake Commission Act 1993.

☒ **SWIMPOOL** Swimming Pool Water Connection - Pursuant to the Tauranga City Council General Bylaw 2008, it is a requirement of the Tauranga City Council that at the applicant's expense, an appropriate backflow prevention device is installed on the water main servicing the property, in an accessible position for inspection and servicing, at a point as near as practicable to the boundary of the property. Refer to the attached Water Consent for backflow requirements.

☒ **CUTSERVICE** All existing service connections are to be adequately terminated and made safe.

Water is to be disconnected and plugged at the point of supply by a registered plumber.

Sanitary sewer is to be capped at the lot boundary by a registered drainlayer and the position logged from the site boundaries.

Any gas service is to be disconnected by an authorised contractor. Application for termination should be made to either of the following gas retailers:

Contact Energy Phone 0800 363 726 or Natural Gas Corporation phone 0800 800 430.

☐ **SEC 363** Under Section 363 of the Building Act 2004 it is an offence to permit public use of a building for which no building consent or code of compliance certificate has been granted.

☒ **FIRESERVICE** The building owner is required to make provision for an evacuation scheme under Section 21A of the Fire Service Act 1975.

☒ **XING** Vehicle crossings are to be a maximum width of 4.5m at the kerb.

TCC Ref: 1800805

Project Information Memorandum – Other (cont'd)

(X) A consent notice is registered on the Certificate of Title for:

Lots 1-12, 18-33, 40-50, 119-124 and 131-148 requiring that:

(a) The owners of such lots acknowledge that permitted farming activities are undertaken on other land in the vicinity and that any lawful management practices (including the spraying of horticultural crops) associated with the farming activities concerned may continue to be undertaken in accordance with any relevant New Zealand Standards and Codes of Practice.

(b) The design and construction of any structures requiring a Building Consent in accordance with the Building Act 2004 shall comply fully with the recommendations contained in the Geotechnical Report compiled by S & L Consultants Ltd dated January 2007, Reference 17726-1D. Any development of the property shall also be undertaken in accordance with the above report.

(c) All domestic stormwater from roofs, accessway, parking and manoeuvring areas and landscaped areas shall be collected and piped to the stormwater connection provided to ensure minimal development overland water flows between properties or is directed off site in an appropriate manner.

(X) This site is located in a medium windzone

Planning: Ret wall - max height
front boundary 1-8m
wall supporting cut.

Tauranga City

Application for
Building Consent and/or
Section 33 or Section 45, Building Act 2004

TCC Ref:4607481

Single Residential Dwelling and Accessory Buildings Project Information Memoranda and/or Drainage and/or Water Services Approval

Section 198 Local Government Act 2002, and/or Tauranga City Council Water Supply Bylaw 2007, and/or Tauranga City Council Code of Practice for Development

This box for office use only Application No: 36577 Receipt No: 370551

The Building

#9036/24

Street address of building:
[for structures that do not have a street address, state the nearest street intersection and the distance and direction from that intersection]
30 Caldera Cres Pyes Pa

Legal description of land and where building is located:
[state legal description as at the date of application and, if the land is proposed to be subdivided, include details of relevant lot number and subdivision consent]
Lot: 132 DPS No. 382535
Flat: DPS No.

Building name: *[If applicable]*

Location of building within site/block number:
[includes nearest street access]
Front Boundary

Number of levels: *[include ground level and any levels below ground]*
One

Level / Unit number: *[If applicable]*

Total Floor Area (m²)

Indicate area affected by the building work if less than the total area (m²)

Current, lawfully established, use:
[include number of occupants per level and use if more than 1]

Year first constructed:
[approximate date is acceptable eg: 1920s or 1960-1970]

The Owner

[All contact details must be in New Zealand.]

#39212 ✓

Name of owner:
[Names must be in full]
Leo John Ryan
Courtney Jane Ruth Faass

Owner's mailing address:
17 Gordon Rd, Mt Maunganui

Contact person: *[If owner is company, trustee or similar]*

Street address / Registered office:

Phone numbers Landline Mobile
Daytime After hours

Email address:

Evidence of ownership is attached to this application:

☐ Certificate of Title ☐ Lease ☐ Agreement for Sale and Purchase ☑ Other document

Agent/Contact Person

(Only required if application is being made on behalf of the owner)

Name of agent: Al Homes

Contact person: *[insert n/a if the agent is an individual]* Dion Wilson

Agent's mailing address: P.O Box 4367, Mt Maunganui

Street address / registered office:

Phone numbers Landline Mobile 027 2224853

Daytime After hours

Facsimile number(s):

Email address(es): dion.wilson@alhomes.co.nz

Relationship to owner:
[State details of the authorisation from the owner to make the application on the owner's behalf ie written authority]

First point of contact for communications with the Council / Building Consent Authority: Full Name Dion Wilson

The agent/contact person as nominated above is to receive the following:

Please tick box:

Processing enquiries ☑ PIM ☑ Service Consent ☑ Building Consent ☑ Copy of Code Compliance Certificate (cost $15.00) ☐

Email ☑

Who will be paying for this consent? Owner ☑ Agent/Contact ☑ Builder ☐

Application

I request that you issue a:

☐ Project Information Memorandum only

☐ Building Consent only. If applying for building consent only, please provide PIM No .....

☑ Both PIM and Building Consent

for the building work described in this application.

Signed by the owner *or* **Signed by the agent**
[on behalf of, and with written authority from, the owner]

Signature ..... Signature .....

Name ..... Name Dion Wilson

Date ..... Date 14/2/2012

The Project

Detailed Description of the Building Work:

Build a 1.8m high retaining wall along front boundary of property.

Will the building work result in a change of use of the building? ☐ Yes ☑ ~~No~~

If Yes, provide details of the new use:

Intended life of the building if less than 50 years: *[number of years]* 50

List building consents previously issued for this project: *[if any]:*

BC 35842

What was the previous use of the building site?

Bare section

Estimated value of the building work on which the building levy will be calculated: $ 9,500 (incl. GST)
[state estimated value as defined in section 97 of the Building Act 2004]

Project Information Memorandum

The following matters are involved in the project: *[tick the matters relevant to the project]* Vetting Officer ☐

Yes ☐	No ☑	**Is there a proposed subdivision for this land?** If Yes, please provide resource consent number .....
Yes ☐	No ☑	Are you digging out the site for a building platform?
Yes ☐	No ☑	Are there new or altered connections to Council sewer, storm water or water mains?
Yes ☐	No ☑	Are you altering domestic sewer or storm water drains?
Yes ☐	No ☐	Are you building near or over any road or public space?
Yes ☐	No ☑	Are you building near or over existing domestic sewer, storm water, water mains or wells?
Yes ☐	No ☑	Are you building or altering a vehicle crossing (entrance)?
Yes ☐	No ☑	Is the site contaminated?
Yes ☐	No ☑	Will the building be sited on sloping ground, or near to a bank, a stream or a coastal zone?
Yes ☑	No ☐	Have you demonstrated new or altered locations and/or external dimensions of proposed buildings?
Yes ☐	No ☑	Are you installing new or altering existing drains?
Yes ☐	No ☑	Are you intending to use or store hazardous substances?
Yes ☐	No ☑	Is there any other relevant information? Please state below or attach information, eg land use, consents.

Comments .....

Office Use Only	Signed:	Date: .....

Building Consent

Do not fill in this section if the application is for a project information memorandum only.

The building work will comply with the building code as follows:
[if you're not sure which clauses are applicable, talk to your architect]

Clause		Means of Compliance	Proposed Inspections
[which of the following clauses will be involved in the proposed work?]		*[refer to the relevant compliance document(s) or detail of alternative solution in the plans and specifications]*	*[state means of inspection. Note PS4 or certification may be required]*
☑ B1	Structure	☐ B1/AS2 ☑ NZS3604 ☐ NZS1170 ☐ NZS4229 ☑ Other VM1 *[specify]*	☑ Council ☐ Engineer ☐ Other ..... *[specify]*
☑ B2	Durability	☑ B2/AS1 ☐ NZS3101 ☑ NZS3602 ☐ NZS3604 ☐ Other ..... *[specify]*	☑ Council ☐ Engineer ☐ Other ..... *[specify]*
☑ C1-4	Fire	☐ C/AS1 ☑ Other C2/AS1 NZMP3640:2003 *[specify]*	☑ Council ☐ Engineer ☐ Other ..... *[specify]*
☑ D1	Access routes	☑ D1/AS1 ☐ NZS4121 ☑ Other NZS4229 *[specify]*	☑ Council ☐ Engineer ☐ Other ..... *[specify]*
☐ D2	Mechanical installations for access	☐ D2/AS1 ☐ NZS4332 ☐ EN81 ☐ EN115 ☐ Other ..... *[specify]*	☐ Engineer ☐ Other ..... *[specify]*
☑ E1	Surface water	☑ E1/AS1 ☐ AS/NZS3500.3 ☐ Other ..... *[specify]*	☑ Council ☐ Other ..... *[specify]*
☑ E2	External moisture	☑ E2/AS1 ☐ Specific design and testing ☐ Other ..... *[specify]*	☑ Council ☐ Other ..... *[specify]*
☑ E3	Internal moisture	☑ E3/AS1 ☐ Other ..... *[specify]]*	☑ Council ☐ Other ..... *[specify]*
☐ F1	Hazardous agents on site	☐ F1/AS1 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☐ F2	Hazardous building materials	☐ F2/AS1 ☐ NZS4223 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☐ F3	Hazardous substances etc including HSNO Act requirements	☐ F3/AS1 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☑ F4	Safety from falling	☑ F4/AS1 ☐ FSP Act ☑ Other NZS4223 *[specify]*	☑ Council ☐ Other ..... *[specify]*
☐ F5	Construction and demolition hazards	☐ F5/AS1 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☐ F6	Lighting for emergency	☐ F6/AS1 ☐ NZS 2293 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☑ F7	Warning systems	☑ F7/AS1 ☐ AS/NZS1668 ☐ NZS4512 ☐ NZS4541 ☐ Other ..... *[specify]*	☑ Council ☐ Engineer ☐ Other ..... *[specify]*
☐ F8	Signs	☐ F8/AS1 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*

Clause *[which of the following clauses will be involved in the proposed work?]*		Means of Compliance *[refer to the relevant compliance document(s) or detail of alternative solution in the plans and specifications]*	Proposed Inspections *[state means of inspection. Note PS4 or certification may be required]*
☑ G1	Personal hygiene	☑ G1/AS1 ☐ Other ..... *[specify]*	☑ Council ☐ Other ..... *[specify]*
☐ G2	Laundering	☑ G2/AS1 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☐ G3	Food preparation and prevention of contamination	☐ G3/AS1 ☐ Other ..... *[specify]*	☑ Council ☐ Other ..... *[specify]*
☑ G4	Ventilation	☐ G4/AS1 ☐ AS1668.2 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☑ G5	Interior environment	☑ G5/AS1 ☐ Other ..... *[specify]*	☑ Council ☐ Other ..... *[specify]*
☐ G6	Airborne and impact sound	☐ G6/AS1 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☑ G7	Natural light	☐ G7/AS1 ☐ Other ..... *[specify]*	☑ Council ☐ Other ..... *[specify]*
☑ G8	Artificial light	☑ G8/AS1 ☐ NZS6703 ☐ Other ..... *[specify]*	☑ Council ☐ Other ..... *[specify]*
☑ G9	Electricity	☑ G9/AS1 ☑ Other AS/NZS 3000 & 3008 ..... *[specify]*	By certification only
☐ G10	Piped services	☐ G10/AS1 ☐ NZS5261 ☐ Other ..... *[specify]*	By certification only
☑ G11	Gas as an energy source	☑ G11/AS1 ☐ Other ..... *[specify]*	By certification only
☑ G12	Water supplies	☑ G12/AS1 ☐ AS/NZ3500.2 ☐ AS/NZ3500.5 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☑ G13	Foul water	☑ G13/AS1 ☑ AS/NZ3500.2 ☐ BS5572 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☑ G14	Industrial liquid waste	☐ G14/AS1 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☐ G15	Solid waste	☐ G15/AS1 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*
☑ H1	Energy efficiency	☐ H1/AS1 ☑ NZS4218 ☐ NZS4243 ☐ ALF Design Manual ☐ NZS4214 ☐ Other ..... *[specify]*	☐ Council ☐ Other ..... *[specify]*

When an alternative solution to the building code is proposed, the application shall be in writing with documentation clearly showing how the specific performance requirements of the N.Z. Building Code are satisfied.

Waiver/modification to NZ Building Code required for following parts of code:

.....

.....

.....

Attachments

[Tick as applicable or put n/a if there are no attachments]

The following documents are attached to this application:

- ☐ Drainage and/or Water Services Application
- ☐ Plans and Specifications [list below]

2 sets plans .
2 sets Engineers Calcs .

- ☐ Project Information Memorandum
- ☐ Development Contribution Notice
- ☐ Certificate attached to Project Information Memorandum
- ☐ A3/A4 Plan showing location of all Specified Systems for Compliance Schedule (ie, manual call points, fire cells, fire/smoke doors, backflow preventers, exit signs, etc.)

Contacts

Designer/Architect
Business/name ACD Architecture
Address 1426 Cameron Rd
Greerton, Tauranga
Landline 7 541 3133 Mobile
Facsimile LBP Number

Builder
Business/name BOP Commercial builders
Address Paul Oldham
Landline Mobile
Facsimile LBP Number

Cladding Installer
Business/name
Address
Landline Mobile
Facsimile LBP Number

Roofer
Business/name
Address
Landline Mobile
Facsimile LBP Number

Electrician
Business/name
Address
Landline Mobile
Facsimile Registration

Gasfitter
Business/name
Address
Landline Mobile
Facsimile Registration

Plumber
Business/name
Address
Landline Mobile
Facsimile Registration

Drainlayer
Business/name
Address
Landline Mobile
Facsimile Registration

Fireplace Installer
Business/name
Address
Landline Mobile
Facsimile Registration

Other
Business/name Ralph Gillard Consulting
Address 4 Dawn View Pl
RD 6, Te Puna
Landline 7 552 4476 Mobile
Facsimile Registration

Privacy Information

Pursuant to the Privacy Act 1993 the following information is brought to your attention.

This document collects personal information about you and is collected pursuant to Section 33 and/or Section 45 of the Building Act 2004. Pursuant to Section 216 of the Building Act 2004, the Information contained in this document will be made available and passed on to the public on request.

The information contained in the document is being collected and held by the Tauranga City Council. You do have the right of access to and correction of this information subject to the provisions of the Privacy Act 1993.

Pursuant to Section 217 of the Building Act 2004 the building owner may request the plans and specifications be marked confidential for the purposes of security. Such a request must be in writing and addressed to:

Group Manager Customer and Environmental Services, Tauranga City Council, Private Bag 12 022, Tauranga 3143

Service Connection Authorisation

Vehicle Crossing

(Please tick box)

☑ Not applicable

☐ I intend using the existing vehicle crossing

☐ I intend installing a new residential vehicle crossing (Please note: maximum width 4.5m at kerb)

☐ I intend installing a new commercial vehicle crossing (Please note: maximum width 6m at kerb)

☐ I intend installing a new industrial vehicle crossing (Please note: maximum width 9m at kerb)

Please note:

- Your proposed vehicle crossing must be clearly illustrated on the site plans accompanying this application and is to be clear of any obstructions, such as:
  - **Trees** - **Stormwater Cesspits** - **Streetlights** - **Traffic Islands** - **Manholes**
- When uplifting your building consent, you will receive a copy of a Council pamphlet headed *"Vehicle Crossing and Asset Protection Requirements"*. It is important you read this pamphlet and follow the instructions provided.
- If required, and prior to uplifting your building consent, the applicant shall pay Council a sum of money being the specified amount of a vehicle crossing and/or asset protection bond. No interest shall be payable to the applicant on the bond monies held by Council. All or any reasonable expenses incurred by Council in effecting repairs to a damaged vehicle crossing, footpath, wastewater, stormwater assets or arising there from, shall constitute a debt due to the Council by the applicant and may be recovered by Council by deduction from the monies deposited with the Council under this bond.
- When Council is satisfied that all specified works are completed and all as-built plans accepted, the said monies shall be repaid to the person nominated below and the bond cancelled. It should noted further that the applicant is the person/s making application for this building consent and / or project information memorandum and must be the owner of the land on which building work is contemplated or a person who or which has agreed in writing, whether conditionally or unconditionally, to purchase the land or any leasehold estate or interest in the land, or take a lease of the land, while the agreements remains in force.

Please nominate who is to receive vehicle crossing and / or asset protection bond refund: *(Please tick box)*

☐ Owner ☐ Owner's agent/contact person ☐ Builder

Sewer Connection

(Please tick box)

☑ Not applicable

☐ I intend using the existing sewer connection

☐ I intend installing a new ..... mm sewer connection and have completed and attached the application form.

☐ I intend installing an on-site effluent treatment system

☐ Other *(supply details)* .....

.....

Please note:

- Your proposed sewer drainage system must be clearly illustrated on the site plans accompanying this application.
- If you intend installing an on-site effluent treatment system, it must be designed and installed in accordance with the Environment Bay of Plenty (EBOP) Operative On-Site Effluent Treatment Regional Plan.
- For further information, phone EBOP 0800 368 267.
- A trade waste consent is required for any wastewater discharge from a trade activity (Refer Trade Waste Officer, Tauranga City Council, phone 577 7000.)

Stormwater Disposal

(Please tick box)

☑ Not applicable

☐ I intend using the existing stormwater connection

☐ I intend installing a new ..... mm stormwater connection and have completed and attached the application form.

☐ I intend installing an on-site disposal system.

☐ I intend installing a new kerb connection

☐ Other *(supply details)* .....

.....

Please note:

- Your proposed stormwater drainage system must be clearly illustrated on the site plans accompanying this application.

Water Services Application

If a New Water Connection, Change of Use of Water Connection, or an Alteration to an Existing Water Connection is being applied for, please complete the **Drainage and/or Water Services Application** on page 13 and submit it along with this form. If this does not apply, please sign here

Name..... Signature. Amber McMillan Date 15/2/12.

SPECIFICATION FOR TIMBER POST AND RAIL RETAINING WALLS at Ryan Dwelling, 30 Caldera Crescent, Tauranga

Scope

This specification covers construction of retaining walls using timber poles in accordance with details shown on Drawings or Sketches provided by Ralph Gillard Consulting Company Ltd.

Timber Specification and Preservation

1. Timber poles shall be peeled and tapering radiata pine logs complying with the requirements of NZS 3605 'Timber Piles and Poles for Use in Building', treated to the Timber Treatment Specification H5.
2. Sawn timber planks in ground contact shall be radiata pine treated to specification H5 unless H4 is shown on the Ralph Gillard Consulting Company drawings. The timber planks shall be VSG8 or G8 grade timber unless No. 1 Framing Grade is shown on the Ralph Gillard Consulting Company drawings. (In low walls (less than 1.8m high say), with the Engineer's approval in writing, the timber grade may be able to be relaxed to Number 1 Framing Grade and in those cases where plank replacement is possible, the timber treatment may be able to be relaxed to H4)
3. All timber shall have the timber treatment identification brands visible when delivered to the site, and shall be protected against damage during storage and handling.
4. Dimensions of poles are specified as minimum small end diameters. Actual diameters will be somewhat greater due to taper and timber grading.
5. Cutting of timbers shall be avoided wherever possible. If cutting is necessary the exposed surfaces shall be flooded with a copper napthenate type of wood preservative.

Excavation

1. All excavation shall be carried out in such a way that it does not remove support from adjoining properties or other structures or the road. Excavation in stages to allow for temporary support during construction or temporary shoring of excavation may be required. Excavations unsupported during construction may be hazardous.
2. Excavations shall only be carried out by adequately skilled persons and proper care shall be exercised at all times to ensure lives and property are not endangered.
3. It is the builder's responsibility to ensure that the area to be excavated is free from buried services.
4. Excavations for foundations shall be carried out by augering to the diameter and depth detailed on the drawings or sketches provided by Ralph Gillard Consulting Company Ltd. Allowance shall be made in positioning augered holes for the backward slope of the wall and for the concrete surround to the poles. Driving of poles is NOT an acceptable alternative to augering.

Pole Cutting and Placement

1. Poles shall be erected with the large end at the bottom of the hole and the small end upper most.
2. If the poles delivered to site are longer than required only the small diameter end may be shortened. Poles shall not be cut at any point which is below ground level.

Concrete

1. Concrete for foundation backfill shall be premixed concrete with a 28-day strength of 17.5 MPa.
2. Concrete shall be placed under and around poles and well compacted by tamping or a vibrator.
3. Poles shall be temporarily propped and protected against disturbances for at least 2 days after placement of concrete.

Rail Fixing

1. The minimum length of the horizontal rails shall be twice the spacing of the vertical poles.
2. The joints in the rails shall be staggered so that, at each pole, no more than every second rail is joined. Joints in the rails shall be butted closely with a square butt.
3. Horizontal timbers shall be fixed to poles with hot dip galvanized nails. 100mm minimum length nails shall be used for rails of 50mm nominal thickness. 150mm nails shall be used for rails made out of full rounds and half rounds. Timbers shall be laid in position commencing at the bottom of the wall. Care shall be taken to achieve neat straight lines of horizontal timbers.

Backfilling

1. The backfill to within 200mm of finished surface level shall be granular free draining material not larger than 100mm in diameter.
2. The backfill shall be well compacted in layers of not more than 200mm as it is being placed. If there is insufficient room to get compaction equipment behind the wall use a say 100mm dia pole to compact by tamping from above.
3. The top surface shall be sealed against entry of surface water with a layer of subsoil.

20 September 2011

A1 Homes
PO Box 4367
Mt Maunganui 3149

Dear Sir/Madam

Additional Information Required (Two Copies)
Application for Building Consent (Reference Number 35842)

Property Situated at: 30 Caldera Crescent
Lot No: 132 **DP No:** 382533

Two copies of the following information are required before your building consent application can be fully processed. Please provide only the relevant plans and documentation to avoid additional consent processing charges being incurred.

1. The calculation for site coverage does not appear to include any roof area or guttering that exceeds the permitted 600mm eave. Is the building area of 170.84m^2 over frame or over cladding? For calculating site coverage, the over cladding area is the area required in the calculation.

2. The retaining wall shown on the consent plans is in close proximity to a Council sewer main and manhole. Please demonstrate that this wall complies with Council's Infrastructure Development Code close proximity rules.

Yours faithfully

Sandy Fleet
Project Information Memorandum Officer: Building Services

Please address all Communications to:

Manager: Building Services
Tauranga City Council
Private Bag 12022
Tauranga 3143

(**Fax:** (07) 577 7034)

A1homes

acdarchitecture.com

BUILDING SPECIFICATION

APPROVED
These plans are approved in accordance with The NZ Building Code.
These plans must remain on site.
TAURANGA CITY COUNCIL

New Residence for :

Leo Ryan

30 Caldera Cresent, Pyes Pa, Tauranga.

05.08.11

1012 TABLE OF CONTENTS

2210 PREPARATION AND GROUNDWORK

1. GENERAL

This section relates to the clearance, excavation and backfilling of the site area in preparation for:

- footings and floor slabs
- backfilling behind basement retaining walls

Documents

1.1 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3604	Timber-framed buildings
OSH	Approved code of practice for safety in excavation and shafts for foundations

1.3 SITE SAFETY

Provide adequate support for all excavations. Cover holes and fence off open trenches and banks.

1.4 ARCHAEOLOGICAL DISCOVERY

If fossils, antiquities and other items of value are found refer to the general section 1270 CONSTRUCTION for actions to be taken with archaeological discovery.

2. PRODUCTS

2.1 EXCAVATED CLEAN FILL

Clean, free of contamination, mineral soil from other formations in the excavation which may be selected and approved as suitable for filling by having grading and moisture content properties that will allow recompaction to 95% of maximum density.

2.2 VOLCANIC TUFF FILL

Scoriaceous tuff of variable grading excluding excessive silt or clay material, capable of being placed and compacted as specified.

2.3 ROCK FILL

Hard material comprising rock, broken stone, hard brick, concrete, run of pit scoria, or other comparable inert material capable of being placed and compacted as specified.

2.4 SAND FILL

Clean sand of such grading in particle size to achieve mechanical compaction to 90% maximum density.

2.5 HARD FILL

Scoria or crushed rock to GAP (General All Passing) 40 grading.

2.6 GRANULAR FILL

Approved screened crushed gravel or scoria, graded in size from 20mm to 7mm, clean. When tested with a standard sieve of 4.75 opening no material is to pass.

2.7 DRESSING COURSE

Scoria to GAP 20 grading, or "dirty footpath scoria", or equivalent "all in" graded crushed metal aggregate.

2.8 FREE-DRAINING AGGREGATE

Scoria or crushed gravel graded 50 to 14 clean.

3. EXECUTION

3.1 WASHOUT BAY FOR TRUCK
Provide a designated area for trucks to be washed down to avoid mud and dirt being carried off site.

3.2 EXCAVATION GENERALLY
Carry out excavation, using plant suitable for the purpose, to the guidelines set by the OSH publication: Approved code of practice for safety in excavation and shafts for foundations.

3.3 BURNING OF MATERIALS
Burning of materials is not permitted on site.

3.4 PROTECT EXISTING WORK
Protect from damage existing buildings, structures, roads, paving and services nominated on the drawings as being retained.

3.5 PROTECT TREES
Protect from damage trees, shrubs, natural site features and existing landscaped areas nominated on the drawings as being retained. Ensure existing levels are undisturbed beneath the dripline of retained trees.

3.6 EROSION CONTROL
Ensure measures are in place to contain silt dislodged as a result of water infiltration and to prevent it being carried off site with stormwater.

3.7 SURFACE PREPARATION
Comply with NZS 3604, section 3.5, **Site preparation**. Remove all turf, vegetation, trees, topsoil, stumps, uncontrolled fill and rubbish from the area to be built on.

3.8 UNDERGROUND ELEMENTS AND SERVICES
Break out and remove old foundations, slabs, drainage pipes, manholes, tanks, cables and redundant services. Report for instructions when any unexpected voids, made-up ground or services are encountered. Seal off the ends of drains or remove to territorial authority approval.

3.9 STOCKPILE TOPSOIL
Stockpile excavated topsoil on site where directed. Keep separate from other excavated materials. Spread and level where directed before completion of the works.

3.10 SHORING AND UNDERPINNING
Carry out shoring and underpinning shown on the drawings and as necessary to prevent subsidence of adjoining public or private property and to ensure the safety of the public and site personnel. Maintain protection throughout the progress of the works, or until foundations and subgrade structures have been completed and the stability of adjoining public and private property secured.

3.11 GENERAL EXCAVATION
Trim ground to required profiles, batters, falls and levels. Remove loose material. Protect cut faces from collapse. Keep excavations free from water.

3.12 ROCK EXCAVATION
If rock is found at any level above the underside of the structural foundations, or above required base levels for site service trenches, immediately notify the owner. Obtain written instructions from the owner on the proposed approach to rock excavation, or consequent alterations to subgrade construction. Confirm any changes with the territorial authority.

3.13 FOUNDATION EXCAVATION
Take foundation excavations to depths shown. Keep trenches plumb and straight, bottoms level and free of soft spots, stepped as detailed and clean and free of water.

3.14 INADEQUATE BEARING

If bearing is not to NZS 3604, 3.1.2 **Foundations** and 3.1.3 **Determination of good ground**, then excavate further and backfill with material as follows. Confirm any changes with the territorial authority.

Below slabs on grade:	Hardfill compacted in 150mm layers
Below footings:	10 MPa concrete
Service trenches:	Hardfill compacted in 150mm layers

If excavation exceeds the required depths, backfill and compact to the correct level with material as listed.

3.15 STANDARD OF COMPACTION

Place fill in layers of not more than 150mm and compact to achieve 95% of maximum dry density. For granular fill material, the fill shall be compacted to 80% of saturated dry density.

3.16 GRANULAR BASE FOR SLABS

To conform to NZS 3604, section 7.5.3, **Granular base**. Consolidate with a vibrating roller. Blind the surface with 20mm of coarse sand or sand/cement and roll ready to receive a damp-proof membrane.

3.17 GENERAL BACKFILLING

Obtain written confirmation from the owner before using any excavated material. Compact approved backfilling in 150mm layers with the last 200mm in clean topsoil, lightly compacted and neatly finished off.

3.19 SURPLUS MATERIAL

Remove surplus and excavated material from the site.

2310 FOUNDATIONS

1. GENERAL

This section relates to all foundation and piling work, with the exception of in situ concrete work and concrete masonry.

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3631	New Zealand national timber grading rules

Performance

1.4 INSPECTIONS
Give notice to Engineer and contract administrator, at least 24 hours prior to foundation inspection being required. At inspection foundation to be clear of obstructions like, backfill, site concrete and reinforcing.

2. PRODUCTS

2.6 NAILS
Steel, stainless steel and galvanized steel of pattern to NZS 3604, table 6.6 **Nailing schedule for hand-driven and power-driven nails** and section 4 Durability.

2.7 BOLTS AND SCREWS
Steel, stainless steel and galvanized steel to NZS 3604.

2.8 NAIL PLATES
Stainless steel and galvanized steel toothed or nailed steel plates to the plate manufacturer's design for the particular locations shown on the drawings.

2.9 CORROSION RISKS
Use stainless steel fixings, connectors, etc in all zones, with the timber treatments CuAz (Preservative code 58) and ACQ (Preservative code 90).

2.10 CONCRETE
For piles and footings, 17.5 MPa prescribed mix concrete to NZS 3104, section 3, and cover to reinforcing to NZS 3604, 4.5.1, generally 50mm, against ground 75mm. Provisions for prescribed mix concrete, and NZS 3604, section 6.4.5, Pile footings.

3. EXECUTION

3.1 FOUNDATIONS GENERALLY
Comply with NZS 3109, 3602 and NZS 3604 except as varied by this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 EXCAVATIONS
Refer to 2210 PREPARATION AND GROUNDWORK.

3120 CONCRETE

1. GENERAL

This section relates to formwork, reinforcement, concrete mixes and the placing of concrete.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B1/AS1	Structure
AS 1366.3	Rigid cellular plastics for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
NZS 3101.1	Concrete structures standard
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
AS/NZS 4671	Steel reinforcing materials

2. PRODUCTS

2.1 NORMAL CONCRETE

Normal concrete 17.5, 20 or 25 MPa grade, (refer to SELECTIONS), maximum aggregate size 19mm ready-mixed to NZS 3104. Provide delivery dockets listing mix and despatch details.

2.2 PRESCRIBED MIX CONCRETE

Prescribed mix concrete 17.5, 20 or 25 MPa grade (refer to SELECTIONS) minimum strength, using either separate batching of sand and builder's mix or coarse aggregate to NZS 3104, table 3.1, Grading recommendations for combined and uncombined coarse aggregates.

2.3 SITE CONCRETE

Special concrete 10 MPa with minimum water for workability, all materials and batching to NZS 3104, table 3.1, Prescribed mixes (P).

2.4 REINFORCEMENT

Bars to AS/NZS 4671. Grade 300E deformed, other than for ties, stirrups and spirals, unless shown otherwise on the drawings. Welded reinforcing mesh to AS/NZS 4671.

2.5 TYING WIRE

Mild drawn steel wire not less than 1.2mm diameter.

2.6 SPACERS AND CHAIRS

Precast concrete or purpose made moulded PVC to approval. Where concrete spacer blocks are used in exposed concrete work use blocks matching surrounding concrete.

2.7 DAMP-PROOF MEMBRANE

0.25mm minimum polyethylene to NZS 3604, 7.5.4, Damp-proof membrane.

2.8 CELLULAR POLYSTYRENE INSULATION

Proprietary expanded polystyrene (EPS) foam board to AS 1366.3.

3. EXECUTION

3.1 HANDLE AND STORE

Handle and store reinforcing steel and accessories without damage or contamination. Store on timber fillets on hard ground in a secure area clear of any building operation. Lay steel fabric flat.

Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity.

3.2 FALSEWORK AND FORMWORK

Use falsework and formwork of sufficient strength to retain and support the wet concrete to the required profiles and tolerances. Select formwork finish to produce the specified finished quality. Ensure timber or plywood used for formwork is non-staining to the set concrete.

Securely fix and brace formwork sufficiently to support loads and with joints and linings tight enough to prevent water loss. Do not use tie wires or rods unless approved in writing by the Contract Administrator. Unless detailed otherwise, provide a 19mm chamfer or fillet strip at all interior and exterior angles of beam and column forms. Mitre at intersections.

Water blast to clean formwork. Keep formwork wet before concrete is placed.

Unless detailed otherwise, set up soffit boxing for beams and slabs to provide a camber when forms are stripped, of 3mm rise for every 3 metres of total clear span.

3.3 INSTALL DAMP-PROOF MEMBRANE

Apply polythene membrane to prepared basecourse with 150mm laps between sheets. Tape seal laps and penetrations with 50mm wide pressure sensitive plastic tape. Refer to drawings for perimeter details.

3.4 INSTALL CELLULAR POLYSTYRENE INSULATION

Install EPS insulation system to manufacturer's requirements.

3.5 CUT AND BEND REINFORCEMENT

Cut and bend bars using proper bending tools to avoid notching and to the requirements of NZS 3109: 3.3 Hooks and bends. Minimum radii of reinforcement bends to NZS 3109, table 3.1, Minimum radii of reinforcement bends. Do not rebend bars. Where rebending is approved, use a purpose built tool, proper preparation and preheating.

3.6 ADJUSTMENTS

Use a purpose built tool for on site bending and to deal with minor adjustments to steel reinforcement.

3.7 TOLERANCES, BENDING

To NZS 3109, 3.9, Tolerances for reinforcement.

3.8 SECURE REINFORCEMENT

Secure reinforcement adequately with tying wire and place, support and secure against displacement when concreting. Bend tying wire back well clear of the formwork. Spacing as dimensioned, or if not shown, to the clear distance minimums in NZS 3109, 3.6, Spacing of reinforcement.

3.9 LAPPED SPLICES

Length of laps where not dimensioned on the drawings in accordance with the SELECTIONS. Increase laps of plain round steel by 100%. Provide laps only where indicated on the drawings. Tie all lapping bars to each other.

3.10 REINFORCEMENT COVER

Minimum cover to all reinforcing bars, stirrups, ties and spirals, as shown on drawings. Where cover is not shown on drawings provide minimum cover to NZS 3101.1, table 3.6, Minimum required cover for a specified intended life of 50 years. Fix chairs for top reinforcement in slabs at 1.0 metre centres or to ensure adequate support. Cover tolerances to NZS 3109, 3.9, Tolerances for reinforcement.

3.11 CASTING IN

Build in all grounds, bolts and fixings for wall plates and bracing elements, holding down bolts, pipes, sleeves and fixings as required by all trades and as shown on the drawings, prior to pouring the concrete.

Do not use grounds exceeding 100mm in length. Location and form of conduits to be approved in writing by the Contract Administrator. Minimum cover 40mm. Do not encase aluminium items in concrete. Do not paint steel embedded items more than 25mm into the concrete encasement. Cut back form ties to specified cover and fill the cavities with mortar.

Form all pockets, chases and flashing grooves as required by all trades and as shown on the drawings.

Wrap all pipes embedded in concrete with tape to break the bond and to accommodate expansion. Do not embed pipes for conveying liquids exceeding a temperature of 50°C in concrete.

3.12 CONSTRUCTION JOINTS

Locate and construct as shown on the drawings or in accordance with NZS 3109, 5.6, Type B.

3.13 PRE-PLACEMENT INSPECTION

Do not place concrete until all excavations, boxing and reinforcing have been inspected and passed by the Building Consent Authority.

3.14 SURFACE FINISHES

To NZS 3114, 105, Specification of finishes, as scheduled or as denoted on the drawings.

3.15 EXPOSED CONCRETE

Formwork linings and surface finishes as nominated for both fair face and concealed or exposed surfaces. Unless detailed, obtain written confirmation of the type and pattern of all joints.

3.16 CONCRETE SURFACE TOLERANCES

To NZS 3114, 104, Surface tolerances and NZS 3114, 105, Specification of finishes, with the suggested tolerances becoming the required tolerances.

3.17 PUMPING CONCRETE

Set up and supervise pump operation, placing and compaction of the mix to NZS 3109, 7.4, Handling and placing and NZS 3109, 7.6, Compaction Advise the ready-mix supplier of the type of pump and the slump required, in addition to the concrete grade, strength and quantity.

3.18 COMPACTION

Use power operated vibrators on foundations, vertical constructions and beams.

3.19 RESIDENTIAL FLOOR SLABS

Construct to NZS 3604, 4.5 **Concrete and concrete masonry** and NZS 3604, 7.5, **Concrete slab-on-ground floors in timber buildings** - (and in the Canterbury Earthquake Region NZBC B1/AS1). Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish. Tolerance on flatness: maximum 3mm gradual deviation over a 3 metre straight-edge, to NZS 3109, 104, Surface tolerances.

3.20 SAW CUTS

Cut slabs where indicated on the drawings and as required to control shrinkage cracking. Carry out cutting as soon as possible, without causing tear-out of aggregate and before shrinkage cracking has occurred, generally within 24 hours of pouring. Where saw cuts are made, cut out 100mm of every second wire of the mesh for a length of 50mm each side of the saw cut position. Saw cuts: $^1/_3$ slab depth or 30mm minimum.

Spacing of sawcuts

Floor situation	Maximum spacing of sawcuts both ways
Industrial floor	5m
Architectural, exposed floor, thin finishes, rigid finishes	4m
Carpet on underlay flooring	6m

3.21 SURFACE DEFECTS

Make good surface defects immediately after forms are stripped. Make good hollows or bony areas with 1:2 mortar or plaster, finished to the same tolerances as the parent concrete. Fill any tie rod holes with 1:2 mortar.

3.22 CURING OF CONCRETE

Keep damp for not less than seven days. Ensure curing of slabs commences as soon as possible after final finishing, by the use of continuous water sprays, or ponding. Alternately, apply a curing membrane. Ensure any membrane used will not affect subsequent applied finishes.

3.23 STRIKE FORMWORK

Strike formwork without damaging or overloading structure. Do not remove formwork before the following minimum periods:

12 hours:	Sides of beams, walls and columns
4 days:	Slabs in beam and slab construction (leave props under slab spans over 2 metres)
10 days:	Props from under slab spans over 2 metres
18 days:	Beams, soffits and slab spans over 5 metres

3.24 CLEAN OUT

Clean out saw cuts. Fill with cement grout where the floor will be covered with carpet or vinyl.

3.25 REMOVE

Remove all unused materials and all concrete and reinforcing debris from the site.

3820 CARPENTRY

1. GENERAL

This section relates to the supply and erection of light timber framing, floors, flooring underlays and decking.

1.1 RELATED WORK
Refer to 4161 WRAPS, UNDERLAYS AND DPC for wraps, underlays, foils and DPC.

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
AS/NZS 1328.1	Glued laminated structural timber - Performance requirements and minimum production requirements
AS/NZS 1748.1	Timber - Solid - Stress graded for structural purposes - General requirements
AS/NZS 2269.0	Plywood - Structural - Specification
AS/NZS 2904	Damp-proof courses and flashings
AS/NZS 2918	Domestic solid fuel burning appliances - Installation
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3631	New Zealand national timber grading rules
NZS 3640	Chemical preservation of round and sawn timber
AS/NZS 4347	Damp-proof courses and flashings - Methods of test
FTMA	Frame and Truss Manufacturers Association of New Zealand Inc - Code of Practice

***A copy of NZS 3604 Timber-framed buildings, must be held on site.**

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:

1.4 SAMPLES
Provide samples of the following for review prior to ordering:
- Boarding for exterior decks
- Timber strip flooring.

1.5 DIMENSIONS
All timber sizes except for battens are actual minimum dried sizes.

2. PRODUCTS

2.1 TIMBER FRAMING, TREATED
Species, grade and in service moisture content to NZS 3602, NZBC B2/AS1 and treatment to NZS 3640, NZBC B2/AS1. Either mechanically stress graded to AS/NZS 1748.1, or visual grading to NZS 3631.

2.2 TIMBER FRAMING, CHEMICAL FREE, MECHANICALLY STRESS GRADED
Species, grade and moisture content in service as set out in NZS 3602, NZBC B2/AS1. Machine stress graded to AS/NZS 1748.1, with an average moisture content at supply of 16% or less.

2.3 LAMINATED TIMBER
Radiata pine laminations to AS/NZS 1328.1; treated as required by NZS 3602, NZBC B2/AS1, to the requirements of NZBC B2/AS1, NZS 3640, with special attention to Appendix B "Specification advisory notes". Supply weather resistant sealed.

2.4 TIMBER TRUSSES
To FTMA Code of Practice. Moisture content 16% at supply

2.5 TIMBER TRUSSES, CHEMICAL FREE
To FTMA Code of Practice. Moisture content 16% at supply

2.12 NAILS
Type to NZS 3604, section 4, **Durability**, and of the size and number for each particular types of joint as laid down in the nailing schedules of NZS 3604, sections 6-10.

2.13 BOLTS AND SCREWS
Bolts and screws of engineering and/or coach type complete with washers, to the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6-10.

2.14 NAIL PLATES
Comply with the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Plates to the plate manufacturer's design for the particular locations as shown on the drawings.

2.15 CONNECTORS
Comply with the requirements of NZS 3604, section 4, **Durability**, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Connectors and structural brackets to the connector manufacturer's design for particular locations shown on drawings.

2.16 CORROSION RISKS
Use stainless steel fixings, connectors, etc in all zones, with the timber treatments CuAz (Preservative code 58) and ACQ (Preservative code 90).

2.17 DPC
Refer to 4161 WRAPS, UNDERLAYS AND DPC section

3. EXECUTION

3.1 EXECUTION GENERALLY
To NZS 3603 and NZS 3604 except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 SEPARATION
Separate all timber framing timbers from concrete, masonry and brick by: -
- a full length bituminous damp-proof membrane overlapping timber by at least 6mm; or
- a 12mm minimum free draining air space

3.3 ATTENDANCE
Provide and fix blocks, nogs, openings and other items as required by other trades.

3.4 MOISTURE CONTENT
Maximum allowable equilibrium moisture content (EMC) for non air-conditioned or centrally heated buildings for framing to which linings are attached.

Framing at erection:	24% maximum
Framing at enclosure:	20% maximum
Framing at lining:	16% maximum
Timber strip flooring:	10% at time of laying

3.5 SET-OUT
Set out framing in accordance with the requirements of NZS 3604 and as required to support sheet linings and claddings.

3.8 FRAMING WALLS
Frame to required loading and bracing complete with lintels, sills and nogs, all fabricated and fastened to NZS 3604, section 8, **Walls**.

3.10 FRAMING ROOFS

Frame to required loading and bracing complete with valley boards, ridge boards and purlins. Design and fit roof trusses complete with anchorage. All fabricated and fastened to NZS 3604, section 9, **Posts** and 10, **Roof framing**.

3.11 FRAMING CEILINGS

Frame to required loading and bracing complete with runners and battens set out to support ceiling lining. All fabricated and fastened to NZS 3604, section 13, **Ceilings**. Trim for openings in ceilings and hatches to NZS 3604 section 13.3, **Openings in ceilings**. Provide blocking for water tanks located in the ceiling space to NZS 3604, section 13.4, **Water tanks in roof space**.

3.12 INSTALLING WALL WRAPS, UNDERLAYS

Refer to 4161 WRAPS, UNDERLAYS AND DPC section

3.22 DPC TO TIMBER

Refer to 4161 WRAPS, UNDERLAYS AND DPC section.

4161T THERMAKRAFT WRAPS, UNDERLAYS AND DPC - RESIDENTIAL

1. GENERAL

This section relates to the application of **Thermakraft** Industries (NZ) Ltd, DPC, DPM, underfloor foil insulation, wall wraps and roofing underlays:
- for use in residential applications

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

NZMRM	New Zealand Metal Roofing Manufacturers Inc.

1.3 INTERPRETATION

Wall wraps used in this specification has the same meaning as building wraps or wall underlays in NZS 3604 and NZBC E2/AS1.

Documents

1.4 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZS/AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
NZS 2295	Pliable, permeable building underlays
AS/NZS 2904	Damp-proof courses and flashings
NZS 3604	Timber-framed buildings
NZS 4200	Pliable building membranes and underlays
AS/NZS 4347	Damp-proof courses and flashings - Methods of test
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM	NZ Metal Roof and Wall Cladding - Code of Practice

1.5 MANUFACTURER/SUPPLIER DOCUMENTS

Thermakraft documents relating to this part of the work:
Thermakraft product manual and technical data sheets.
BRANZ Appraisal 356 - Thermakraft **Cover-Up™** Breather-Type Building Wrap
BRANZ Appraisal 329 - **Supercourse 500** Damp-Proof Course and Concealed Flashing
BRANZ Appraisal 560 - **Mirrablack** Damp Proof Course and Concealed Flashing
BRANZ Appraisal 549 - **Diflex 130** Building Wrap
BRANZ Appraisal 614 - **Aluband™/Aluminium** Window Sealing System
BRANZ Appraisal 651 - Thermakraft **Covertek**™407 Fire Retardant Self-Supporting Roof Underlay
BRANZ Appraisal 695 - **Watergate-Plus** Fire Retardant Wall Underlay
BRANZ Appraisal 711 - Thermakraft **Covertek™** 403 Fire Retardant Wall Underlay

Manufacturer/supplier contact details

Web:	www.thermakraft.co.nz
Telephone:	0800 806 595

1.6 MANUFACTURER'S WARRANTY

Warrant this work under normal environmental and use conditions against failure of materials and execution. Thermakraft Industries Ltd warrant performance of products if design and installation complies with relevant technical literature, NZBC, and recognised industry Codes of Practice. Copy of Thermakraft Product Warranty available on request.

Requirements

1.7 NO SUBSTITUTIONS
Substitutions are not permitted to any specified materials, or associated products, components or accessories.

1.8 INSTALLATION SKILL LEVELS
Installers to be experienced in the installation of **Thermakraft** products and familiar with **Thermakraft** Industries technical literature and the related documents listed in this design i.e. NZMRM NZ Metal Roof and Wall Cladding - Code of Practice.

2. PRODUCTS

Materials

DPM

2.2 DAMP-PROOF MEMBRANE - MEDIUM DUTY
Thermathene Black™, a minimum of 250 microns polyethylene film, which compiles to NZS 3604, 7.5.4, **Damp-proof Membrane**, to NZBC E2/AS1. Refer to SELECTIONS for type of jointing tape.

DPC

2.3 EMBOSSED POLYETHYLENE
Supercourse 500, hi-impact polyethylene film to AS/NZS 2904 and embossed on both sides. Thickness 500 microns minimum, manufactured for use as a damp-proof course and concealed flashings around doors and windows and to BRANZ Appraisal 329.

2.5 PERIMETER DPC
Thermakraft Perrimeter DPC, a heavy kraft impregnated with high grade bitumen.

Wall wraps / underlay

2.9 SYNTHETIC, NON ABSORBENT WOVEN BREATHER TYPE WALL UNDERLAY
Thermakraft Cover-Up™, high tensile coated polyolefin woven building underlay with micro perforated pores that allow the membrane to breathe. A fire retardant product, Flammability Index of ≤ 5, when tested to NZS/AS 1530.2. The product has a BRANZ Appraisal 356.

Roofing underlay

2.15 BITUMINOUS HEAVY WEIGHT BUILDING PAPER
Thermakraft 213™, bituminous heavy weight building paper to NZS 2295.

2.16 BITUMINOUS SELF-SUPPORTING ROOFING UNDERLAY
Thermakraft 215™, bituminous self-supporting roofing underlay to NZS 2295.

Accessories

2.24 WINDOW AND DOOR SEALING TAPE
Thermakraft Aluband™/Window Sealing Tape system consists of synthetic faced reinforced bituminous window sealing tape, **Thermakraft Aluband™** Corner Moulding™ piece, used in conjunction with the **Thermakraft Aluband™** Hand Tool to ensure good adhesion and a tight fit into corners. See **Thermakraft** Data Sheet 312 for installation details and BRANZ Appraisal 614.

2.25 AIR SEAL BACKING ROD
P.E.F. Thermakraft WindowWorm Backing Rod, a cylindrical flexible closed cell polyethylene material available in various diameters and used in conjunction with foam sealants. Refer to SELECTIONS for sizes.

2.26 STUD STRAPS - POLYETHYLENE
Thermastrap 201 & 203, 19mm wide polyethylene straps.

2.27 WIRE NETTING
75mm galvanized hexagonal wire netting to AS/NZS 4534.

2.28 AUSMESH
Ausmesh 300, 2mm x 150 x 300mm galvanized or PVC coated safety mesh to AS/NZS 4389.

2.29 GUTTER AND UNDER FLASHINGS
Thermakraft 215™, bituminous breather type building paper cut to width for use under valley, apron flashing and internal gutters.

Soffit liner cut to width from **Thermakraft 210™** bituminous breather type building paper. Refer to SELECTIONS.

2.30 TAPE
Thermakraft tapes to compliment the underlay. Pressure sensitive aluminium foil tapes for joining foil insulation and vapour barriers. **Thermakraft Aluband™ Window Sealing Tape** can be used to repair damaged bituminous building papers.

3. EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS
Design application and installation of **Thermakraft** Building products to NZBC E2/AS1, BRANZ Appraisals, **Thermakraft** Technical Literature and Industry Codes of Practice.

3.2 STORAGE
Store building underlays and accessory materials, under conditions that ensure no deterioration or damage. Store rolls in an upright position on a smooth floor and protected from sunlight, UV radiation and moisture.

3.3 INSPECTION
Before starting work, check that the building construction phase will allow work of the required standard. Carry out remedial work identified before laying underlay.

Application - DPC/ DPM

3.4 DPC TO LOSP TREATED TIMBER
Lay Supercourse 500 / MirraBlack DPC under LOSP or CCA treated bottom plate of all timber framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.

3.5 DPC TO TIMBER / STEEL
Lay DPC under the bottom plate of all timber / steel framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier. Refer to SELECTIONS for type.

3.6 DPC TO MASONRY AND BRICK VENEER
Lay DPC along based of cavity and fix top edge to studs with galvanized clouts. Turn DPC out over concrete rebate under bottom course of veneer.

3.7 DPM TO CONCRETE FLOOR
Lay DPM under concrete floor substrate over sand binding, in a single layer with 150mm overlaps at joints to provide a waterproof barrier. Refer to SELECTIONS for type.

Application - Wraps / wall underlay

3.9 WALL UNDERLAY
Fix horizontally to outside face of framing in true alignment, with succeeding sheets overlapping 150mm to NZBC E2/AS1, clause 9.1.7, **Building wrap** and refer to **Thermakraft** industries for requirement for fastenings. Fix to **Thermakraft** Industries Technical Data specifications. Scribe neatly around penetrations and openings to leave

no gaps. For gaps around Poly Butyl pipe systems , refer to pipe manufacturer's technical specifications. Keep clean, undamaged and without visible weather deterioration until closed in.

Application - Roofing underlay

3.11 WIRE NETTING
Lay 75mm galvanized wire netting at right angles across the purlins and drawn taunt before fixing. Tie edges of netting together with galvanized wire clips.

3.12 BUILDING PAPER ROOF UNDERLAY
Lay vertically over purlins on wire netting with a 150mm side lap. Fix securely to purlins with galvanized fixing clips. Lay underlay to avoid excessive dishing between purlins. When used vertically limit individual runs to 10 metres for bituminous based papers.

4231HW JAMES HARDIE WEATHERBOARD CLADDING

1. **GENERAL**

This section relates to the supply and fixing of the following fibre cement products:
- James Hardie Linea™ Weatherboard cladding
- James Hardie selected soffit lining

1.1 RELATED WORK

Refer to ~ for ~.
Refer to painting section/s for the protective coating required to meet the NZBC durability requirements.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC E2/VM1	Weathertightness
AS/NZS 1170.2	Structural design actions - Wind actions
AS/NZS 2908.2	Cellulose-cement products - Flat sheet
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

James Hardie documents relating to this part of the work:
Linea™ Weatherboard technical specification
James Hardie Weatherboards technical specification
Eaves and Soffit Linings installation manual
BRANZ Appraisal 446 - Linea™ Weatherboard
BRANZ Appraisal 447 - Linea™ Weatherboard - Cavity Construction
CodeMark™ Certificate Number GM-10-30018 James Hardie Linea™ Weatherboard Direct fixed and Cavity Cladding

Manufacturer/supplier contact details

Company:	James Hardie New Zealand Limited
Web:	www.jameshardie.co.nz
Telephone:	Ask James Hardie™ on 0800 808 868

The BRANZ appraisal is available at www.branz.co.nz.

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

25 years:	For **Linea™ Weatherboard** product (refer to James Hardie™ product warranty)
15 year:	For accessories supplied by James Hardie (refer to James Hardie™ product warranty)
From:	Date of purchase

- Provide this warranty on the manufacturer's standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years:	For James Hardie™ ~. (refer to James Hardie™ product warranty)
15 year:	For accessories supplied by James Hardie (refer to James Hardie™ product warranty)
From:	Date of purchase

- Provide this warranty on the manufacturer's standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

15 years:	For **Silkline® Soffit Lining / Eclipsa® Eaves Lining** base sheet (refer to James Hardie™ product warranty)
10 years:	For coating on **Silkline® Soffit Lining / Eclipsa® Eaves Lining** (refer to James Hardie™ product warranty)
15 year:	For accessories supplied by James Hardie (refer to James Hardie™ product warranty)
From:	Date of purchase

- Provide this warranty on the manufacturer's standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 NO SUBSTITUTIONS
Substitutions are not permitted to any specified system, or associated components and products.

1.8 MAINTENANCE REQUIREMENTS
Provide relevant James Hardie maintenance requirements at completion of the work.

Requirements - Linea™ Weatherboard with CodeMark™ Certificate

1.9 QUALIFICATIONS - LINEA™ INSTALLER
Installer to be experienced in the application and a;
- James Hardie Accredited Installer; or,
- A Licenced Building Practitioner; or,
- A person with a trade certificate being a current member of a Building Trade Association.

If requested provide evidence of qualification prior to commencing work.

1.10 LINEA™ INSTALLATION INFORMATION
Installer to comply with all the relevant information in;
- Linea™ Weatherboard Technical Specification (Dec 2010); and,
  Branz Appraisal 446 or Branz Appraisal 447

1.11 LINEA™ INSTALLATION CHECKLIST
Installer to complete, sign and provide a James Hardie Installation Checklist (Feb 2009) incorporating the Certificate of Installation requirements of Global-Mark CodeMark Certification program. Contact James Hardie for a copy of the Installation Checklist.

Performance

1.12 PERFORMANCE, WIND
The design wind pressures are to NZS 3604, up to and including Very High Wind Zone. James Hardie Technical Specifications are suitable for these conditions.

1.13 SPECIFIC DESIGN, WIND
The design wind pressures are to AS/NZS 1170.2, for specific design wind zone (beyond Very High Wind Zone). Only specifically designed or approved details included in the Contract Documents can be used.

2. PRODUCTS

Materials

2.2 BUILDING WRAP
Refer to section 4161 WRAPS, UNDERLAYS AND DPC.

2.5 LINEA™ WEATHERBOARDS
James Hardie Linea™ Weatherboards, 16mm thick, pre-primed, manufactured from a reduced density cellulose fibre cement formulation and cured by high pressure autoclaving, manufactured to AS/NZS 2908.2, tested to NZBC E2/VM1 for weathertightness and complying with the NZBC.

2.8 SOFFIT LINING
James Hardie 4.5mm Hardiesoffit™ Lining, HardieFlex™ Eaves Lining, Silkline® Soffit Lining Eclipsa™ Eaves Lining, HardieGroove™ Lining and 6mm HardieFlex™ Lining soffit manufactured from treated cellulose fibre, Portland cement, sand and water and cured by high pressure autoclaving manufactured to AS/NZS 2908.2.

Components

2.9 FASTENER TYPE
Fasteners to minimum durability requirements of the NZBC. Refer to NZS 3604, section 4, **Durability**, for requirements for fixing's material to be used in relation to the exposure conditions.

Exposure conditions & nail selection prescribed by NZS 3604, section 4, table 4.3, **Steel items such as nails and screws used for framing and cladding**.

Zone	Fixings Material
Zone D / Microclimates (incl. Geothermal)	Grade 316 Stainless
Zone B, Zone C	Hot-dipped galvanized
Bracing - All zones	Grade 316 Stainless

Check against SED (specific engineering design) requirements for microclimate conditions.

Refer to NZBC E2/AS1, Table 20, **Material selection**, and Table 21, **Compatibility of materials in contact**, for selection of suitable fixing materials and their compatibility with other materials.

2.10 SCREWS
30mm x 7 gauge stainless steel HardieDrive screws

2.11 GALVANIZED NAILS
60mm x 3.15mm diameter jolt head
75mm x 3.15mm diameter jolt head
HardieFlex™ Nail 40mm x 2.8mm diameter
HardieFlex™ Nail 50mm x 2.8mm diameter
HardieFlex™ Nail 60mm x 3.15mm diameter
HardieFlex™ Nail 75mm x 3.15mm diameter

2.12 STAINLESS STEEL NAILS
60mm x 3.15mm diameter jolt head 316 grade
75mm x 3.15mm diameter jolt head 316 grade
HardieFlex™ Nail 40mm x 2.8mm diameter 316 grade
HardieFlex™ Nail 50mm x 2.8mm diameter 316 grade
HardieFlex™ Nail 60mm x 3.15mm diameter 316 grade
HardieFlex™ Nail 75mm x 3.15mm diameter 316 grade

2.13 SOFFIT JOINTERS AND CAPPING MOULDS
Extruded uPVC jointer, 2 way jointer, capping and scotia mould.

Accessories

2.14 SEALANT
Silaflex AT-Facade sealant or similar. Refer to James Hardie technical specifications for application requirements.

3. EXECUTION

Conditions

3.1 STORAGE
Take delivery of products dry and undamaged on pallets, and keep on pallet. Protect edges and corners from damage and covered to keep dry until fixed.

3.2 HANDLING
Avoid distortion and contact with potentially damaging surfaces. Carry weatherboards in vertical position. Do not drag weatherboards across each other, or across other materials. Protect edges, corner and surface finish from damage.

3.3 SUBSTRATE
Do not commence work until the substrate is of the standard required by James Hardie for the specified finish; plumb, level and in true alignment. Moisture content of timber framing must not exceed the requirements specified by NZS 3602 to minimise shrinkage and movement after sheets are fixed.

Application - generally

3.7 FIX BUILDING WRAP
Refer to 4161 WRAPS, UNDERLAYS AND DPC.

3.9 PENETRATIONS AND FLASHINGS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:
- Building wrap appropriately incorporated with penetration and junction flashings.
- Materials lapped in a way that water tracks down to the exterior face of the building wrap.
- Wall cladding underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- Claddings neatly finished off to all sides of openings
- Installation of flashings (those required to be installed prior to installation of penetrating elements).

3.10 INSTALL LINEA™ WEATHERBOARDS
Cut weatherboards to required lengths and fit joints off-stud using tongue and groove ends. Fit internal corners and weatherboards as per Linea™ Weatherboard technical specifications. Fit and fix external corners and joint soakers as required.

3.11 INSTALL FLASHINGS
Install flashings at all wall openings, penetrations, junctions, connections, window sills, heads and jambs to NZBC E2/AS1.

3.12 INSTALL JAMES HARDIE WEATHERBOARDS
Fit concealed soaker, internal corners and fix weatherboards as per James Hardie Weatherboard technical specifications. Fit and fix external corners and joint soakers as required.

3.13 INSTALL SOFFIT SHEETS
Cut sheets dry and ensure all edges and joints are fully supported. Nail and insert uPVC fasteners to James Hardie requirements. Fit complete with jointers and capping moulds. Refer to Eaves and Soffit Linings installation manual.

3.14 INSTALL FLUSH JOINTED SOFFIT SHEETS
Cut sheets dry and ensure all edges and joints are fully supported. Fit expansion joints to limit finished areas to 9 metre x 6 metres for large soffits or 7.2 metres for narrow soffits. Flush joints with James Hardie Base Coat, paper reinforcing tape and James Hardie Top Coat to flush width of 180mm. Refer to Eaves and Soffit Linings installation manual.

Completion

3.15 REPLACE
Replace all damaged or marked elements.

3.16 LEAVE
Leave work to the standard required for following procedures.

3.17 REMOVE
Remove debris, unused materials and elements from the site.

4311M METALCRAFT ROOFING PROFILED ROOFING

1. **GENERAL**

This section relates to the supply and fixing of **Metalcraft Roofing** profiled roofing complete with accessories.

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

AS/NZS 1170.2	Structural design actions - Wind actions
AS 3566	Self-drilling screws for the building and construction industries
NZS 3604	Timber-framed buildings
NZMRM	NZ Metal roof and wall cladding - Code of practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Are available on the website or by contacting Metalcraft Roofing.

For technical assistance contact **Metalcraft Roofing**

Web:	www.metalcraftroofing.co.nz

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Warrant this work under normal environmental and use conditions against:

15 years	Failure of coating adhesion (manufacturer's standard warranty)
15 years	Weatherproofing failure caused by material penetration as a result of corrosion (manufacturer's standard warranty)
5 years	Weatherproofing failure caused by substandard workmanship

From: Date of completion of installation

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

1.7 QUALIFICATIONS

Roofers to be **Metalcraft Roofing** Approved Installers, or experienced, competent roofers familiar with **Metalcraft Roofing** products.

1.8 MAINTENANCE INSTRUCTIONS

Provide one bound copy of all relevant **Metalcraft Roofing** maintenance information on completion of the roofing work.

Performance

1.9 FIXINGS, WIND
Design and use the fixings appropriate for the wind zone (R) and topographical classification (T) of this site and building height; as required by NZS 3604, or by wind loads given by AS/NZS 1170 Part 2. Allow for specific loadings at corners and the periphery of the roof, where localised pressure factors apply. Confirm with Metalcraft Roofing the fastener type and fixing pattern for the load capacity required.

1.10 CO-ORDINATE
Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof.

1.11 PERFORMANCE
Accept responsibility for the weather-tight performance of the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

2. PRODUCTS

Materials - General

2.1 WIRE NETTING
Refer to 4161 WRAPS, UNDERLAYS AND DPC for wire mesh.

2.2 SAFETY MESH
Refer to 4161 WRAPS, UNDERLAYS AND DPC for safety mesh.

2.3 UNDERLAY
Refer to 4161 WRAPS, UNDERLAYS AND DPC for underlays.

2.4 METALCRAFT ROOFING PROFILES
Refer to SELECTIONS for type.

2.6 FLASHINGS GENERALLY
Formable grade 0.55mm BMT for galvanized, Zincalume® and pre-coated steel, and 0.90mm BMT for aluminium to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

2.7 FLASHINGS TO VERGE, RIDGE AND HIP
Supplied by **Metalcraft Roofing** to match or to suit the roofing.

Components

2.8 FASTENERS GENERALLY
Minimum Class 4 durability and not less than the roofing material being fixed. Screw fasteners to be head stamped identifying the manufacturer and class.

2.9 FIXING CLIPS TO TROUGH SECTION ROOFING
Galvanized steel (powder coated for aluminium) to suit the material and profile of the rigid sheet and location as required by **Metalcraft Roofing** for **Metdek 400**. Fix to steel with 16mm x 10 gauge galvanized wafer head self-drilling screws and to timber with 50mm long galvanized spiral rolled flat head nails.

Fix the continuous **Metdek 855** metal strip clips with plastic inserts to steel with 14 gauge x 42mm long hex head tek screws and to timber with 12 gauge x 55mm long hex head T17 screws - Class 4 or roofzip 12 gauge x 50mm long.

2.10 FIXING SCREWS
To AS 3566. Screws appropriate to the roofing material and the supporting structure, and wind load as required by **Metalcraft Roofing,** and with a durability not less than the material fixed.

2.11 RIVETS
Sealed aluminium, minimum diameter 4.8mm.

Accessories

2.12 SEALANT
Neutral curing silicone or polymer sealant as required by **Metalcraft Roofing** and used as directed.

2.13 CLOSURE STRIPS
Polyurethane profiled closed cell foam strips to fit the sheet profile.
Brand: Ecofoam
Profile: To suit selected cladding profile

3. EXECUTION

Conditions

3.1 INSPECTION
Inspect the roof framing and supporting structure to ensure that it is complete and fully braced ready for roofing and free from any misalignments or protrusions that could damage the roofing.

3.2 FRAMING TIMBER MOISTURE
When continuous metal cladding etc. Runs along a long continuous timber member and is directly fixed to it, the timbers equilibrium moisture content (EMC) to be 18% or less. For flashings in this situation (sometimes called transverse flashings) the framing EMC to be maximum 16%, and preferably as low as 12%. Transverse flashings can be temporarily tacked in place and final fixing done when moisture content is acceptable.

3.3 STORAGE
Take delivery of and accept packs of roofing dry and undamaged on delivery. Reject all damaged material. Store on a level firm base clear of the ground, with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets.

3.4 HANDLING
Avoid distortion and contact with damaging substances, including cement. Do not drag sheets across each other or other materials. Protect edges and surface finishes from damage. Use soft, flat sole shoes when fixing and for all other work on the roof.

3.5 SEPARATION
Isolate dissimilar materials in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials. Do not use unpainted lead sheet in contact with or allow water run-off onto galvanized steel or Zincalume®.

Application

3.6 SET-OUT & LAYING
Carefully set out to allow cover flashings of equal width at the ends of the building. Lay sheets with side laps away from the prevailing wind ensuring ends of sheets are true to line. Check during fixing to eliminate creep or spread and use string lines along purlin centres to keep fastenings in line.

3.7 FORMING
Form stop-ends and downturns to **Metalcraft Roofing** recommendations.

3.8 END LAPS
End laps are not recommended, except where specifically detailed to **Metalcraft Roofing** requirements.

3.9 THERMAL MOVEMENT
Roof fixing and jointing to conform with **Metalcraft Roofing** requirements for thermal movement.

3.10 FIXING GENERALLY

Install and fix in accordance with the **Metalcraft Roofing** and Cladding Systems Manual and the NZMRM NZ Metal roof and wall cladding - Code of practice and to **Metalcraft Roofing** required fixing patterns and details for each area of the building roofing. Use only screws as required by **Metalcraft Roofing**. Paint colour matched fixings and accessories before installation.

3.11 FIX UNDERLAY, NETTING AND MESH

Refer to 4161 WRAPS, UNDERLAYS AND DPC for the installation of underlays, wire netting and safety mesh.

3.12 FIX INSULATION

Refer to INSULATION for the installation of thermal and acoustic insulation.

3.13 MARKING AND CUTTING

Cut only by shearing tools. Do not use black lead pencils for marking Zincalume®, Colorsteel® products.

3.14 FIX SHEETS

Fix sheets in place using the fastening system required by **Metalcraft Roofing** for specified profiles, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

3.16 FLASH

Flash roof to parapets, walls and penetrations to detail in Metalcraft Roofing installation manual and to the NZMRM NZ Metal roof & wall cladding - Code of practice and **Metalcraft Roofing** requirements. Cut accurately and fix using sealant and rivets to detail and to **Metalcraft Roofing** requirements to form a weatherproof cover. Ensure flashings are designed and installed to avoid water ponding.

3.17 FIX RIDGES AND HIPS

Cut accurately and fix using primary fasteners to the purlins. Join using neutral curing silicone or polymer sealant and sealed rivets to detail and to the NZMRM NZ Metal roof and wall cladding - Code of practice. Ensure flashings are designed and installed to avoid water ponding.

3.18 FIX VERGE AND CAP FLASHINGS

Cut accurately and fix using primary fasteners to the purlins. Join using neutral curing silicone or polymer sealant and sealed rivets to detail and to the NZMRM NZ Metal roof and wall cladding - Code of practice. Ensure flashings are designed and installed to avoid water ponding.

3.19 PENETRATIONS

Flash and overflash all penetrations through the roof.

3.20 PENETRATIONS AND JUNCTIONS

Check that adjoining walls and parapets are prepared ready for the installation of the roofing. Confirm that openings have been prepared ready for the installation of skylights and other penetrations through the roof. Required work includes the following:

- underlay turned up at wall and parapet lines
- underlay finished and dressed off to all openings, ready for the installation of skylights and other penetrations
- roofing installation neatly finished to all sides of openings and to all wall and parapet junctions
- installation of flashings (those required to be installed prior to installation of penetrating elements and/or wall linings).

Completion

3.21 REPLACE

Replace damaged or marked elements.

3.22 LEAVE

Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.

3.23 REMOVE

Remove all trade rubbish, swarf and unused materials from the roof and surrounds daily during the work. Sweep down at the end of each day, and clean out spoutings, gutters and rainwater pipes on completion of the roof. Remove debris, unused materials and elements from the site.

4521 ALUMINIUM WINDOWS AND DOORS

1. GENERAL

This section relates to the manufacture, supply, and installation of ~:
- aluminium windows
- aluminium doors and frames
- flashings

1.1 RELATED WORK

Refer to glazing sections for glass types

1.2 ABBREVIATIONS AND TERMS

PVF^2	Polyvinylidene Fluoride
SLS	Serviceability limit state
ULS	Ultimate limit state
WANZ	Windows Association of Zealand
PQAS	Powder Coating Quality Assurance System

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 1734	Aluminium and aluminium alloys - flat sheets, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
AAMA 2604.05	Performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
NZS 3604	Timber-framed buildings
AS 3715	Metal finishing - Thermoset powder coatings for architectural applications
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
NZS 4211:1985	Performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
AS/NZS 4284	Testing of building facades
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
WANZ	Window installation system - An Alternative Solution for the installation of windows and doors
WANZ	Powder Coating Quality Assurance System (PQAS)
WANZ	SFA 3503-03:2005 Anodising Standard
BRANZ BU 337	Protecting Window Glass from Surface Damage

US Federal Specification

TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)
TT-S-00230C	Sealing compound, elastomeric type, single component (for caulking, sealing and glazing in buildings and other structures)

Requirements

1.6 QUALIFICATIONS

Work to be carried out by tradesmen experienced, competent and familiar with the materials and techniques specified.

Warranties

1.8 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

5 years: For fabrication

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

1.9 WARRANTY - INSTALLER
Provide an installer/applicator warranty:
2 years: For installation

- Provide this warranty in the installer/applicator standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Performance

1.10 PERFORMANCE - WIND
Construct windows, exterior doors and frames to withstand design wind pressures to NZS 3604.

1.13 AIR INFILTRATION
To NZS 4211 section 8 Air infiltration

1.14 PERFORMANCE - STRUCTURAL/WEATHER-TIGHTNESS
The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window manufacturer.

Finishes

1.15 CERTIFY COATINGS
Certify on request compliance with this specification and support with control and sampling records. Test for film thickness to BS 3900, part C5, method No. 4, using method (b) for certifying thickness and method (a) where any dispute arises as to the thickness provided.
The coating should be applied by an applicator who can certify that the coating has been applied in accordance with the specification.

1.16 CERTIFICATION
Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of NZS 4211 and the specified design wind pressure and air leakage level.

2. PRODUCTS

Materials

2.1 WINDOWS
Refer to SELECTIONS for type and finish.

2.2 DOORS
Refer to SELECTIONS for type and finish.

2.3 ALUMINIUM EXTRUSIONS
Alloy designation to comply with AS/NZS 1866. Branded and extruded for anodising or powder coating.

2.4 ALUMINIUM SHEET AND STRIP
Complying with AS/NZS 1734 of suitable thickness. Rolled for anodising or powder coating.
Alloy designation: 5251 - H16 or 5005 - H16

2.5 STAINLESS STEEL SHEET AND STRIP
Type: 316 austenitic steel

Finish grade: 2B (satin lustre)

2.6 REVEALS - TIMBER PAINTED
Timber reveals for paint finish with all sides primed grooved for wall linings or flush finished for architraves.

2.7 REVEALS - ALUMINIUM
Aluminium reveals fitted to frame via thermal break.

2.9 FLASHINGS GENERALLY
Material, grade and colour of head flashings to match the window frames. Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

Components - for cavity systems

2.14 WANZ CAVITY CLOSER
Flashing device to close the cavity above the window or door unit to direct water that occasionally penetrates the wall cladding into the cavity spaces adjacent to the window.

2.15 WANZ SUPPORT BAR
Extruded aluminium support bar with built in drainage and ventilation to NZBC E2, to provide continuous support to the window unit.

Components

2.16 GLAZING GASKETS
Thermoplastic rubber. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.

2.17 HARDWARE AND FURNITURE
Hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer. Refer to SELECTIONS for type and finish. Key alike all lockable window hardware able to be keyed alike.

2.18 SAFETY STAYS
Stainless steel non releasable restrictors to limit window opening to NZBC F4/AS1, Table 2, Acceptable opening sizes for barriers.

Structural glazing sealants

2.19 POINTING SEALANT
Building sealant or approved equivalent with not less than a ± 40% movement factor complying with US Federal Specification TT-S-001543A.

2.20 STRUCTURAL SEALANT
Provide in structural sealant joints for movement. Follow recommendations of the structural sealant manufacturer. Use in conjunction with compatible silicone rubber spacers and gaskets or double-sided expanded cellular glazing tapes.

2.21 WEATHERING SEALANT
Building sealant used in accordance with manufacturer's instructions for weather sealing glass to glass joints complying with US Federal Specification TT-S-0011534A, or a one-part polyurethane medium modulus (± 25% movement) to US Federal Specification TT-S-00230C.

Finishes

2.24 POWDER COATED ALUMINIUM - HIGH PERFORMANCE
PVF² fluoropolymer powder coating in accordance with AAMA 2604.05 and WANZ Powder Coating Quality Assurance System.

3. EXECUTION

Conditions - generally

3.1 DO NOT DELIVER
Do not deliver to site any elements which cannot be unloaded immediately into suitable conditions of storage.

3.2 UNLOAD WINDOW JOINERY
Unload, handle and store elements in accordance with the window manufacturer's requirements.

3.3 AVOID DISTORTION
Avoid distortion of elements during transit, storage and handling.

3.4 PREVENT DAMAGE
Prevent prefinished surfaces rubbing together, and contact with mud, plaster and cement. Keep paper and cardboard wrappings dry.

3.5 PROPRIETARY ELEMENTS
Fix in accordance with the window manufacturer's requirements.

3.6 PROTECTIVE COVERINGS
Retain protective coverings and coatings to BRANZ BU 337 and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

Conditions - fixings and fastenings

3.8 SUPPLY OF FIXINGS
Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS.

3.9 EXPOSED FIXINGS AND FASTENINGS
Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 316 stainless steel.

3.10 PROTECTED FIXINGS AND FASTENINGS
Fixings and fastenings not exposed to the weather may be hot-dip galvanized steel with a coating weight of 610 g/m² complying with AS/NZS 4680.

3.11 TIMBER / PVC REVEALS
Before fixing to aluminium frames, ensure that timber reveals which are being painted have been primed on all surfaces.

Assembly

3.12 FABRICATION
Fabricate frames as detailed on shop drawings. Install glazing, hinges, stays and running gear as scheduled. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation.

3.13 HARDWARE GENERALLY
Factory fit all required and scheduled hardware. Account for all keys and deliver separately to the site manager.

3.14 SAFETY STAYS
Factory fit safety stays to all windows scheduled for safety stays and to all windows where safety stays are required to comply with NZBC F4/AS1 4.0, Opening windows.

Installation - windows and doors

3.15 CORROSION PROTECTION
Before fixing, apply suitable barriers of bituminous coatings, stops or underlays between dissimilar metals in contact, or between aluminium in contact with concrete.

3.16 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.

Required preparatory work includes the following:
- wall cladding underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 Building wrap to wall openings.
- claddings neatly finished off to all sides of openings
- installation of flashings (those which are required to be installed prior to frames).

3.17 INSTALLATION
Fix to comply with the reviewed shop drawings and installation details including flashings and bedding compounds, pointing sealants and weathering sealants.

3.18 INSTALLATION DIRECT FIX
Install to window manufacturers details and drawings including sill pans to window and door units.

3.19 INSTALLATION CAVITY CONSTRUCTION
Install to WANZ Installation System details and drawings including WANZ cavity closers, support bars and support angles

3.20 INSTALL FLASHINGS
Install flashings to heads, jambs and sills of frames as supplied and required by the window manufacturer and as detailed on the drawings. Finish head flashings to match window finish.

Place all flashings so that the head flashing weathers the jamb flashings, which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.

Except where window/door frames are recessed, ensure that head flashings over-sail unit by 30mm minimum at each end.

3.21 COMPLETE AIR SEAL
To NZBC E2/AS1:9.1.6 Air seals. Form an air-tight seal by means of a proprietary expanding foam or sealants used with backing rods, applied between the window / door reveal and structural framing to a depth of 10 - 20mm, to provide a continuous air tight seal to the perimeter of the window or door.

3.22 FIX HARDWARE
Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing

3.27 SEAL FRAMES ON SITE
Seal frames to each other and to adjoining structure and finishes, all as required by the window manufacturer and to make the installation weathertight. Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.

3.28 PREPARE
Ensure joints are dry. Remove loose material, dust and grease.

3.29 PREPARE JOINTS
Prepare joints in accordance with the sealant manufacturer's requirements, using required solvents and primers where necessary.

3.30 PREPARATION
Mask adjoining surfaces which would be difficult to clean if smeared with sealant.

3.31 BACKING
Insert polyethylene rod or tape back-up behind joints being pointed with sealant.

3.32 BACK UP
When using back-up material do not reduce depth of joint for sealant to less than the minimum required by the manufacturer of the sealant.

3.33 POINTING, BEAD
Tool sealant to form a smooth, flat bead.

3.34 POINTING, FILLET
Tool sealant to form a smooth fillet with a profile and dimensions required by the sealant manufacturer.

3.35 FINISHING
Remove excess sealant from adjoining surfaces, using the cleaning materials nominated by the sealant manufacturer and leave clean.

Completion - cleaning

3.36 REMOVE TRADE DEBRIS
Remove trade debris by appropriate means on a floor by floor basis as each floor is completed and again before any work is covered up by others. Arrange for general removal.

3.37 TRADE CLEAN
Trade clean window frames, operable windows and doors, glass and other related surfaces inside and out at the time of installation to remove marks, dust and dirt, to enable a visual inspection of all surfaces.

3.38 PROTECTIVE COVERINGS
Retain protective coverings and coatings and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

3.39 SAFETY
Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Masking tape must not be used for this purpose.

Completion

3.40 REPLACE
Replace damaged, cracked or marked elements.

3.41 PROTECTION
Protect finishes against damage from adjacent and following work.

3.42 IN SITU TOUCH-UP TO POWDER COATED ALUMINIUM
In situ touch-up of polyester or fluoropolymer coated aluminium is only permitted only to minor surface scratching. Otherwise replace all damaged material.

3.43 LEAVE
Leave work to the standard required for following procedures.

3.44 REMOVE
Remove safety indicators and protective coverings, and wipe down all joinery thoroughly to leave it perfectly clean. Remove debris, unused materials and elements from the site.

3.45 MANIFESTATIONS

Apply manifestations to comply with NZS 4223.3, 303.1 Manifestations.

4610 GLAZING RESIDENTIAL

1. GENERAL

This section relates to the supply and fixing of glass products for external and internal joinery in residential type buildings and includes:
- windows and doors
- frameless shower and bath screens
- splashbacks, wall linings

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

PVB	Polyvinyl Butyral
CIP	Cast in place

Documents

1.3 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC B1/AS1	Structure, 7.0 Glazing
NZBC F2/AS1	Hazardous building materials, 1.0 Glazing
NZBC F4/AS1	Safety from falling, 1.0 Barriers in buildings
NZBC H1	Energy Efficiency
NZS 3604	Timber-framed buildings
NZS 4218	Thermal insulation - Housing and Small Buildings
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 2208	Safety glazing materials in buildings
AS/NZS 4666	Insulating glass units
BRANZ BU 337	Protecting window glass from damage

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Warranties

1.5 MANUFACTURERS WARRANTY

Warrant glass under normal environmental and use conditions against failure of materials.

Warranty period:	10 years for insulating glass units
	10 years for laminated glass
	10 years for toughened glass

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

1.6 SAMPLES

Submit samples of selected glass for review if required.

Performance

1.7 ENERGY EFFICIENCY

Provide glazing to meet the energy requirements of NZS 4218 and NZBCH1 for housing small buildings.

Refer to SELECTIONS and schedules for location and type of glazing.

2. PRODUCTS

Materials

2.1 CLEAR FLOAT GLASS
Clear ordinary annealed transparent float glass for general window glazing. Thickness as required by NZS 4223.

2.2 TEXTURED, PATTERNED OR OBSCURE GLASS
Translucent, annealed, rolled glass with a decorative pattern on one surface.

2.3 LAMINATED GLASS
Grade A Safety Glass to AS/NZS 2208 with PVB or CIP resin interlayer.

2.4 TOUGHENED GLASS
Grade A Safety Glass to AS/NZS 2208.

Components, general

2.11 JOINTING, PUTTY AND SEALING MATERIALS
Ensure jointing, putty and sealing materials are compatible with glass substrates. Confirm compatibility with laminated glass, IGUs and coatings.

Components, timber glazing

2.12 PUTTY, TIMBER FRAME
Linseed oil base glazing putty. Not to be used with laminated or IGUs.

2.13 SPRIGS
Diamond metal pieces to retain glass in timber sashes and frames.

2.14 GLAZING TAPE
Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes for bead glazing. For internal use only.

2.15 GASKETS
PVC or Santoprene to window manufacturers' requirements.

2.16 SETTING BLOCKS
Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes. Use with bead glazing and for IGUs.

3. EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS
To NZS 4223, Parts 1, 3 and 4 with all external glazing is wind and watertight on completion.

3.2 DELIVERY
Keep glass dry and clean during delivery and bring on to site when ready to glaze directly into place. Comply also with the storage requirements set out in BRANZ BU 337.

3.3 GLASS CONDITION
All glass to have undamaged edges and surfaces.

3.4 GLASS THICKNESS
If not specifically stated in the glazing schedule determine the minimum thickness of glass for each sheet as required by NZS 4223.Part 1, 3 and 4.

Determine the final glass thickness based on whether wind loading or human impact considerations govern.

3.5 REBATE DIMENSIONS
Provide rebates for glazing to the widths and depths necessary for each situation including minimum glass edge cover to NZS 4223.1, Section 4 Glazing.

Conditions - human impact safety requirements

3.7 SAFETY GLAZING MATERIAL
Use only materials from NZS 4223.3, Appendix 3.A Schedule of safety glazing materials that also comply with the relevant requirements of AS/NZS 2208. Ensure material is permanently marked and if cut by the distributor or installer mark each piece to NZS 4223.3, clause 303.7 Identification of safety glazing materials.

3.8 CONTAINMENT
Edge cover to comply with NZS 4223.1, Section 4 Glazing, table 5. Otherwise to NZS 4223.3, clause 303.2 Containment.

Assembly

3.9 WORKING OF GLASS
All working of glass as required in NZS 4223.1.

3.10 EDGE WORK AND BEVELLING
Edgework other than a clean cut. Refer to SELECTIONS/drawings for type.

3.11 SURFACE TREATMENT
Refer to SELECTIONS/drawings for finish.

3.12 SURFACE CUTTING
Refer to SELECTIONS/drawings for finish.

Application aluminium

3.22 INSTALL GLASS TO ALUMINIUM FRAMES
Install glass to NZS4223.1.
- Bead glaze to Section 4 Glazing.
- Channel glaze to Section 4 Glazing, and Section 5 for Framed, Unframed, Partly Framed Glass Assemblies.

3.23 INSTALL SAFETY GLASS
To NZS 4223.3, as modified by NZBC F2/AS1.

Finishing

3.31 SAFETY
Indicate the presence of transparent glass for the remainder of the construction period, with whiting, tape or signs compatible with the glass type.

3.32 MANIFESTATIONS
To NZS 4223.3, clause 303.1 Manifestation (making glass visible).

Completion

3.33 TRADE CLEAN
Clean off or remove safety indicators at completion of the building.

3.34 REPLACE
Replace damaged, cracked or marked glass.

3.35 LEAVE
Leave work to the standard required by following procedures.

3.36 REMOVE
Remove debris, unused materials and elements from the site.

4710P PINK® BATTS® & PINK® BATTS® SILENCER® INSULATION

1. GENERAL

This section relates to Tasman Insulation **Pink® Batts®** insulation materials installed into residential buildings.
It includes:
Thermal:
- **Pink® Batts® Wall Insulation (Pink® Batts® Classic** and **Pink® Batts® Ultra®)**
- **Pink® Batts® Ceiling Insulation (Pink® Batts® Classic** and **Pink® Batts® Ultra®)**

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

STC	Sound Transmission Class
IIC	Impact Insulation Class

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC H1/AS1	Energy efficiency
NZS 4218:2004	Energy Efficiency - Small building envelope
NZS 4220	Code of practice for energy conservation in non-residential buildings
NZS 4243.1	Energy Efficiency - Large buildings - Building thermal envelope
NZS 4246	Energy efficiency - Installing insulation in residential buildings
NZECP 54	NZ Electrical Codes of Practice for the installation of recessed luminaires and auxiliary equipment

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents related to this section are:
Tasman Insulation New Zealand: Product Data Sheets

Manufacturer/supplier contact details

Company:	**Tasman Insulation New Zealand**
Web:	www.pinkbatts.co.nz
Telephone:	0800 PINK BATTS (746 522)

Warranties

1.5 GUARANTEE

Provide a Tasman insulation guarantee.

- For **Pink® Batts®** insulation products.
- Provide on completion of the installation, a **PinkFit® Home Insulation Installation Guarantee** form, to confirm the insulation has been installed to NZS 4246.

Requirements

1.6 QUALIFICATIONS, PINK® BATTS® AND PINK® BATTS® SILENCER®

Installers to be **PinkFit® - Preferred Pink® Batts® installers**. A list of approved installers can be obtained from the web, by telephone or from the local building supplies merchant.

Web:	www.pinkbatts.co.nz
Telephone:	Freephone 0800 746 534 (0800 PINKFIT)

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Tasman Insulation **Pink® Batts®** insulation or associated products, components or accessories.

2. PRODUCTS

Materials - thermal

2.1 PINK® BATTS® CEILING INSULATION
Pink® Batts® Ceiling Insulation (**Pink® Batts® Classic** and **Pink® Batts® Ultra®**) is a light weight flexible bio-soluble glass wool manufactured from up to 80% recycled glass, bonded with a thermosetting resin to form rectangular insulating slabs and blanket.

2.2 PINK® BATTS® WALL INSULATION
Pink® Batts® Wall Insulation (**Pink® Batts® Classic** and **Pink® Batts® Ultra®**) is a light weight flexible bio-soluble glass wool manufactured from up to 80% recycled glass, bonded with a thermosetting resin to form rectangular insulating slabs and blanket.

Components

2.7 FASTENERS
Insul anchors complete with retaining washer.

2.8 TAPES
Proprietary plastic tape stapled across framing to retain insulation in unlined wall and ceiling locations.

2.9 ADHESIVE TAPE
Pressure sensitive adhesive tape.

3. EXECUTION

3.1 STORAGE
Accept materials undamaged and dry and store in a location that protects them from the weather and damage. Avoid distortion, stretching, compression, puncturing and damage to edges of materials. Do not use damaged or wet insulation materials.

3.2 HANDLING
Wear protective clothing as necessary and when handling, avoid delamination or distortion of the rectangular form. Maintain full thickness unless compression is an installation system requirement.

3.3 INSPECTION
Before starting installation of blankets and slabs, check that the location and framing are free from moisture, that the cavities are not interconnected and that mesh, building papers and vapour barriers are in place.

Application - general

3.4 INSTALL INSULATION - GENERAL
Lay, install, fit and fix to NZBC H1/AS1: Energy efficiency, 2.0 Building thermal envelope, and to manufacturer's requirements. Install in housing to NZS 4218 and NZS 4246. Install in large buildings to NZS 4243.1 and NZS 4220. Allow insulation to re-loft/relax prior to installation. Do not cover vents and cut around all recessed light fittings and metal flues to the safety requirements of NZECP 54. Lift up electrical wires, lighting transformers/controllers and lay the insulation underneath.

Application, thermal insulation

3.5 INSTALL PINK® BATTS® CEILING INSULATION
Ensure that the product is installed dry; if wet replace before installation. If cutting is required, cut oversize by 5-10mm to ensure a friction fit. Insulate around vents (not over them) to allow unhindered ventilation.

Fit **Pink® Batts® Ceiling Insulation** beneath electrical wiring and plumbing. Install to the outer edge of the top plate. Maintain a 25mm gap clearance between the **Pink® Batts®**

insulation and roof underlay. Adhere to the clearances as per product datasheet for recessed light fittings; clearances are required for some fittings to prevent light fittings from overheating and failing. Refer to NZS 4246 for installation guidelines and **Pink® Batts®** Product Data Sheets, for detailed installation instructions.

3.6 INSTALL PINK® BATTS® WALL INSULATION

Ensure the product is installed dry; if wet replace before installation. If cutting is required, cut oversize by 5-10mm to ensure a friction fit. Fill gaps around windows and doors with off-cuts. Insulate around vents (not over them) to allow unhindered ventilation.

Fit **Pink® Batts® Wall Insulation** behind electrical wiring and plumbing. Ensure there are no gaps, folds or undesirable compression at edges.

Refer to NZS 4246 for installation guidelines and **Pink® Batts®** Product Data Sheets, for detailed installation instructions.

Completion

3.11 CLEAN UP

Clean up as the work proceeds, so no spare offcuts or any other matter or item remain behind claddings or linings.

3.12 LEAVE

Leave work to the standard required by following procedures.

3.13 REMOVE

Remove debris, unused materials and elements from the site.

5113G GIB® PLASTERBOARD LININGS

1. GENERAL

This section relates to the supply, fixing and jointing of GIB® plasterboard linings and accessories to timber and steel framed walls and ceilings to form:
- standard systems
- bracing systems
- wet area systems

1.1 RELATED SECTIONS

Refer to 5171G GIB® PLASTERBOARD FIRE & SOUND LININGS for performance wall linings

1.2 ABBREVIATIONS

The following abbreviations are used throughout this part of the specification:

AWCINZ	Association of Wall and Ceiling Industries New Zealand

Documents

1.3 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC E2/AS1	External moisture
AS 1397	Steel sheet and strip - hot-dipped, zinc-coated, or aluminium/zinc-coated
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3604	Timber-framed buildings
AS/NZS 4600	Cold-formed steel structures

BRANZ technical paper P21: A wall bracing test and evaluation procedure

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.4 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents which refer to work in this section are:

GIB® Site Guide (Jan 2010)
GIB Ultraline® Plus lining system (February 2006)
GIB® Noise Control Systems (March 2006)
GIB Sound Barrier® Noise control system for Floors (July 2002)
GIB Aqualine® Wet Area Systems (March 2007)
GIB® Ezybrace™ Systems (April 2009)
GIB® Residential Garage Boundary Walls (March 2009)
GIB® Rondo™ Metal Ceiling Batten Systems
GIB-Cove®
GIB® Goldline™ Platinum Tape-on Trims
GIB® UltraFlex high impact corner mould

BRANZ Appraisal 294 (2009) - GIB® Ezybrace™ Systems
BRANZ Appraisal 427 - GIB Aqualine® Wet Area Systems

Copies of the above literature are available at

Web:	www.gib.co.nz
Telephone:	0800 100 442

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified GIB® systems, GIB® system components, GIB® plasterboard, associated GIB® products or GIB® accessories.

1.6 INSTALLER WORK SKILLS AND QUALIFICATIONS
GIB® plasterboard fixers and plasterers to be experienced competent workers, familiar with GIB® plasterboard lining systems installation and finishing techniques. Submit evidence of experience on request. For example:
- National Certificate of Interior Systems; or
- Certified Business member of AWCINZ.

Performance

1.7 INSPECTIONS AND ACCEPTANCE
Allow for inspection of the finished plasterboard surface:
- before applying sealer and
- before applying finish coatings or decorative papers,
so that after assessment of the type and/or angle of illumination and its effect on the completed decorative treatment, group approval and acceptance of the surface can be given.

1.10 BRACING REQUIREMENTS
Provide braced wall systems using GIB® Ezybrace™ Systems (April 2009) to meet the requirements of NZS 3604 when tested to BRANZ Technical paper P21. Refer to drawings for location and type.

2. PRODUCTS

Materials

2.1 GIB® PLASTERBOARD
Gypsum plaster core encased in a face and backing paper formed for standard and water resistance use to AS/NZS 2588. Refer to SELECTIONS for location, type, thickness and finish.
GIB® Standard plasterboard
GIB Braceline® & GIB® Noiseline dual purpose wall bracing & noise control plasterboard

2.2 CORNICE
GIB-Cove® plasterboard cornice. Refer to SELECTIONS for profile and size.

Components

2.4 SCREWS
GIB® Grabber™ drywall screws.

2.5 NAILS
GIB® Nails (gold passivated).
Size: 30mm, 40mm

2.7 CONTROL JOINTS
GIB® Goldline™ tape-on trims

2.8 TAPE ON TRIMS AND EDGES
GIB® Goldline™ tape-on trims
GIB® UltraFlex high impact corner mould.

Accessories

2.9 ADHESIVE
Timber frame and/or steel frame:
GIBFix® One ultra low VOC water based wallboard adhesive
GIBFix® All-Bond solvent based wallboard adhesive

2.10 JOINTING COMPOUND
Bedding compound: GIB Tradeset®, GIB Lite Blue®, GIB MaxSet®, GIB ProMix® All Purpose, GIB Plus 4®

Finishing compound:	GIB ProMix® All Purpose GIB ProMix® Lite, GIB® U-Mix, GIB Plus 4®, GIB® Topcoat
Cove:	GIB-Cove® Bond

2.11 JOINTING TAPE
GIB® paper jointing tape.

2.12 ACOUSTIC SEALANT
GIB Soundseal® ultra low VOC water based highly flexible acoustic sealant.

2.13 GAP FILLER
GIB® Gap Filler ultra low VOC multi-purpose acrylic flexible filler

2.14 MOULD RESISTANT SEALANT
GIB® Aquaseal ultra low VOC mould resistant water based silicone sealant

3. EXECUTION

Conditions

3.1 STORAGE
Store GIB® plasterboard sheets and accessories in dry conditions stored indoors out of direct sunlight in neat flat stacks on either an impervious plastic sheet or clear of the floor with no sagging and avoiding damage to ends, edges and surfaces. Reject damaged material. Refer to GIB® Site Guide (Jan 2010).

3.2 LEVELS OF PLASTERBOARD FINISH
Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in AS/NZS 2589.

3.3 CONFIRM LEVELS OF PLASTERBOARD FINISH ACCEPTANCE
Before commencing work, agree in writing upon the surface finish assessment procedure towards ensuring that the quality of finish expectations are reasonable and are subsequently obtained and acceptable.

Do not apply decorative treatment until it is agreed in writing by the contractor, subcontractors and decorator that the specified plasterboard Level of Finish has been achieved.

"Levels of plasterboard finish" is a tool for specifying the required quality of finish when installing and flush stopping GIB® plasterboard **prior** to the application of a range of decorative finishes under various lighting conditions. Refer to **AS/NZS** 2589.

3.4 SUBSTRATE
Do not commence work until the substrate is plumb, level and to the standard required by the sheet manufacturer's requirements. Refer to GIB® Site Guide (Jan 2010).

3.5 TIMBER FRAME MOISTURE CONTENT
Maximum allowable moisture content to AS/NZS 2589 for timber framing at lining: 18% or less for plasterboard linings. Refer to NZBC E2/AS1 and GIB® Site Guide (Jan 2010).

3.7 PROTECTION
Protect surfaces; cabinetwork, fittings, equipment and finishes already in place from the possibility of water staining and stopping damage. Refer to GIB® Site Guide.

Application

3.8 INSTALL CEILING BATTENS
Install to 70x35 timber ceiling Battens @ 450ctrs

3.9 LINING WALLS AND CEILINGS GENERALLY
Form to GIB® Site Guide (Jan 2010). Ensure bulk insulation thickness shall not exceed that of the wall framing.

3.10 BOARD ORIENTATION
Minimise joints by careful sheet layout using the largest sheet sizes possible, and generally fixing horizontally. Where part sheets are required for various stud heights they should be positioned so the cut sheet is as low as possible to keep joints below eye level.

3.12 FORM WET AREA SYSTEMS
Form to GIB Aqualine® Wet Area Systems.

3.13 FORM BRACING SYSTEMS
Form to GIB® Ezybrace™ Systems (April 2009).

3.14 FORM CONTROL JOINTS
Form control joints to GIB® Site Guide.

3.15 INSTALL COVES
Install to GIB-Cove® literature using GIB-Cove® Bond.

3.16 INSTALL TAPE-ON TRIMS
Install to GIB® Goldline™ Tape-on trims literature and/or GIB® Ultraflex high impact corner mould literature.

Finishing

3.17 FINISHING GENERALLY
To GIB® Site Guide (Jan 2010) and AS/NZS 2589.

Completion

3.18 REPLACE
Replace damaged sheets or elements.

3.19 CLEAN DOWN
Clean down completed surfaces to remove irregularities and finally sand down with fine paper to the sheet manufacturer's requirements, to leave completely smooth and clean.

3.20 REMOVE
Remove debris, unused materials and elements from the site.

3.21 LEAVE
Leave work to the standard required by following procedures.

6211 WALL TILING

1. GENERAL

This section relates to the supply and installation of ceramic wall tiles.
It includes:
- cement render walls
- concrete masonry walls
- timber substrate walls

1.1 RELATED WORK
Refer to 6221 FLOOR TILING for floor tiling.

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

AS 3740	Waterproofing of wet areas within residential buildings
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
AS4992.2	Ceramic tiles - Grouts and adhesives
BS 6431	Ceramic floor and wall tiles
BRANZ	Good practice guide - Tiling

1.3 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
~

Manufacturer/supplier contact details
Company: ~
Web: ~
Email: ~
Telephone: ~

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
~ years: For ~

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
~ years: For ~

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 QUALIFICATIONS
Tilers to be experienced, competent trades people familiar with the materials and techniques specified.

1.7 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.8 SAMPLES
Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed.

Provide the following samples for review by the Contract Administrator:
~

1.9 ADHESIVES COMPATIBILITY
Adhesives selected for use on proprietary substrates or waterproof membranes to have documented compatibility approval from the respective manufacturers.

2. PRODUCTS

Materials

2.1 WALL TILES
To BS 6431. Refer to SELECTIONS for product selection.

Accessories

2.2 SHEET WATERPROOFING MEMBRANE
Proprietary sheet waterproofing system.

2.3 LIQUID WATERPROOFING MEMBRANE
To AS 3740.

2.4 SAND AND CEMENT GROUT
1 part Portland cement to 2-3 parts fine sand mixed to a paste consistency with a minimum of clean water.

2.5 GROUT
Cement based, compressible and to suit particular location/use. To AS 4992.2.

2.6 TILE ADHESIVE
To AS 4992.2.

2.7 MOVEMENT JOINT SEALANT
To BRANZ Good practice guide: Tiling, section 5.0.
- Neutral cured sealant for areas where waterproof membranes are used or where used against aluminium.
- Acid cured sealant except for areas where waterproof membranes are used or where used against aluminium.

Note: Check compatibility of membrane and sealant, use bond breaking tape to separate them if required.

3. EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING
Take delivery of materials and goods and store on site and protect from damage.
Protect finished surfaces, edges and corners from damage.
Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish.

3.2 CHECK TILES
Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT
Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT
Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

Conditions

3.5 SERVICES AND ACCESSORIES
Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

3.6 SUBSTRATE TEMPERATURE
Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.7 LIGHTING
Light the tile work as closely and clearly as possible to that of the finished lighting, to ensure that differences in plane surface are highlighted during installation.

Application - preparing new surfaces

3.8 NEW CONCRETE OR MASONRY WALLS
Ensure structural walls have air dried for 4 weeks before applying mortar/adhesive. Ensure concrete and/or concrete block is dry and if in doubt check for moisture content by hygrometer. Do not proceed with tiling work until readings for the whole area show 75% relative humidity or less.

Remove contaminants including form release oil that may affect bonding or adhesion. Surface to finish clean and dry with a texture giving a complete key.

3.9 NEW SHEET LININGS
Remove contaminants that may affect bonding or adhesion. Surface to finish clean and dry with a texture to give a complete key to the tile manufacturer's requirements and with a maximum variation in the background plane of 4mm in 2 metres.

Application - preparing existing surfaces

3.10 EXISTING CONCRETE OR MASONRY WALLS
Remove paint and other finishes sufficiently to obtain a key and prepare in accordance with the tile manufacturer's requirements. Variation in background maximum of ± 4mm in 2 metres lineal.

3.11 EXISTING SHEET LININGS
Remove paint and other finishes sufficiently to obtain a key and remove contaminants that affect bonding or adhesion. Surface to finish clean and dry with a texture to give a complete key to the stile manufacturer's requirements.

Application - waterproof membranes

3.12 INSTALL WATERPROOFING MEMBRANE
Install waterproofing membrane between the tile adhesive and the substrate. Reinforce all junctions of the waterproofing membrane to BRANZ Good practice guide - Tiling; 7.0 Waterproofing interior wet areas. Unless otherwise specified or shown on the drawings, install waterproof membranes as follows: -

Unenclosed shower cubicle
To 1800mm above floor and 300mm above shower rose.
To at least 1500mm from shower rose.
To the floor within 1500mm of the shower rose.

Bath with a shower over and no shower screen
To 1500mm from the shower rose and top edge.
To 1800mm above base of bath.
To the floor within 1500mm of the shower rose.

Bath with shower over and a screen for the shower
To 1800mm height around sides of bath.

Bath
To 150mm minimum around the sides and along walls horizontally 150mm minimum.

Splashback to a vanity
To 300mm minimum up wall behind the vanity.
To the floor level at least twice the width of the vanity and 500mm min beyond it at each end.

3.13 SHEET WATERPROOFING MEMBRANE
Install to manufacturers requirements and to BRANZ Good practice guide - Tiling, 7.0 Waterproofing interior wet areas.

3.14 LIQUID WATERPROOFING MEMBRANE
Apply the selected liquid waterproof membrane system to the membrane manufacturer's requirements and in accordance with AS 3740 and to BRANZ Good practice guide - Tiling, 7.0 Waterproofing interior wet areas.

Application - tile installation

3.15 TILE FIXING GENERALLY
To AS 3958.1. Apply adhesive, prepare and fix tiles by the method required by the adhesive manufacturer and tap them firmly into place.

3.16 FITTING TILES
Ensure cut edges are smooth and installed without jagged or flaked edges. Do not install single tiles in more than one piece. Maintain the heights of wall tile work in full courses to the nearest dimension. Within allowed tolerances, ensure corners of tiles are flush and level with corners of adjacent tiles. Keep joint lines, including mitres, straight and of an even width. Fully bed trim units, moulded or shaped pieces and other accessories with an appropriate bedding material. Fix accessories level, plumb and true to the designated projection at detailed locations and heights.

3.17 MOVEMENT JOINTS
Provide movement joints with a minimum width of 4mm, carried through tile and bedding and where substantial movement is anticipated, through the rigid sheet to the structure. Install joints over expansion joints, at junctions between different backgrounds, abutting other materials, at storey heights horizontally and 3 to 4 metres vertically, at internal corners and at junctions with floors and columns. Ensure joints are clean, formed, filled and with sealant inserted to the sealant manufacturer's requirements.

3.18 TILE FINISH AND JOINTS
Ensure finished surfaces are flat and true to a tolerance of ± 4mm in 2 metres from the required plane. Clean surplus bedding material from joint spaces and tile surface. Ensure joint widths are consistent throughout the installation with 1.5mm width for dust-pressed tiles and 6mm for extruded tiles, measured at the tile face. Ensure joint alignment is consistent throughout the installation and to a tolerance of ± 4mm in 2 metres from the detailed joint alignment.

3.19 THIN BED FIXING
Apply adhesive to a maximum 3mm bed thickness with a minimum of voids.

Notched trowel method
For internal dry applications, spread adhesive to a uniform thickness and "rib" it with a notched trowel to the adhesive manufacturer's requirements. Press tiles and beat into place to obtain adequate coverage by adhesive on the back of each tile.

Floating method
Apply adhesive to a uniform thickness. Apply tiles with a twisting or sliding action and tap back firmly into the floated bedding.

Buttering
With a trowel butter adhesive evenly over the whole of the back of the tile, slightly thicker than the final required adhesive thickness. Press and tap firmly into position leaving no voids. Do not use "spot-fixing".

Occasionally remove a tile as fixing proceeds to check the maintenance of adequate contact with the adhesive.

3.20 THICK BED FIXING
Apply thick-bed cement based adhesive to an average 6mm bed thickness as a floated bed and to the tile manufacturer's requirements. Prepare and fix tiles by the method required by the tile manufacturer and beat and tap them firmly into place.

Grouting

3.21 APPLY GROUTING
Remove spacers. Apply grouting mix to as large an area as can be worked before setting commences. Work with a grouting tool back and forth until joints are completely filled with no adhesive showing. Avoid damage to the surface of tiles, using masking tape where necessary. Finish to the depth of the cushion and flush with surface to cushion edge and square edge tiles. Remove surplus grout with a damp cloth and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

3.22 APPLY PROPRIETARY GROUTING
Remove spacers. Prepare joints, mix and apply grout and finish off to the tile manufacturer's requirements, uniform in colour, smooth and without voids, pinholes or low spots.

Cleaning

3.23 CLEAN TILES
Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

Completion

3.24 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.25 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

3.26 PROTECTION
Provide the following temporary protection of the finished work:
~

4. SELECTIONS
Substitutions are not permitted to the following, unless stated otherwise.

Samples

4.1 SAMPLES FOR REVIEW
~

Materials

4.2 CERAMIC TILES
Location: ~
Manufacturer: ~
Pattern/number: ~
Colour: ~
Edging: ~

4.3 STONE TILES
Location: ~
Manufacturer: ~
Pattern/number: ~
Tile size ~mm x ~mm
Colour: ~
Edging: ~
Grout width: ~mm

4.4 MOSAIC TILES
Location: ~
Manufacturer: ~
Pattern/number: ~
Colour: ~
Edging: ~

4.5 PRIMER
Location: ~
Manufacturer: ~
Trade name/number: ~

4.6 TILE ADHESIVE
Location: ~
Manufacturer: ~
Brand/type: ~
Trade name/number: ~

4.7 GROUT
Location: ~
Manufacturer: ~
Trade name/number: ~

4.8 MOVEMENT JOINT SEALANT - NEUTRAL CURED
Location: ~
Manufacturer: ~
Trade name/number: ~

Components

4.9 WATERPROOF MEMBRANE
Location: ~
Type: ~
Manufacturer: ~
Brand: ~

Spares

4.10 SPARE TILES
Tile: ~
Number: ~

6221 FLOOR TILING

1. GENERAL

This section relates to the supply and installation of ceramic floor tiles.
It includes:
- concrete substrates
- timber substrate floors
- timber floor overlays

1.1 RELATED WORK
Refer to 6211 WALL TILING for wall tiling.

Documents

1.2 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC D1/VM1	Access routes
NZBC D1/AS1	Access routes
NZBC E3/AS1	Internal moisture
AS/NZS 3661.1	Slip resistance of pedestrian surfaces - Requirements
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
NZS 4121	Design for access and mobility - Buildings and associated facilities
AS/NZS 4671	Steel reinforcing materials
AS 4992.2	Ceramic tiles - Grouts and adhesives
BRANZ	Good practice guide: Tiling

1.3 MANUFACTURER/ SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:
~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
~ years: For ~

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
~ years: For ~

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 QUALIFICATIONS
Tilers to be experienced, competent trades people familiar with the materials and techniques specified.

1.7 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.8 SAMPLES
Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed.

Provide the following samples for review by the Contract Administrator:
~

1.9 DEFLECTION CRITERIA FOR SUSPENDED FLOORS
Check that the floor is rigid enough for the tiling. Deflection of suspended floors should not exceed $^{1}/_{360}^{th}$ of the span under dead load and live load.

1.10 ADHESIVES COMPATIBILITY
Adhesives selected for use on proprietary substrates or waterproof membranes to have documented compatibility approval from the respective manufacturers.

1.11 PROVIDE SPARE TILES
Provide spare tiles. Refer to SELECTIONS for type and quantity.

Performance

1.12 SLIP RESISTANCE FOR ACCESS ROUTES
Slip resistance for tiles to comply with NZBC D1/AS1: 2.0 Level access routes and 3.0 Ramps.
- when in place on a level access route, to have a mean coefficient of friction (μ) not less than 0.4 when tested in accordance with AS/NZS 3661.1.
- when in place on a sloping access route, to have a coefficient of friction (μ) not less than 0.4 + 0.0125S (S = slope of surface expressed as a percentage).

1.13 PROVIDE EVIDENCE OF SLIP RESISTANCE
Provide evidence that the tiles comply with the standard of performance specified.

1.14 CERTIFY SLIP RESISTANCE
Provide certificates and any other evidence at the time of selection/supply that the tiles comply with NZBC D1/VM1 and NZBC D1/AS1: Access routes.

2. PRODUCTS

Materials

2.1 FLOOR TILES
Refer to SELECTIONS for product selection.

2.2 REINFORCING MESH
To AS/NZS 4671, galvanized 500mm x 500mm x 2.5mm.

2.3 SEPARATING LAYER
Single layer polyethylene film.

2.4 BUILDING PAPER
Breather type bitumen saturated kraft paper.

2.5 ANTI FRACTURE/UNCOUPLING MEMBRANE
Proprietary anti-fracture/uncoupling membrane.

2.6 COMPRESSED FIBRE CEMENT SHEET
18mm Thick high density sheet of Portland cement, fine sand, cellulose fibre and water, with a smooth finish both sides.

2.7 FIBRE CEMENT FLOOR OVERLAY
6mm or 9mm thick sheet of Portland cement, sand, fine cellulose fibre and water, with a smooth finish.

2.8 ACOUSTIC OVERLAY
Minimal thickness sound control system to isolate impact noise.

2.9 UNDERFLOOR HEATING
Refer to appropriate underfloor heating section for electric undertile heating system.

Components

2.10 EXPANSION JOINT, METAL AND RUBBER
Clear anodised aluminium/brass with metal anchor to set into in-situ concrete, cement screed/bed and complete with rubber infill.

2.11 EXPANSION JOINT, METAL AND COMPOUND
Aluminium/brass angles with high density foam rubber insert and jointing compound.

2.12 EXPANSION JOINT, PLASTIC
Rigid stabilised PVC sides with flexible central section.

Accessories

2.13 SCREED
Mix of 3:1 Portland cement, coarse washed sand gauged with liquid polymer additive to the tile manufacturer's stated requirements.

2.14 CEMENT MORTAR
Sand and cement bedding coat with liquid polymer additive, to the tile manufacturer's stated requirements.

2.15 SHEET WATERPROOFING MEMBRANE
Proprietary sheet waterproofing system.

2.16 LIQUID WATERPROOFING MEMBRANE
To AS 3740.

2.17 TILE ADHESIVE
To AS 4992.2.

2.18 SAND AND CEMENT GROUT
1 part Portland cement to 2-3 parts fine, washed sand, mixed to a paste consistency with a minimum of clean, potable water.

2.19 PROPRIETARY GROUT
Cement based, compressible and to suit particular location/use. To AS 4992.2.

2.20 MOVEMENT JOINT SEALANT
To BRANZ Good practice guide: Tiling, section 5.0.
- Neutral cured sealant for areas where waterproof membranes are used or where used against aluminium.
- Acid cured sealant except for areas where waterproof membranes are used or where used against aluminium.

Note: Check compatibility of membrane and sealant, use bond breaking tape to separate them if required.

3. EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING
Take delivery of materials and goods and store on site and protect from damage.
Protect finished surfaces, edges and corners from damage.
Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish

3.2 CHECK TILES
Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT
Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT
Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

3.5 GENERALLY
Prepare surface and complete tiling work in accordance with AS 3958.1, as modified by BRANZ Good practice guide: Tiling.

Conditions

3.6 SERVICES AND ACCESSORIES
Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

3.7 DO NOT START
Do not start laying tiles until concrete floors are cured, moisture content of floors is such that shrinkage is complete, thermal movement has been accommodated and the levels and surface finish will achieve tile laying of the required standard.

3.8 SUBSTRATE TEMPERATURE
Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.9 MOISTURE CONTENT
Ensure the floor is dry and if in doubt check for moisture content by hygrometer. Do not proceed with tiling work until readings for the whole area show 75% relative humidity or less.

Application - preparing new surfaces

3.10 CONCRETE FLOORS
Completely remove surface contaminants such as paints, oils, release and curing compounds. Remove projections, unevenness and loose material to leave a clean dust and dirt free surface.

3.11 SCREEDS
Form screeds with a deviation from plane of not more than 5mm over 3 metres.

3.12 FALLS
Form screeds in areas where water is used in significant amounts with a deviation from plane of not more than 5mm over 3 metres. Unless otherwise specified form screeds with the following falls:

Unless stated otherwise provide minimum fall gradients to BRANZ Good Practice Guide - Tiling, clause 6.5 Falls in floors.

1 : 40 minimum	For tiled decks which also act as a roof
1 : 60 minimum	For paving over ground
1 : 50 minimum	For unenclosed shower bases (to NZBC E3/AS1, 3.3.5)

1 : 60 minimum	For enclosed shower bases
1 : 50 minimum	For shower bases for people with disabilities (to NZS 4121, 10.5.11.3 (b).)
1 : 60 minimum	For commercial kitchens or similar

3.13 TIMBER SUBFLOOR AND COMPRESSED FIBRE CEMENT SHEET
Completely remove surface contaminants such as paints and loose material, to leave a clean dust and dirt free surface with screw heads flush.

3.14 ANTI FRACTURE/UNCOUPLING MEMBRANE SYSTEM TO TIMBER FLOORS
Cover timber floors with the anti fracture/uncoupling membrane to manufacturer's requirements.

Application - preparing existing surfaces

3.15 EXISTING CONCRETE FLOORS
Completely remove existing surface finishes down to the concrete. If the exposed concrete finish is not suitable then scabble or acid etch the surface to expose the coarse aggregate.

3.16 EXISTING TIMBER FLOORS
Completely remove existing surface finishes, punch nail heads and sand to a smooth, clean, dust free surface.

3.17 OVERLAY TO TIMBER FLOORS
Cover timber floors with 6mm thick fibre cement sheet overlay on the flooring and across the joists, glued and nailed with relief joints, to the overlay manufacturer's requirements.

3.18 ANTI FRACTURE/UNCOUPLING MEMBRANE SYSTEM TO EXISTING TIMBER FLOORS
Cover existing timber floors with the anti fracture/uncoupling membrane to manufacturer's requirements.

Movement joints

3.19 MOVEMENT JOINTS
Provide movement joints with a minimum width of 4mm, carried through tile and bedding and where substantial movement is anticipated, through the rigid sheet to the structure. Install joints over expansion joints, at junctions between different backgrounds, abutting other materials, at internal corners and at junctions with floors and columns. Ensure joints are clean, formed, filled and with sealant inserted to the sealant manufacturer's requirements.

3.20 METAL EXPANSION JOINT
Accurately locate and fix joints in situ, with the bedding, or on top of the bedding, to finish flush with the installed tile and to the tile manufacturer's requirements. Fit and fix rubber/rubber compound inserts to finish flush. Fit expansion joints at regular intervals over the floor area at intervals not exceeding 4 metres, at changes in floor plane and where the floor plane is interrupted.

Underlays

3.21 ACOUSTIC UNDERLAY
Place acoustic underlay strip around the base of walls, columns and any vertical fixtures. Glue fix underlay pads to substrate using adhesive as required by the underlay manufacturer, ensuring pads are placed diagonally to the joints in the surface floor coverings.

Waterproofing

3.22 INSTALL WATERPROOFING MEMBRANE
Install waterproofing membrane between the tile adhesive and the substrate. Reinforce all junctions of the waterproofing membrane to BRANZ Good practice guide: Tiling; 7.0

Waterproofing interior wet areas. Unless otherwise specified or shown on the drawings, install waterproof membranes as follows:

Unenclosed shower cubicle
To 1800mm above floor and 300mm above shower rose.
To at least 1500mm from shower rose.
To the floor within 1500mm of the shower rose.

Bath with a shower over and no shower screen
To 1500mm from the shower rose and top edge.
To 1800mm above base of bath.
To the floor within 1500mm of the shower rose.

Bath with shower over and a screen for the shower
To 1800mm height around sides of bath.

Bath
To 150mm minimum around the sides and along walls horizontally 150mm minimum.

Splashback to a vanity
To 300mm minimum up wall behind the vanity.
To the floor level at least twice the width of the vanity and 500mm min beyond it at each end.

3.23 LAYING SHEET WATERPROOFING MEMBRANE
Install to manufacturers requirements and to BRANZ Good tiling practice, 7.0 Waterproofing interior wet areas.

3.24 APPLYING LIQUID WATERPROOFING MEMBRANE
Apply the selected liquid waterproof membrane system to the membrane manufacturer's requirements and in accordance with AS 3740 and to BRANZ Good practice guide: Tiling, 7.0 Waterproofing interior wet areas.

Undertile heating

3.25 INSTALL UNDERTILE HEATING
Refer to the appropriate underfloor heating section for electric undertile heating system.

Application - tile installation

3.26 BONDED CEMENT MORTAR
Apply proprietary cement slurry bond coat over the whole of the floor to the tile manufacturer's requirements. Thoroughly mix and place the 40mm thick mortar bed over the bond coat and firmly tamp, screed and compact to the required level. Apply proprietary cement slurry bond coat to the wet mortar bed and set tiles while still tacky, firmly beating into the bedding and aligning the 3mm tile joints at the same time.

3.27 MODIFIED CEMENT BASED ADHESIVE
Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.28 MODIFIED CEMENT BASED ADHESIVE AND WATERPROOF MEMBRANE
Apply appropriate waterproof membrane to manufacturer's requirements. Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.29 PLASTER SCREED AND SEPARATING LAYER
Lay polyethylene sheet/building paper to a smooth surface, joints lapped 100mm minimum. Place galvanized steel mesh over with spacers to centralise it in the mortar

bed. Thoroughly mix and place the proprietary screed mix to the manufacturer's requirements and compact to the required level. Ensure drying times are observed before installation of tiles by thin/thick set method.

Application - interior tile installation on timber floors

3.30 FIBRE CEMENT OVERLAY AND MODIFIED CEMENT BASED ADHESIVE
Align movement joints with overlay joints. Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.31 FIBRE CEMENT FLOOR AND MODIFIED CEMENT BASED ADHESIVE
Align movement joints with overlay joints. Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.32 TIMBER PRODUCT FLOOR AND MODIFIED CEMENT BASED ADHESIVE
Align movement joints with sheet joints. Spread adhesive to a uniform minimum thickness to manufacturer's requirements, rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.33 TIMBER PRODUCT FLOOR, SEPARATING LAYER, MODIFIED CEMENT BASED ADHESIVE
Lay polyethylene sheet to a smooth surface with joints lapped 100mm minimum. Place galvanized steel mesh over with spacers to centralise it in the mortar bed. Thoroughly mix and place the 50mm thick mortar bed and firmly tamp, screed and compact to the required level. Ensure drying times are observed before installation of tiles by thin/thick set method.

3.34 TIMBER PRODUCT FLOOR, WATERPROOF MEMBRANE, MODIFIED CEMENT BASED ADHESIVE
Apply waterproof membrane to the membrane manufacturer's requirements. Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.35 EXPANSION JOINT, COMPOUND
Provide expansion joints at 4 metre intervals at the perimeter of floors, at changes of level and around structural features. Carefully clean out the joint, insert the backing rod and fill with compound placed by gun. After the correct interval, finish the surface off flush to the compound manufacturer's requirements.

Grouting

3.36 APPLY GROUTING
Remove spacers. Apply grouting mix to as large an area as can be worked before setting commences. Work with a grouting tool back and forth until joints are completely filled with no adhesive showing. Avoid damage to the surface of tiles, using masking tape where necessary. Finish to depth of cushion and flush with surface to cushion edge and square-edge tiles. Remove surplus grout with a damp sponge and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

3.37 APPLY PROPRIETARY GROUTING
Remove spacers. Prepare joints, mix and apply grout and finish off to the grout manufacturer's requirements, to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

Cleaning

3.38 CLEAN TILES
Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

Completion

3.39 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.40 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked tiles. Replace damaged or marked tiles where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures. Ensure tiles are not disturbed by foot traffic for at least 24 hours after laying and after grouting.

3.41 PROTECTION
Provide the following temporary protection of the finished work:
Provide protection to tiles by laying sheet material such as insulating board for the period between completion of laying and completion of the contract works.

4. SELECTIONS
Substitutions are not permitted to the following, unless stated otherwise.

Samples

4.1 SAMPLES FOR REVIEW
~

Materials

4.2 CERAMIC TILES

Location:	~
Manufacturer:	~
Pattern/number:	~
Tile size:	~mm x ~mm
Colour:	~
Edging:	~
Grout width:	~mm

4.3 STONE TILES

Location:	~
Manufacturer:	~
Pattern/number:	~
Tile size:	~mm x ~mm
Colour:	~
Edging:	~
Grout width:	~mm

4.4 MOSAIC TILES

Location:	~
Manufacturer:	~
Pattern/number:	~
Colour:	~

4.5 SCREED

Location:	~
Manufacture:	~
Brand:	~

4.6 SEPARATING LAYER
Location: ~

Manufacturer: ~
Brand/number: ~
Thickness: ~ microns

4.7 BUILDING PAPER
Location: ~
Manufacturer: ~
Brand/weight: ~

4.8 FLOOR OVERLAY
Location: ~
Manufacturer: ~
Brand: ~

4.9 COMPRESSED FIBRE CEMENT SHEET
Location: ~
Manufacturer: ~
Brand: ~

4.10 ANTI-FRACTURE/UNCOUPLING MEMBRANE
Location: ~
Brand: ~

4.11 WET AREA TILE ADHESIVE
Location: ~
Manufacturer: ~
Brand: ~

4.12 TILE ADHESIVE
Location: ~
Manufacturer: ~
Brand/type: ~
Trade name/number: ~

4.13 PROPRIETARY GROUT
Location: ~
Manufacturer: ~
Brand/type: ~
Colour: ~

4.14 MOVEMENT JOINT SEALANT - NEUTRAL CURED
Location: ~
Manufacturer: ~
Trade name/number: ~
Colour: ~

4.15 MOVEMENT JOINT SEALANT - ACID CURED
Location: ~
Manufacturer: ~
Trade name/number: ~
Colour: ~

4.16 PREFORMED MOVEMENT JOINTS
Location: ~
Manufacturer: ~
Trade name/number: ~

Components

4.17 LIQUID WATERPROOFING MEMBRANE
Location: ~
Brand/type: ~

4.18 SHEET WATERPROOFING MEMBRANE
Location: ~
Brand/type: ~

4.19 ACOUSTIC OVERLAY
Location: ~
Manufacturer: ~
Type: ~

Accessories

4.20 EXPANSION JOINT, METAL AND RUBBER
Location: ~
Manufacturer: ~
Catalogue number: ~
Dimensions: ~mm high x ~mm wide
Rubber colour: ~

4.21 EXPANSION JOINT, METAL AND COMPOUND
Location;
Manufacturer: ~
Dimensions: ~mm high x ~mm wide

4.22 EXPANSION JOINT, PLASTIC
Location: ~
Manufacturer: ~
Catalogue/number: ~
Dimensions: ~mm high x ~mm wide

Spares

4.23 PROVIDE SPARE TILES
Tile: ~
Number: ~

6411 VINYL SURFACING

1. GENERAL

This section relates to the supply and installation of vinyl surfacing including skirtings, nosings, trims and edges.
It includes:
- PVC sheet

Documents

1.3 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC D1/VM1	Access routes
NZBC D1/AS1	Access routes
NZS/AS 1884	Floor coverings - Resilient sheet and tiles - Laying and maintenance practices
AS/NZS 4586	Slip resistance classification of new pedestrian surface materials
BRANZ BU 330	Thin flooring materials - 2 Preparation and laying

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 QUALIFICATIONS
Vinyl layers to be experienced, competent trades people familiar with the materials and techniques specified.

1.8 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.9 SAMPLES
Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed.

Provide the following samples for review by the Contract Administrator:

Performance

1.10 SLIP RESISTANCE FOR ACCESS ROUTES
Slip resistance for vinyl to comply with NZBC D1/AS1: 2.0 Level access routes and 3.0 Ramps.
- when in place on a level access route, to have a mean coefficient of friction (μ) not less than 0.4 when tested in accordance with AS/NZS 4586 Slip resistance classification of new pedestrian surface materials.
- when in place on a sloping access route, to have a coefficient of friction (μ) not less than 0.4 + 0.0125S (S = slope of surface expressed as a percentage).

1.11 PROVIDE EVIDENCE
Provide evidence that the vinyl complies with the standard of performance specified.

1.12 CERTIFY
Provide certificates and any other evidence at the time of selection/supply that the vinyl complies with NZBC D1/VM1 and NZBC D1/AS1: Access routes.

2. PRODUCTS

Materials

2.1 VINYL SHEET
High vinyl content homogeneous monolayer flexible PVC sheet flooring.

2.3 COVINGS

Commercial applications:	Pencil cove with butterfly mitres to all external and internal corners. Fillet cove for safety flooring.
Domestic applications:	Pencil or fillet cove method.

2.4 VINYL SHEET WALL COVERING
High vinyl content homogenous flexible PVC sheet wall covering.

2.5 WALL AND FLOOR VINYL JOINING STRIP
White PVC floor to wall finishing strip.

2.6 TRIMS AND EDGING
PVC as supplied by the sheet manufacturer to complete the work.

Accessories

2.7 ADHESIVE
Standard acrylic adhesive to suit the material and substrate and to the vinyl manufacturer's requirements.

2.8 PRIMER AND SEALER
To the adhesive manufacturer's requirements for the particular substrate.

3. EXECUTION

Conditions

3.1 STORAGE
Maintain rolls of sheet, packages of tiles and accessories undamaged and dry. Store rolls upright with other material on level surfaces in non-traffic, non-work areas that are enclosed, clean and dry.

3.2 HANDLING
Avoid distortion, stretching, marking and damage to edges while shifting, unrolling and handling sheet, tiles and accessories. Inspect for any faulty material. Do not use faulty or damaged material.

3.3 BEFORE COMMENCING WORK
Ensure that the building is enclosed, wet work complete, doors hung and lockable, finishes and trim complete, and good lighting available, before starting work.

3.4 INSPECT
Inspect the substrate to ensure it is of the standard required for work in this section.

3.5 LAYING
Carry out the whole of the work to NZS/AS 1884, BRANZ BU 330 and to the flooring manufacturer's requirements.

3.6 LAYOUT
Before beginning the installation confirm the proposed layout of material, location of seams and other visual considerations of the finished work.

Preparing substrate

3.7 NEW CONCRETE
Clear substrate of debris, clean off surface contamination and carry out surface repairs using a proprietary levelling compound. Carefully feather out at perimeters of repaired areas. Grind level, then vacuum to remove all dust. Check for moisture content by hygrometer to BRANZ BU 330 and do not commence laying vinyl until readings for the whole area show 75% relative humidity or less.

3.8 NEW TIMBER BOARD OR PARTICLEBOARD
Clear substrate of debris, clean off surface contamination and carry out surface repairs using a proprietary levelling compound. Carefully feather out at perimeters of repaired areas. Grind smooth, then vacuum to remove all dust.

Check for moisture content and do not commence final sanding or laying until readings for the whole area show a moisture content of: -
- 8 -12% for air conditioned buildings
- 10 -14% for intermittently heated buildings
- 12 -16% for unheated buildings

Vinyl floor laying

3.11 PREPARATION
Check that each colour supplied is from the same batch. Follow the vinyl manufacturer's requirements for conditioning of rolls and the working temperatures and conditions before, during and after laying. Protect work from solar heat gain and switch off under-floor heating during and for 48 hours either side, of the work period.

3.12 ADHESIVE APPLICATION
Apply approved adhesive as required by the vinyl manufacturer and without trowel marks after setting. Follow requirements for open time, taking note of substrate porosity, ambient temperature and relative humidity. Remove excess adhesive as the work proceeds using required techniques.

3.13 LAYING VINYL SHEET
Roll out, cut, leave to condition and install sheet vinyl to the vinyl manufacturer's requirements. Ensure there are no air bubbles or twisting, that the seams are kept clear of adhesive, and immediately the sheet is adhered roll with a 68 kg roller.

3.14 THERMO-WELDING VINYL SHEET
Machine groove and thermo-weld all seams in specified areas, heating the sheet and weld rod to a sufficient temperature to melt and fuse them together into a single mass. Trim the weld to leave a smooth, flush surface with the sheet.

3.15 CROSS JOINS
Plan and allow cuts to avoid cross joins. Obtain written approval of the owner before proceeding if cross joins are unavoidable. Cross joins are not acceptable in wet areas.

3.16 COVE VINYL
Pencil cove flooring to the specified height and finish off as detailed.

3.17 MITRES
Perform butterfly method to internal and external mitres. Thermo-weld mitres.

3.18 VINYL TO STAIRCASES
Fit selected nosing to each tread and at the top of each stair flight, in accordance with the nosing manufacturer's requirements. Lay pre-cut vinyl sheets to each tread and riser, pencil coved at the rear of each tread.

3.19 LAYING VINYL TILES
Set out from the centre of the area in two preparatory runs and modify to suit before laying tiles from the centre to the vinyl manufacturer's requirements. Ensure air is expelled and, as each section is completed, immediately roll with a 68 kg roller. Complete sections before scribing the perimeter tiles.

3.20 FIT VINYL SKIRTING
Fit skirting in accordance with the skirting manufacturer's requirements.

3.21 FIT VINYL EDGING
Fit tapered vinyl edging to all borders, except where abutting carpet.

3.22 CLEAN
Leave vinyl flooring surfaces free of adhesive, dirt and debris. Vacuum off, damp mop with a low foam neutral detergent, with a pH level of 7 to 8. Allow to dry and finally buff with a rotary machine using suitable pads at 300 rpm. Polymer polishes to be used only where approved by the vinyl manufacturer and accepted by the owner.

Cleaning

3.28 CLEAN AND POLISH VINYL
Vacuum off, damp mop with a low foam neutral detergent, with a pH level of 7 to 8. Allow to dry and finally buff with a rotary machine using suitable pads at 300 rpm. Use polymer polishes only where approved by the manufacturer. Leave vinyl flooring surfaces free of adhesive, dirt and debris and to the standard required by following procedures.

Completion

3.29 ROUTINE CLEANING
Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.30 DEFECTIVE OR DAMAGED WORK
Repair damaged or marked vinyl flooring. Replace damaged or marked vinyl where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

3.31 PROTECTION
Provide the following temporary protection of the finished work:

6511 CARPETING

1. GENERAL

This section relates to the supply and installation of carpet laid conventionally (stretched), direct stuck or double stuck down.
It includes:
- carpet underlay
- woven sheet carpet

It is not suitable for natural fibre floor coverings.

1.2 ABBREVIATIONS AND DEFINITIONS
Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

Documents

1.3 DOCUMENTS
Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:
AS/NZS 2455.1 Textile floor coverings - Installation practice - General

1.4 MANUFACTURER/SUPPLIER DOCUMENTS
Manufacturer's and supplier's documents relating to this part of the work:

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER
Provide a material manufacturer/supplier warranty:
1 year: For materials

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR
Provide an installer/applicator warranty:
1 year: For execution

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 QUALIFICATIONS
Carpet layers to be experienced, competent trades people familiar with the materials and the techniques specified, and with AS/NZS 2455.1.

1.8 MOISTURE CONTENT OF CONCRETE SLAB
Concrete slab is be cured and dried to a relative humidity of not exceeding 75% or until the moisture content does not exceed 5.5%, in accordance with AS/NZS 2455.1, refer to section 6192 FLOORING SUBSTRATE PREPARATION.

1.9 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS
Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

1.10 NO SUBSTITUTIONS
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

1.11 SAMPLES
Provide samples of each carpet for review of colour, design and quality. Submit on request samples of underlay and accessories offered.

1.12 RESERVE MATERIAL
Supply reserve carpet, all suitably packaged for delivery and storage. Refer to SELECTIONS.

2. PRODUCTS

Materials

2.1 UNDERLAY
To AS/NZS 2455.1 Soft underlay and underlays manufacturer's requirements.
Refer to SELECTIONS for product selection.

2.2 CARPET
To AS/NZS 2455.1 Textile floor coverings.
Refer to SELECTIONS for product selection.

Components

2.3 BINDER BARS
Anodised aluminium section with fluted face.

2.4 DIVIDER STRIPS
Hardwood strips 20mm x 15mm or as specified. Refer to SELECTIONS for type and size.

2.5 EDGE GRIPPER
To AS/NZS 2270.
Timber/plywood with steel grippers to carpet manufacturer's requirements, constructed of sufficient pins and nails so as to withstand a minimum stretching force of 6580N over a 1220 mm length.

2.6 STAIR NOSING
Refer to SELECTIONS for type.

Accessories

2.7 ADHESIVE, UNDERLAY
To AS/NZS 2455.1, clause 1.5.3. and underlay manufacturer's requirements.

2.8 ADHESIVE, CARPET
To AS/NZS 2455.1, clause 1.5.3. and carpet manufacturer's requirements.

2.9 TAPE
To carpet manufacturer's requirements.

3. EXECUTION

Conditions

3.1 DELIVERY
Take delivery of materials and goods and store on site and protect from damage.
Accept rolls of carpet and accessories undamaged and dry.

3.2 HANDLE AND STORE
Handle carpet on flat dollies using carpet cradles, with probes on fork- lifts and without sharp bending or folding. Store carpet in flat bins with a maximum height of three rows. Keep dry. Protect from damage.

3.3 INSPECTION
Before starting work inspect the substrate to ensure that it will allow work of the required standard, and that all fittings and fixtures around which the carpet is to be scribed are in place.

3.4 PROTECTION
Protect adjoining work surfaces and finishes during the carpet installation.

3.5 TAPE
Tape for binding and seaming using type and width required by the carpet manufacturer to suit the specified carpet and the standard of performance required.

3.6 LAYOUT
Plan the general layout so that:
- seams run lengthways
- traffic runs along the seam
- light from windows is not across the seam
- pile faces away from the light source.

3.7 TEMPERATURE
Acclimatise carpet to a room temperature above 15°C through the whole of the installation.

3.8 FLOOR PREPARATION
Refer to 6192 FLOORING SUBSTRATE PREPARATION. Prepare floor and check conditions required for laying to AS/NZS 2455.1, section 2.

Application - substrate preparation

3.9 PREPARING NEW CONCRETE FLOOR
To be level, smooth, clean, cured and dry. Remove loose material and dust. Refer to 6192 FLOORING SUBSTRATE PREPARATION.

3.10 PREPARING NEW WOOD PRODUCT FLOOR
To be level, sanded smooth and dry with loose material and dust removed. Check for moisture content and do not commence laying until readings for the whole area show a moisture content of:
8 - 12% for air conditioned buildings
10 - 14% for intermittently heated buildings
12 - 16% for unheated buildings
Refer to 6192 FLOORING SUBSTRATE PREPARATION.

Application - carpet laying

3.14 INSTALLATION, UNDERLAY
Installation to underlay manufacturer's requirements. Lay at right angles to the carpet direction.

3.15 INSTALLATION, CONVENTIONAL SYSTEM
Tape carpet joints, fix grippers to floor and install underlay and carpet to AS/NZS 2455.1, section 3. Stretch carpet tight in both width and length evenly without bowing, square with walls.

3.16 INSTALLATION, DIRECT STICK SYSTEM
Direct stick install to AS/NZS 2455.1, section 3. Apply adhesive evenly over the entire substrate surface to the carpet manufacturer's requirements. Lay carpet with all edges,

selvages and joins tightly butted and completely bonded to the floor surface. Roll the carpet with a clean 25 kg roller and ensure complete contact with adhesive.

3.17 INSTALLATION, DOUBLE BOND SYSTEM

Double bond install to AS/NZS 2455.1, section 3. Apply adhesive on the underlay to the carpet manufacturer's requirements. Lay carpet with edges, selvages and joins tightly butted and completely bonded to the underlay surface.

3.20 FIXING TRIMS

Fix binder bars, carpet to carpet bars, and trims to all junctions with other materials and to carpet edges, to the carpet manufacturer's requirements. Ensure that junctions with other materials are neatly formed, with bars and trim securely fastened to the substrate, 20mm from each end and at a maximum of 100mm centres.

Completion

3.21 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.22 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

6700 PAINTING GENERAL

1. GENERAL

This section relates to the general matters related to painting work

1.1 RELATED WORK

Refer to 6711 PAINTING EXTERIOR for exterior paint systems.
Refer to 6721 PAINTING INTERIOR for interior paint systems.

1.2 ABBREVIATIONS

The following abbreviations are used throughout this part of the specification:

APAS	Australian Paint Approval Scheme
MPNZA	Master Painters New Zealand Association Inc.
VOC	Volatile organic compound

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

AS/NZS 2311	Guide to the painting of buildings
AS/NZS 2312	Guide to the protection of structural steel against exterior atmospheric corrosion by the use of protective coatings
OSH	Guidelines for the provision of facilities and general safety in the construction industry
OSH	Guidelines for the management of lead-based paint
MPNZA	Specification manual
MPNZA	Painters hazard handbook

Health and Safety in Employment Act 1992

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified manufacturer's system, or associated components and products.

1.6 QUALIFICATIONS

Painters to be a member of MPNZA and experienced competent workers, familiar with the materials and the techniques specified.

1.7 CONTROL SAMPLES

Prepare samples of the finished work as scheduled, including preparation and colour as specified. Obtain written approval of the appearance before proceeding. Refer to SELECTIONS for requirements.

1.8 HEALTH AND SAFETY

Refer to the requirements of the Health and Safety in Employment Act and OSH: Guidelines for the provision of facilities and general safety in the construction industry. If the elimination or isolation of potential hazards is not possible then minimise hazards in this work on site by using the proper equipment and techniques as required in the MPNZA Painters hazard handbook. Supply protective clothing and equipment. Inform employees and others on site of the hazards and put in place procedures for dealing with emergencies.

Refer to OSH: Guidelines for the management of lead-based paint for the required procedures and precautions when:

- treating/removing lead-based paint
- burning off paint
- sanding off paint
- using solvent based paint removers.

1.9 MATERIAL SAFETY DATA SHEET
Obtain from each paint manufacturer the material safety sheet for each product used. Keep sheets on site and comply with the required safety procedures.

Warranties

1.10 WARRANTY
Warrant this work under normal environmental and use conditions against failure.
2 years: Warranty period

Refer to the general section 1237WA WARRANTY AGREEMENT for the required format and details of when completed warranty must be submitted.

Performance

1.11 MANUFACTURER'S INSPECTION
Allow the paint manufacturers to inspect the work in progress and to take samples of their products from site if requested.

1.12 INSPECTION OF WORK
Inspection of the whole of the work at each of the stages scheduled may be made. Agree a programme that will facilitate such inspection, including notification when each part and stage of the work is ready for inspection.

2. PRODUCTS

Materials

2.1 PAINT TYPES
Use the manufacturer's complete system and only the products specified.

2.2 MATERIALS GENERALLY
Use only the Manufacturer's products which are guaranteed for their consistency and performance under ISO 9001 and APAS approval, prepared, mixed and applied as directed in the Manufacturer's specification sheets, specification manuals and product data sheets.

2.3 THINNERS AND ADDITIVES
Only use thinners or additives within the stated limits for the particular situations specified.

Accessories

2.4 FILLERS
For recommendations on; fillers, stopping, paint strippers, cleaning agents, etching solutions, mould inhibitors, rust inhibitors, knotting and other commodities used for the surface preparation, refer to the manufacturer of the specified coating.

3. EXECUTION

Conditions

3.1 EXECUTION
To conform to manufacturer's requirements and those methods, practices and techniques contained in AS/NZS 2311, the MPNZA Specification manual, and OSH Guidelines for the provision of facilities and general safety in the construction industry.

3.2 PREPARE
Prepare surfaces to the coating manufacturer's requirements.

3.3 COATED SURFACES
Ensure that substrate surfaces are able to achieve the specified finish.

3.4 PRE-PRIMED SURFACES
Sand down any breakdown or damage of the primer to a sound surface and immediately re-prime.

3.5 BRUSH DOWN
Brush down surfaces immediately before application, to remove dust, dirt and loose material.

3.6 COMPATIBILITY
Check that materials are as required by the paint manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other. Use paint from the same manufacturer for each paint system. If not compatible, obtain instructions before proceeding.

3.7 TREATED SURFACES
Where surfaces have been treated with preservatives or fire retardants, check with the treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance. If they are not compatible, obtain instructions before proceeding.

3.8 ANCILLARY SURFACES
The coatings listed in schedules and elsewhere are of necessity simplified. Coat ancillary exposed surfaces to match similar or adjacent materials or areas, except where a fair-faced natural finish is required or items are completely prefinished. In cases of doubt obtain instructions before proceeding.

3.9 HARDWARE
Do not paint hinges or hardware that cannot be removed. If items can be removed, carefully remove hardware, fixtures and fittings before commencing work. Set aside where they cannot be damaged or misplaced and replace on completion.

3.10 PROTECTION
Use dropsheets, coverings and masking necessary to protect adjoining fixtures, fittings and spaces from paint drops, spots, spray and damage.

Preparation - unpainted linings

3.28 PREPARING PLASTERBOARD
Check that joints are prepared to a smooth level surface finish. Fill cracks and surface imperfections with the sheet manufacturer's required stopping compound and lightly sand smooth. Remove dust.

Preparation - unpainted plastics

3.29 PREPARING POLYESTERS (GRP) AND PHENOL FORMALDEHYDES
Wipe surfaces with methyl ethyl ketone or other suitable solvent. Lightly abrade with sandpaper and dust off. Proceed immediately with priming.

Preparation - painted surfaces generally

3.31 SURFACE PREPARATION
Refer to the Manufacturer's specification sheets and product data sheets. Carry out the preparatory work required by them for each of the substrates.

For interior surfaces such as paper faced plasterboard use the Manufacturer's recommended finishing compound as an aid to achieving a Level 5 finish.

3.32 MOULD
Sterilise surface mould by washing or sponging the whole surface with a one part sodium hypochlorite household bleach to three parts clean water solution. Allow bleach to act for 30 minutes and wash off with clean water. Wash cloths and sponges regularly in clean water. Reapplication may be necessary. Treat with anti-mould solution to the treatment manufacturer's requirements.

3.33 GAP FILLING

Fill cracks, holes, indented and damaged surfaces with putty, plaster filler, wood filler, or plastic wood, as appropriate and in accordance with the paint manufacturer's requirements. Allow to dry or set before sanding back level with the surface. Prime coat or seal the timber before using putty. Wet cement or gypsum base plasters before applying filler. Use only Portland cement base types, or water-insoluble organic-based gap fillers in exterior or wet areas.

Preparation - painted surfaces in good condition

3.34 PREPARING SURFACES

Wash down surfaces with either:
- a chlorine based solution; or
- 5-10 millilitres of ordinary household detergent to 1 litre of warm water; or
- a solution of 30 grams of trisodium phosphate to 1 litre of water

Replace solutions frequently and finally wipe over a second time with a clean absorbent cloth.

For surfaces containing heavy smoke and grease deposits, wash down with either:
- mineral turpentine; or
- a 5% solution of ammonia; or
- a 1:40 solution of sugar soap and water

as necessary to remove the deposits. Wipe over with a clean absorbent cloth.

Prepare coatings which have chalked by sanding, brushing, waterblasting or other methods as appropriate.

Lightly sand glossy surfaces to ensure good adhesion of the coatings.

Preparation - painted surfaces in poor condition

3.35 PREPARING PAINTED TIMBER

Completely remove blistered, flaked, excessively chalked and cracked (due to exposed end grain and knots) paint to give a sound base for repainting. Scrape out damaged or decayed timber and where the area is extensive, arrange to cut out and replace with treated timber, primed (including end grain) before fixing.

Scrape clean loose or soft material, holes and depressions in timber due to damage or defects such as resin or gum pockets, knot holes and surface splits. Remove and replace sprung or loose corroded nails.

Where necessary strip paint back to the original timber surface, using the most appropriate of the following methods:
- burning off using a blowtorch to soften paint without charring, before scraping off with a broad knife
- using an electrically heated hot air stream to soften paint, before scraping off with a broad knife
- sanding using orbital and/or belt sanders
- paint removers used to the manufacturer's requirements
- hand scraping.

Follow OSH guidelines for minimising the hazards of stripping.

3.36 PREPARING PAINTED GYPSUM PLASTER

Remove flaked paint completely from powdery, loose and other unsatisfactory plaster surfaces. Treat powdery surfaces with a solution of 150 millilitres of concentrated phosphoric acid and clean water to make 1 litre. Apply the solution, allow to stand 10 minutes and wash down with clean water. Remove loose, weak and drummy plaster and replaster. Allow to cure before proceeding with coatings as for unpainted work.

Confirm that the cause of any efflorescence has been eliminated before wiping it away with a dry rag and making good the damaged surface.

Fill small cracks and damaged surfaces with gypsum plaster or cellulose gypsum compound to just proud of the surface and lightly sand smooth and flush when dry.

3.37 PREPARING PAINTED PLASTERBOARD AND FIBROUS PLASTER
Fill cracks, pores, irregularities and damaged surfaces with the appropriate filler to the paint manufacturer's requirements, trowelled smooth, allowed to dry and lightly sanded to a smooth flush surface. Treat any staining of paint films on plaster as required by the coating manufacturer.

3.39 PREPARING PAINTED METALWORK
Remove corrosion in whatever form. Sand edges to form a smooth surface with surrounding areas unaffected by corrosion. Use a chemical pre-treatment to remove the last traces of and to inhibit future, corrosion. Clean down completely before spot priming to suit the coating system specified.

Application - before applying final coatings

3.40 OFF-SITE WORK
Carry out off-site preparation and coating under cover, in a suitable environment and with adequate lighting. Store items both before and after coating in a clean, dry area, protected from the weather and mechanical damage, properly stacked and spaced to permit air circulation and to prevent sticking of surfaces.

3.41 PRIMING JOINERY
Before priming preservative treated timber ensure that any cut surfaces have been retreated. Liberally coat end grain, allow to soak in and then recoat. Ensure LOSP. treated joinery has dried sufficiently to lose odour.

3.42 CONCEALED JOINERY SURFACES
Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.

3.43 CONCEALED METAL SURFACES
Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.

3.44 DOORS
Prime or seal and paint all six faces of doors before hanging.

3.45 BEAD GLAZING
Before glazing apply the first two coats, or the primer and one undercoat, to rebates of stained, varnished or painted joinery and beads.

3.46 PUTTY GLAZING
Follow putty manufacturers recommendations for application, drying, and painting. Ensure that the putty is fully protected by the coating system as soon as it is sufficiently hard.

Application - generally

3.47 PAINTING GENERALLY
Comply with the paint manufacturer's requirements and any additional requirements in this specification.

3.48 MIXING
Thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.

3.49 ENVIRONMENT
Paint exterior surfaces only in favourable weather conditions:
- warm dry days without frost or heavy dews
- avoid painting in direct sunlight any surfaces that absorb heat excessively
- as far as possible apply paint in the temperature range 15°C to 25°C

- do not paint if temperatures fall outside the range of 10°C and 35°C unless paints with the necessary temperature tolerance have been specified
- do not apply solvent borne paint if moisture is present on the surface

3.50 SEQUENCE OF OPERATIONS

Painting work to generally follow the following sequences:
- complete surface preparation before commencing painting
- apply paint in the specified sequence using the specified paint
- allow full drying time between coats to the paint manufacturer's requirements
- do not expose primers, undercoats and intermediate coats beyond manufacturers stated instructions before applying the next coat
- finish broad areas before painting trim
- ensure batch numbers of tins are matched for whole areas
- internally, paint ceilings before walls and walls before joinery, trim and other items

3.51 PAINT APPLICATIONS

Select brush, roller, or pad and apply paint to the requirements of the paint manufacturer and to obtain a smooth even coating of correct thickness, uniform gloss and colour.

3.52 DRYING TIME

Before handling or applying the next coat of paint, give each coat the full drying time as required by the paint manufacturer. Ensure that surfaces are dry and that condensation does not occur before the paint reaches surface-dry condition.

3.53 LIGHTLY SAND

Lightly sand primers, sealers, undercoats and intermediate coats to remove dust pick-up, protruding fibres and coarse particles. Remove dust immediately before applying the next coat.

3.54 DEFECTIVE WORK

Correct defective work immediately and re-coat as required, following precisely the paint system specified.

3.55 EACH COAT

Each coat of paint and the completed paint system to have the following qualities and properties:
- uniform finish, colour, texture, sheen and hiding power
- the specified number of coats applied
- no blemishes such as runs, sags, crinkling, fat edges, entrained paint skins, hairs, dust, bare or starved patches, cracks, brush marks, ladder marks and blistering
- proper covering of corners, crannies, thin edges, cracks, end grain and other difficult places of application

Completion

3.56 CLEAN

Clean adjoining surfaces, glass and fittings of any paint contamination. Clean off glass indicators at completion of the building works. Clean glass inside and out to a shining finish.

3.57 CLEAN EQUIPMENT

Use the Manufacturer's environmental wash system for the cleaning of water-based paint and plasters from brushes, rollers, plastering or spray equipment to separate the solids from the water component for safe disposal.

3.58 LEAVE

Leave the whole of this work uniform in gloss and colour, of correct thickness, free from painting defects, clean and unmarked and to the standard required by following procedures.

3.59 REMOVE

Remove dropsheets, coverings and masking to leave surrounding surfaces and areas clean, tidy and undamaged. Remove debris, unused materials and elements from the site.

3.60 REPLACE HARDWARE

Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

7120 HOT AND COLD WATER SYSTEM

1. GENERAL

This section relates to piped potable water supply systems from the network utility supply authority water main to designated points and appliances, the installation of hot water heating appliances, distributing piped hot water to other appliances, and the installation of valves.

1.1 RELATED WORK

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures and tapware selections.

Documents

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC H1/AS1	Energy Efficiency
AS 1432	Copper tubes for plumbing, gasfitting and drainage applications
AS/NZS 2492	Cross Linked Polyethylene (PE-X) pipe for pressure applications
AS/NZS 2537	Mechanical joining fittings for use with cross-linked Polyethylene (PE-X) fittings for hot and cold water applications
AS/NZS 2642.1	Polybutylene (PB) plumbing pipe systems - Polybutylene (PB) pipe extrusion compounds
AS/NZS 2642.2	Polybutylene pipe fittings Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
AS/NZS 2642.3	Polybutylene pipe systems - Mechanical jointing fittings for use with polybutylene pipes for hot and cold water applications
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design and performance requirements
AS/NZS 3500.1	Plumbing and drainage - Water services
AS/NZS 3500.5	National plumbing and drainage - Domestic installations
NZS 3501	Specification for copper tubes for water, gas and sanitation
AS 3688	Water supply - Copper and copper alloy body compression and capillary fittings and threaded-end connectors
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
NZS 4305	Energy efficiency domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4607	Installation of thermal storage electric water heaters: valve-vented systems
NZS 4617	Tempering (3-port mixing) valves
NZS 5261	Gas installation
DIN 8077	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - Dimensions
DIN 8078	Polypropylene (PP) Pipes - PP-H, PP-B, PP-R, PP-RCT - General quality requirements and testing.

Plumbers, Gasfitters and Drainlayers Act 2006

1.3 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:

~

Copies of the above literature are available from ~

Web: ~
Email: ~
Telephone: ~
Facsimile: ~

Requirements

1.4 QUALIFICATIONS
Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.5 INFORMATION FOR OPERATION AND MAINTENANCE
Provide the following general operation and maintenance information as electronic PDF format documents:
~

Provide this information prior to practical completion.

Warranties

1.6 WARRANTY
Provide warranty for:
2 years: For the supply and installation of the plumbing system and fixtures

- Provide the warranty in the standard form in the general section 1237WA WARRANTY AGREEMENT.
- Commence the warranty from the date of practical completion of the contract works.

Performance

1.7 TESTING
Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed.

Slowly fill service pipes with water to exclude air. Apply test pressure of a 90 metre head or a maximum working pressure plus 50%, whichever is the greater. Ensure there is no measurable loss of pressure for a minimum of 30 minutes. Slowly fill distribution pipes with water to exclude air. Ensure that with draw-off taps closed the system must remain water-tight. Ensure that mixers and other fittings that have pressure limits are protected during testing.

1.8 STANDARDS FOR COPPER PIPE
This section is based on NZS 3501 to NZBC G12/AS1 for the supply of copper pipe and fittings.
If the specified pipe is not available, pipes to AS 1432 and fittings to AS 3688 can be used, under NZBC G12/VM1 if written BCA approval is obtained by the plumber (both Standards are referenced in AS/NZS 3500.1). If these Standards are used adjust diameters so that bore sizes are not compromised, otherwise comply with all other aspects of this section.
The whole project to be either to NZS 3501 or AS 1432.

2. PRODUCTS

2.1 COPPER PIPE
To NZS 3501 complete with copper-alloy compression fittings or crox type joints and seal ring compression joints complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1, Table 1 and NZBC G12/AS1, Table 1.

2.2 PVC-U PIPE
Complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1 Durability, Table 1 and NZBC G12/AS1, Table 1.

2.3 POLYBUTYLENE PIPE
Polybutylene tubing to AS/NZS 2642.1, AS/NZS 2642.2 and AS/NZS 2642.3 complete with fittings and accessories brand-matched with durability to NZBC B2/AS1 Durability, table 1 and NZBC G12/AS1, table1.

2.4 POLYETHYLENE PIPE
To AS/NZS 4130 Series 1 complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1, table 1 and NZBC G12/AS1, table1.

2.5 POLYPROPYLENE RANDOM WATER PIPE
Polypropylene pipes to DIN 8077 and DIN 8078 complete with fusion welded fittings and accessories brand-matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1, table 1 and NZBC G12/VM1.

2.6 CROSS LINKED POLYETHYLENE PIPE
Cross Linked Polyethylene Pipe to AS/NZS 2492 and fittings to AS 2537.2 with a minimum pressure capability of 1200 kPa complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1, table 1 and NZBC G12/VM1.

2.7 WATER METER
To the requirements of the network utility operator.

2.8 VALVES
Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief or temperature valve, pressure relief valve and isolating valves to NZBC G12/AS1.

2.9 BACKFLOW PREVENTION DEVICES
Provide backflow prevention devices to AS/NZS 2845 where it is possible for water or contaminants to backflow into the potable water supply. Refer to NZBC G12/AS1 3.4 Backflow protection, and NZBC G12/AS1, table 2, Selection of Backflow Protection.

2.10 TEMPERING VALVE
Tempering valve to NZS 4617 to NZBC G12/AS1.

2.11 HEADER TANKS
Pre-formed black polyethylene or stainless steel tank, complete with access opening and lid and overflow tray.

Materials - Hot water heating appliances

2.12 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE
To NZS 4305, ceramic-coated steel thermal storage cylinder, insulated and complete with required fittings.

Components

2.18 INSULATION
Pre-formed pipe sections complete with bends and fittings, with fixing tape to the manufacturer's requirements and to NZBC H1/AS1.

2.19 PROTECTIVE TAPE
Plasticised PVC tape system with primer, mastic fixing and outer coating.

Fire stopping accessories

2.20 FIRE STOPPING SYSTEMS
For sealing around pipe penetration through fire walls and floors use a combination of the following:
- Gunnable inorganic or silicone elastomer sealant, packed to maintain the specified fire resistance rating of the floor or wall.
- Two-part silicone foam elastomer sealant, packed to maintain the specified fire resistance rating of the floor or wall.
- Fire wrap containing intumescent material used in conjunction with the selected sealer.

- Fire collar with intumescent packing to maintain the specified fire resistant rating of the floor or wall.

3. EXECUTION

3.1 EXECUTION GENERALLY
Generally carry out the whole of this work and tests to NZBC G12/VM1 or G12/AS1.

3.2 HANDLE AND STORE
Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress.

Store tapware in a shelved, dry and securely locked area. Retain tapware in the manufacturer's original packaging, complete with all fixings and installation instructions. Label each unit separately with its space/fixture number to match.

3.3 CORE HOLES AND SLEEVES
Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.

3.4 CONCEAL
Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.

3.5 CORROSION
Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

3.6 THERMAL MOVEMENT
Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.

3.7 PIPE SIZE
Flow rates to each outlet to be no less than those given in NZBC G12/VM1 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures. Pipe size as determined in NZBC G12/AS1, table 4, Tempering valve and nominal pipe diameters.

3.8 ELECTROLYTIC ACTION
Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.

3.9 EXCAVATE
Excavate for the water main to a firm, even trench base in straight runs. Allow to backfill.

Application - Jointing

3.10 JOINTING COPPER PIPE
Braze pipe, fit alloy compression fittings, crox type joints and seal ring compression joints to NZBC G12/AS1.

3.11 JOINTING PVC-U PIPE
Solvent welded joints using spigots and sockets, flanged joints and seal ring compression joints to NZBC G12/AS1.

3.12 JOINTING POLYBUTYLENE PIPE
Aluminium clamped, seal ring compression or push fit "O" ring seal jointing to pipe system manufacturer's requirements.

3.13 JOINTING POLYETHYLENE PIPE
Seal ring compression joints and electrofusion to NZBC G12/AS1.

3.14 JOINTING POLYPROPYLENE PIPE
Fusion weld joints to manufacturer's requirements.

Application - Pipework installation

3.15 WATER SUPPLY CONNECTION
Arrange with the network utility operator for a connection to the water main and from there through a water meter and gate valve. Provide back flow prevention to NZBC G12/AS1.

3.16 POTABLE WATER SUPPLY PIPEWORK INSTALLATION
From connection point, run pipes complete with all fittings, support and fixing, joins and install to manufacturers specifications. Size the pipes and branches in straight runs to deliver the acceptable flow rate to NZBC G12/VM1 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures and size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Pipework support spacing to be firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with machine made 3 diameter bends, complete with necessary valves and fittings. Conceal pipework and pressure test before the wall linings are fixed.

3.17 HOT WATER PIPEWORK
Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to NZBC G12/VM1 or NZBC G12/AS1, table 7 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, and preformed 3 diameter bends, complete with all necessary valves and fittings.

Lag all pipes with rigid insulation to the manufacturer's requirements and G12/VM1 or G12/AS1.

3.18 EQUIPOTENTIAL BONDING
Earth metallic water supply pipe and metallic sanitary fixtures to NZBC G12/AS1, 9.0.

3.19 IN-LINE FILTER
Install an in-line filter immediately adjacent to the main isolating valve at the point of entry to the building, in an accessible position to allow for easy cleaning.

Application - Hot water systems

3.20 HOT WATER CYLINDER INSTALLATION GENERALLY
Install hot water cylinders complete to the manufacturer's requirements and with seismic restraint as required to storage cylinders, to NZBC G12/AS1, 6. 11, Water heater installation. Valve-vented systems to NZS 4607.

3.21 INSTALLING HOT WATER PIPE INSULATION
Insulate all hot water pipes to NZBC H1/AS1, AS/NZS 3500.5, 3.11.7 Insulation of piping and to the insulation manufacturer's instructions. Cut insulation sections tight between timber framing and tight between the webs of steel studs.

3.22 INSTALL ELECTRIC HOT WATER CYLINDERS AND BOILING CYLINDERS
Install where shown complete with all the necessary fittings to the cylinder manufacturer's requirements and in accordance with NZBC G12/AS1: 6.11. Valve-vented systems to NZS 4607.

3.27 INSTALL HOT WATER CYLINDER OVERFLOW TRAY
Install drained overflow tray to hot water cylinder to NZBC G12/AS1.

3.28 INSTALL TEMPERING VALVE
Install 1 metre minimum from outlet of hot water cylinder and to manufacturer's instructions. Install copper pipework for 1 metre minimum downstream of tempering valve prior to connection of non-metallic pipework.

3.29 PENETRATIONS
Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

Application - Fire resistant work

3.30 FIRE STOPPING WORK
Prepare pipe penetration and install fire stopping system around pipes to manufacturer's installation instructions.

Installation - Valves

3.31 INSTALLING BELOW GROUND ISOLATING VALVE
Install all below ground items such as main isolating valves and water meters in preformed concrete pits or approved equivalent.

3.32 INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED
Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.

3.33 INSTALLING BACKFLOW PREVENTION DEVICE
Provide and install backflow prevention device as near as practicable to the potential source of contamination, and in an accessible position for maintenance and testing to AS/NZS 2845.3.

Completion

3.34 LABEL
Label all pipework with permanent adhesive markers at 3 metre minimum intervals.

3.35 CLEAN IN-LINE FILTER
Clean all in-line filters on completion of works.

3.36 REPLACE
Replace damaged or marked elements.

3.37 LEAVE
Leave work to the standard required by following procedures.

3.38 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

Water main

4.1 POLYETHYLENE WATER MAIN
Size: 25mm outside diameter (i.e. DN 25 in AS/NZS 4130)

Pipework

4.2 COPPER PIPE
Manufacturer: ~
Brand: ~
Nominal bore: ~mm
Wall thickness: ~mm

4.3 PVC-U PIPE
Manufacturer: ~
Brand: ~

4.4 POLYBUTYLENE PIPE
Manufacturer: ~
Brand: ~

4.5 POLYPROPYLENE RANDOM PIPE
Manufacturer: ~
Brand: ~
Size: ~mm outside diameter

4.6 CROSS LINKED POLYETHYLENE PIPE
Manufacturer: ~
Brand: ~
Size: ~ Nominal Bore / OD Size (mm)

4.7 EXPOSED PIPES
Manufacturer: ~
Type: ~
Nominal bore: ~mm
Accessories: ~

4.8 RIGID INSULATION
Brand: ~
Material: ~
Wall thickness: ~
Finish: ~

Hot water systems

4.9 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE
Brand: ~
Model size: ~

Valves and accessories

4.15 MAIN ISOLATING VALVE
Location: ~
Brand/type: ~

4.16 FLOOR/ZONE ISOLATING VALVES
Location: ~
Brand/type: ~

4.17 APPLIANCE ISOLATING VALVES - CONCEALED
Appliance: ~
Brand/type: ~

4.18 APPLIANCE ISOLATING VALVES - EXPOSED
Appliance: Washing machine
Brand/type: Refer to tapware selections

4.19 TEMPERING VALVE
Location: ~
Brand/type: ~

4.20 BACKFLOW PREVENTION DEVICE
Location: ~
Brand/type: ~

4.21 IN-LINE FILTER
Location: ~
Brand/type: ~

4.22 HEADER TANKS
Maker/brand: ~
Capacity: ~ litres
Size: ~mm diameter x ~mm high

Fire resistant sealers

4.23 FIRE RESISTANT SEALER
Manufacturer: ~
Type: ~

4.24 FIRE RESISTANT FOAM SEALER
Manufacturer: ~
Type: ~

4.25 FIRE RESISTANT WRAPS
Manufacturer: ~
Type/number: ~

4.26 FIRE RESISTANT COLLARS
Manufacturer: ~
Type/number: ~
Pipe size: ~mm diameter

7411 RAINWATER SPOUTING SYSTEMS

1. **GENERAL**

This section relates to rainwater disposal systems including spouting and downpipes:
- metal
- PVC

Related work

Documents

1.2 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC E1/AS1	Surface water
AS 1273	Unplasticised PVC (uPVC) downpipe and fittings for rainwater
MRM	NZ Metal roof and wall cladding - Code of practice

Documents listed above and cited in the clauses that follow are part of this specification. However this specification takes precedence in the event of it being at variance with the cited document.

1.3 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:
~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

1.4 ABBREVIATIONS AND TERMS

The following abbreviations are used throughout this part of the specification:

BMT	Base metal thickness
MRM	New Zealand Metal Roofing Manufacturers Inc
Spouting	Roof gutter bracketed off the roof edge or fascia.
Gutter	Internal gutter or gutter formed as integral part of the roof fabric.

Requirements

1.5 QUALIFICATIONS

Work to be carried out by tradesmen experienced, competent and familiar with the materials and techniques specified.

Warranties

1.6 WARRANTY

Warrant this work under normal environmental and use conditions against:

3 years:	For weatherproofing by substandard workmanship:
From:	Commence the warranty from the date of completion of installation
Form:	Installers standard warranty form

Refer to the general section 1237 WARRANTIES for details of when completed warranty must be submitted.

1.7 WARRANTY - MATERIAL

Warrant this work under normal environmental and use conditions:

10 Years	For failure of coating adhesion
10 Years	For weatherproofing by material penetration

Form: Manufacturer's standard warranty form
From: Commence the warranty from the date of completion of installation

Refer to the general section 1237 WARRANTIES for details of when completed warranty must be submitted.

Performance

1.8 TEST
Test the completed rainwater disposal system with water to ensure spoutings are laid to correct falls, that both spouting and downpipes are unobstructed and that no ponding occurs in spoutings.

2. PRODUCTS

Materials - uPVC

2.2 UPVC DOWNPIPES
To suit the spouting system, pipes solvent cement jointed and complete with stand-off brackets, galvanized screws and accessories, brand matched and complete to the manufacturer's specifications. Refer to SELECTIONS for type.

Materials - metal

2.3 SPOUTING
Complete with matching brackets to suit spouting and screws. Refer to SELECTIONS for type.

2.4 SPOUTING BRACKETS
All exposed brackets to be colour matched before installation. Brackets to be hot-dipped galvanised, zincalume, aluminium, stainless steel or brass as specified and to suit application. Electroplated components are not acceptable. Refer to SELECTIONS for type.

2.5 DOWNPIPES
Complete with stand-off brackets, screw fixed. Refer to SELECTIONS for type.

Materials - fascia/barge system

2.6 CONCEALED FASCIA/BARGE SPOUTING SYSTEM
Fascia/barge type complete with jointing, brackets, fittings and accessories, brand matched and complete to the manufacturer's requirements. Refer to SELECTIONS for type.

2.7 EXTERNAL FASCIA/BARGE SPOUTING SYSTEM
Fascia/barge type complete with jointing, brackets, fittings and accessories, brand matched and complete to the manufacturer's requirements. Refer to SELECTIONS for type.

Components

2.8 DROPPERS
Metal or uPVC droppers, compatible with spouting material and sized to fit inside the downpipe.

2.9 FASTENERS GENERALLY
Minimum Class 4 durability and not less than the roofing material being fixed.

2.10 RIVETS
Sealed aluminium, minimum diameter 4mm.

2.11 SEALANT
MS Polymer sealant.

3. EXECUTION

Conditions

3.1 HANDLE AND STORE
Handle and store downpipes, spouting and accessories to avoid damage. Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Avoid exposure to sunlight if strippable film is still on the product.

3.2 SUBSTRATE
Check that fascias, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

3.3 THERMAL MOVEMENT
Make adequate provision in the fixing and jointing of the spouting for thermal movement in the length of the spouting. Provide an expansion joint in spouting over 18 metres in length for steel gutter.

3.4 CORROSION
Separate metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips. Do not allow copper downpipes to discharge onto lower galvanized or zinc aluminium coated steel roofs.

Application - uPVC

3.6 INSTALL UPVC DOWNPIPES
Assemble downpipes, solvent welded complete, fit to outlets, galvanized screw fix with pipe clips to rigidly stand 25mm off the wall, plumb and discharging into the stormwater gully or pipe inlet to the downpipe manufacturer's required practice.

Application - metal

3.7 INSTALLATION GENERALLY
Install to MRM NZ Metal roof and wall cladding - Code of practice recommendations where not otherwise specified.

3.8 INSTALL VALLEY GUTTERS
Attach valley gutters to valley boards by clips allowing for thermal movement to MRM NZ Metal roof and wall cladding - Code of practice, clause 8.4.5 Valley gutters. Separate valley gutter from valley boards with a layer of bituminous building paper.

3.9 INSTALL SECRET GUTTERS
Install secret gutters to fall allowing for thermal movement to MRM NZ Metal roof and wall cladding - Code of practice, clause 8.4.8 Secret gutters. Rivet and seal joints with MS Polymer sealant.

3.10 INSTALL METAL SPOUTING
Establish minimum falls necessary (minimum 1:500, 2mm in 1 metre) to outlets to prevent ponding and screw fix brackets, true to line at 750mm centres maximum for external gutters less than 175mm wide and at 600mm centres maximum for gutters 175mm to 300mm wide. In areas where snow fall is possible the centres should be reduced to 600mm maximum. Lap spouting joints a minimum of 40mm, silicone seal between surfaces and pop rivet to the manufacturer's recommendations. Ensure the joint is fixed over its full girth. Cut out neatly for and fit the pre-formed downpipe dropper and rivet and seal around the joint. All installation to MRM NZ Metal roof and wall cladding - Code of practice recommendations.

3.11 INSTALL PRE-PAINTED METAL SPOUTING
Establish minimum falls necessary (minimum 1:500, 2mm in 1 metre) to outlets to prevent ponding and screw fix brackets true-to-line at 750mm centres maximum for external gutters less than 175mm wide and at 600mm centres maximum for gutters 175mm to 300mm wide. In areas where snow fall is possible the centres should be reduced to 600mm maximum. Lap spouting joints a minimum of 40mm and silicone seal and pop rivet to the manufacturer's recommendations. Cut out neatly for and fit the pre-formed downpipe dropper and silicone seal around the lap joint. All installation to MRM NZ Metal roof and wall cladding - Code of practice recommendations.

3.12 INSTALL EXTERNAL FASCIA/BARGE SPOUTING SYSTEM
Install concealed fascia brackets to rafters with either screws or nails and fit fascia to a level line. Fit gutter brackets to fall to outlet. Cut and form corner junctions and barge junctions and fit spouting rigidly to brackets. Cut out neatly for and fit pre-formed downpipe droppers. Silicone seal and pop-rivet all lap joints. All installation to MRM NZ Metal roof and wall cladding - Code of practice recommendations.

3.13 INSTALL DROPPERS
Install either 2 outlets or one outlet and an overflow to each spouting section. Cut out neatly for and fit the pre-formed downpipe dropper and rivet and seal around the joint. All installation to MRM NZ Metal roof and wall cladding - Code of practice recommendations.

3.14 INSTALL METAL DOWNPIPES
Form downpipes complete with angle bends as needed with joints lapped and sealed. Screw fix with pipe clips to rigidly stand off the wall plumb and discharging into stormwater gully or inlet pipe. All installation to MRM NZ Metal roof and wall cladding - Code of practice recommendations.

3.15 INSTALL DOWNPIPE SPREADERS
Install downpipe spreaders where required to MRM NZ Metal roof and wall cladding - Code of practice, clause 8.5.1 Downpipe spreaders. Provide spreaders to downpipes that discharge on to a lower roof. Ensure spreaders do not discharge directly over fasteners or laps. Spreaders to have holes equalling twice the diameter of the downpipe.

3.16 INSTALL SUMPS
Install sumps where required to MRM NZ Metal roof and wall cladding - Code of practice, clause 8.6 Sumps.

3.17 INSTALL RAINWATER HEADS
Install rainwater heads where required to MRM NZ Metal roof and wall cladding - Code of practice, clause 8.6.1 Rainwater heads.

3.18 INSTALL OUTLETS AND OVERFLOWS
Install outlets and overflows where required to MRM NZ Metal roof and wall cladding - Code of practice, clause 8.6.2 Outlets and overflows.

3.19 INSTALL SUMP PROTECTION
Install leaf guards of the same area as the sump. Set the leaf guard above the calculated level of flow; not directly in the outlet.

Application - concealed fascia/barge spouting system

3.22 INSTALL CONCEALED FASCIA/BARGE SPOUTING SYSTEM
Ensure rafters/outriggers are true-to-line and face and fix stand-off brackets before roofing is in place. Cut fascia/barge to required length, seal edges and clip fit rigidly to brackets. Fit corner soaker joints. Cut spouting to length to form folded lap joints elsewhere complete with downpipe droppers and expansion joints for thermal movement, all silicone sealed and riveted. Install overflows equal to the downpipe cross section area at rainwater heads and downpipe locations as required by the spouting manufacturer. Install to NZBC E1/AS1, 5.5 Overflow outlets and completed to the spouting manufacturer's required practice and fixed by the spouting manufacturer's approved installers.

Completion

3.23 REPLACE
Replace damaged or marked elements.

3.24 LEAVE
Leave the whole of this work discharging completely and freely into the stormwater system and free of all debris. Leave work to the standard required by following procedures.

3.25 REMOVE
Remove debris, unused materials and elements from the site.

4. SELECTIONS

4.1 SPOUTING
Brand: ~
Profile/size: ~mm
Cross section: ~mm^2
Material: ~
Thickness: 0.55mm
Coating system: ~
Colour: ~

4.2 SPOUTING BRACKETS
Type: ~
Material: ~

4.3 DOWNPIPES
Brand: ~
Profile/size: ~mm
Material: ~
Thickness: 0.55mm
Coating system: ~
Colour: ~

4.4 DOWNPIPE BRACKETS
Type: ~
Material: ~

UPVC system

4.6 UPVC DOWNPIPES
Brand: ~
Profile/size: ~mm

Fascia/barge spouting system

4.11 CONCEALED FASCIA/BARGE SPOUTING SYSTEM
Brand: ~
Profile/size: ~mm
Cross section: ~mm^2
Material: ~
Thickness: 0.55mm
Coating system: ~
Colour: ~

4.12 EXTERNAL FASCIA/BARGE SPOUTING SYSTEM
Brand: ~

Profile/size: ~mm
Cross section: ~mm^2
Material: ~
Thickness: 0.55mm
Coating system: ~
Colour: ~

Miscellaneous items

4.13 DOWNPIPE SPREADERS
~

4.14 SUMPS
~

4.15 RAINWATER HEADS
Brand/type: ~
Material: ~
Thickness: ~mm
Finish/colour: ~

7420 SANITARY SYSTEMS

1. GENERAL

This section relates to above ground gravity flow sanitary systems;
- for foul water
- from sanitary fixtures to first underground drain connection
- including system wastes, floor wastes, floor waste gullies, traps, vents and valves
- with associated components and accessories to make the system work

1.1 RELATED SECTIONS

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures tapware and accessories.
Refer to 7430 DRAINAGE for underground drains.
Refer to 7142 GREYWATER SYSTEMS for greywater systems.

1.2 DOCUMENTS

Documents referred to in this section are:

NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water
AS 2887	Plastic waste fittings
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage

Plumbers, Gasfitters and Drainlayers Act 2006

1.3 MANUFACTURER'S DOCUMENTS

Manufacturer's and supplier's documents relating to work in this section are:
~

Copies of the above literature are available by phoning ~.

1.4 QUALIFICATIONS

Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

2. PRODUCTS

2.1 PVC-U WASTE, DISCHARGE AND VENT PIPES

PVC-U pipe to AS/NZS 1260 complete with fittings brand-matched to the pipe manufacturer's requirements.

2.2 EXPOSED PIPES AND TRAPS

Chrome plate on copper pipes and associated copper and brass fittings.
White polybutylene or PVC, including all associated fittings.

3. EXECUTION

3.1 EXECUTION GENERALLY

Carry out this work and complete all tests to AS/NZS 3500.2.
Carry out this work and complete all tests to NZBC G1/AS1: 2.0, 3.0 and G13/AS1.

3.2 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

3.3 INSTALL TRAPS, WASTE AND VENT PIPES

Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to AS/NZS 3500.2 /NZBC G13/AS1 and AS/NZS 2032. Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

3.5 PENETRATIONS

At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

3.6 TEST

Test soil and waste disposal systems to ensure no leakage exists and leave in proper working order.

3.7 CLEAN UP

Remove labels and clean fittings. Remove unused materials from the site.

7430 DRAINAGE

1. GENERAL

This section relates to the supply and laying of gravity foul water (sewage), stormwater and field drains.

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC B1/AS1	Structure - general
NZBC E1/AS1	Surface water
NZBC E2/AS1	External moisture
NZBC G13/AS2	Foul Water
AS/NZS 1254	PVC-U pipes and fittings for Stormwater and Surface Water applications
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of Polyethylene pipe systems
AS 2439.1	Perforated Plastics Drainage and Effluent Pipes and Fittings - Perforated drainage pipe and associated fittings
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
NZS 3104	Specification for concrete production
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications

Plumbers, Gasfitters and Drainlayers Act 2006

1.3 AS-BUILT DRAWINGS

Supply a 1:100 scale as-built drawing of drains and fittings to the territorial authority and to the owner on completion.

1.4 QUALIFICATIONS

Drainlayers to be experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006.

2. PRODUCTS

2.1 CONCRETE

17.5 MPa prescribed mix to NZS 3104.

2.2 REINFORCEMENT

Plain round and/or deformed steel bars, Grade 300 to AS/NZS 4671.

2.3 PVC-U PIPES

PVC-U pipes bends, junctions, fittings and joints to AS/NZS 1254 and AS/NZS 1260.

2.4 POLYETHYLENE PIPES

Polyethylene pipes and fittings to AS/NZS 5065.

2.6 GULLY TRAPS

To NZBC G13/AS2: 3.3 Gully traps, complete with grating.

2.7 SURFACE WATER SUMP GRATINGS

Cast iron frame with lift-up grating.

2.8 STRIP DRAIN CHANNEL

Proprietary, modular, variable invert, PVC or precast concrete drainage channel sections and drainage sump, embedded in site concrete and fitted with selected metal gratings.

2.10 DRAINAGE AND FILLING MATERIALS

Granular:	Clean gravel or crushed stone or a blend of these. Particle size from minimum 7mm to maximum 20mm.
Selected:	Fine grain soil or granular material suitable for bedding; excluding topsoil.
Ordinary:	Top soil or other excavated materials.

3. EXECUTION

3.1 EXCAVATE

Excavate for drains to a firm even base with correct gradients set in straight runs.

3.2 MANUFACTURER'S REQUIREMENTS

All drainage installations to the pipe and fitting manufacturer's requirements.

3.3 DRAINAGE GENERALLY

Carry out drainage work and tests to AS/NZS 3500.2 (sanitary drainage) AS/NZS 3500.3 (stormwater drainage) as modified by NZBC B1/AS1: 6.0. Lay uPVC pipe systems to relevant sections of AS/NZS 2032, NZS 2566.1 and AS/NZS 2566.2. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033 and NZS 2566.1.

3.5 INSTALL GULLY TRAPS

Set on concrete 50mm above the surrounding ground or paving and brought up to protect the top of the fitting. Trowel off.

3.6 LAY STORMWATER DRAINS

Confirm the required location of downpipes and finished ground levels before commencing pipework. Set downpipe bends in concrete with the concrete brought up to protect the top of the bend from damage. Lay drains in straight runs to correct gradients to discharge into the network utility operator's stormwater system.

3.9 INSTALL STRIP DRAIN CHANNEL

Excavate trench and form site concrete base to fall. Set interlocking channel sections, sumps and accessories in place, all in accordance with the channel manufacturer's requirements. Check falls and install gratings and covers.

3.10 INSTALL SURFACE WATER SUMP

To NZBC E1/AS1, complete with ceramic half-siphon pipe and cast iron frame with a lift out grating.

3.14 CONCRETE ENCASEMENT

Concrete encase shallow drains and drains under driveways, on a 100mm deep 17.5 MPa concrete bed reinforced with three 10mm mild steel bars. Surround pipes with a polythene membrane to allow movement and encase in 100mm 17.5 MPa concrete.

3.15 FIELD TEST

Field test drains for watertightness (PVC-U to AS/NZS 2032 or AS/NZS 2566. 2 Appendix N) to the satisfaction of the territorial authority inspector.

3.16 BACKFILL

Backfill drain lines in 150mm layers, well tamped but without disturbing the drains. Finish off with 150mm of topsoil, slightly mounded above the finished ground line.

7701 ELECTRICAL BASIC

1. GENERAL

This section relates to the wiring for domestic and small scale commercial installations, including:

- power
- lighting

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

CFL	compact fluorescent lamp
ELV	extra low voltage
GLS	general lighting service
IP	international protection classification
LCD	liquid crystal display
LED	light emitting diode
MCB	miniature circuit breaker
NUO	Network Utility Operator
PCB	printed circuit board
PIR	passive infrared
RCBO	residual current-operated circuit breaker with over current protection
RCCB	residual current-operated circuit breakers
RCD	residual current device
SIA	security integration architecture
TPS	tough plastic sheathed

Documents

1.3 DOCUMENTS REFERRED TO

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC E2/AS1	External moisture
NZBC F6/AS1	Lighting for emergency
NZBC F7/AS1	Warning systems
NZBC G4/AS1	Ventilation
NZBC G9/AS1	Electricity
AS/NZS 1125	Conductors in insulated electric cables and flexible cord
AS/NZS 1768	Lightning protection
AS 1670.6	Fire detection, warning, control and intercom systems - System design, installation and commissioning - Smoke alarms
AS 2293.1	Emergency escape lighting and exit signs for buildings - System design, installation and operation
AS 2293.3	Emergency escape lighting and exit signs for buildings - Emergency escape luminaires and exit signs
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.2	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand installation conditions
AS/NZS 3100	Approval and test specification-general requirements for electrical equipment
AS/NZS 3112	Approval and test specification - Plugs and socket-outlets
AS/NZS 3113	Approval and test specification - Ceiling roses
AS/NZS 3190	Approval and test specification - Residual current devices (current-operated earth-leakage devices)
AS/NZS 3350.1	Safety of household and similar electrical appliances - General requirements
AS/NZS 3439.3	Low-voltage switchgear and controlgear assemblies - Particular requirements for low-voltage switchgear and controlgear assemblies

	intended to be installed in places where unskilled persons have access for their use - Distribution boards
AS 3786	Smoke alarms
NZS 4301.1	Intruder alarm systems - systems installed in clients premises
AS/NZS 5000.2	Electric cables - Polymeric insulated - for working voltages up to and including 450/750v
NZECP	NZ Electrical Codes of Practice
NZECP 54	NZ Electrical Codes of Practice for the installation of recessed luminaires and auxiliary equipment (available at www.energysafety.govt.nz)
IEC 61643	Components for low voltage surge protection devices

Electricity (Safety) Regulations 2010

Warranties

1.5 WARRANTY

Warrant the complete electrical installation under normal environmental and use conditions against failure of materials and execution.

1 year: Warranty period

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

1.6 COMPLY

Comply with the Electricity (Safety) Regulations 2010, AS/NZS 3000, AS/NZS 3008.1.2 and the New Zealand electrical codes of practice for listed and prescribed work and with the utility network operator's requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

1.7 QUALIFICATIONS

Carry out work under the supervision of an electrical licensed supervisor.

1.11 CERTIFICATE OF COMPLIANCE

Supply a certificate of compliance to the owner, as required by the Electricity (Safety) Regulations (2010) regulation 67, within 20 days of completion as required by regulation 69.

- Arrange for the NUO to inspect before the meter installation, listed work inspection, polarity check and supply becoming live.
- Arrange for an inspector to inspect as required by regulation 70.

2. PRODUCTS

2.1 MAINS SUPPLY, SINGLE PHASE

Tough plastic sheathed neutral screened cable to AS/NZS 4961 and AS/NZS 3008.1.2, with a minimum rating of 60 amps per phase. Include pilot cable where required by network utility company.

2.2 CABLES

Tough plastic sheathed copper conductors to AS/NZS 5000.2, stranded above 1.0mm^2, and to AS/NZS 3008.1.2. Minimum sizes as below. Increase sizes if the method of installation, thermal insulation, cable length or load will reduce the cable rating below that of the MCB rating, or produce an excessive voltage drop.

Lighting circuits:	Domestic: 1.5mm^2 on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm^2 on 16 amp MCBs
Power circuits:	2.5mm^2 on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction
	2.5mm^2 on 16 amp MCBs for domestic insulated construction, or filled cavity

2.5mm^2 on 20 amp MCBs for unenclosed or unfilled cavity construction
2.5mm^2 on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres

Hot water cylinder circuits: Single phase: 2.5mm^2 on 20 amp MCBs
Range/oven/hob circuits: Single phase: 6mm^2 on 32 amp MCBs

Heat resistant cable for final connections to all heated appliances, and high temperature cable in ambient conditions that may be above 35°C.

2.3 METER BOX

Proprietary manufactured, zinc plated powder coated metal case, or ABS plastic, with glazed panel door, weatherproof where mounted outdoors, and complete with meter mounting, main switch and fuse.

2.4 DISTRIBUTION BOARD

Flush surface mount boards manufactured to AS/NZS 3439.3 and installed in accordance with AS/NZS 3000. Manufactured from engineering grade resin with a glow wire rating of 850°C, complete with neutral and earth busbars, and insulated comb phase bar. Distribution boards to have 20% spare capacity for future additions and alterations.

2.5 CIRCUIT PROTECTION

General requirements including main switch 63A or 100A. Residual current protection 30mA, ensure RCCBs' meet Type A and comply with AS/NZS 3190. MCBs to 4.5kA or 6kA rated.

2.6 WALL BOXES

Standard grid size or equivalent to be manufactured from plastic or metal, with 2 or more gang size to be metal with steel inserts for accessory securing screws. Screw fixed.

2.7 SWITCH UNITS

Single pole switches to be 16 amp minimum rated, double pole or intermediate to be 16 amp minimum rated. All switches to be 230 volt a.c. polycarbonate flushplate units. Refer to drawings/schedules for number of switches per unit, dimmer units, neon (indicator or toggle) units and 2 way units.

2.9 SWITCHED SOCKET UNITS

10 amp, 230 volt flat 3 pin socket outlets fitted with safety shutters and manufactured to AS/NZS 3100, AS/NZS 3112 and AS/NZS 3113, single or multi gang as detailed.

2.10 SMOKE ALARMS

Type 1 domestic smoke alarm to NZBC F7/AS1. 1.2 **Descriptions of alarm systems**. Alarm to AS 3786. A wired 230 volt ionised smoke detector type.

2.11 SURGE PROTECTION

Protection for the homes appliances with IEC 61643 Class II surge protection devices fitted to the switchboard. For variable electronic equipment fit IEC 61643 Class III surge protection to switched socket outlets.

2.14 DOOR BELL SYSTEM

Complete with transformer for mounting on distribution board.

2.15 LIGHT FITTINGS

Fluorescent and High Intensity Discharge fittings with low loss control gear and power factor corrected to 0.95 minimum. Control gear suitable for dimming if this is required. All fittings complete with lamps; Incandescent GLS lamps pearl, coiled-coil 230v rated, bayonet cap; Fluorescent triphosphor 2700K; CFL; halogen ELV 12v dichroic reflector with cover glass unless detailed otherwise.

2.18 EXHAUST FANS

Ceiling, wall or duct mounted exhaust fans for ventilation to NZBC G4/AS1, and compliant with AS/NZS 3350.1.

2.19 HEATED TOWEL RAILS

Fixed wired heated towel warmers, double insulated, IPX4 splash-proof, compliant with AS/NZS 3350.1, scratch resistant powdercoated or chrome finish.

2.20 OUTDOOR SWITCHES & SOCKETS

Using materials with superior UV protection, impact strength, and addition chemical resistance when compared with interior polycarbonate fittings. Weather protected, switches to IP56 minimum, and sockets to IP53 minimum. Sockets fitted with safety shutters behind socket pins, and all products able to be padlocked off or on.

3. EXECUTION

3.1 MAIN SUPPLY

Lay underground mains to the NUO requirements. Excavate trench, install cable and marker tape and backfill.

3.2 METER BOX

Fit to meter box manufacturer's and Electricity Retailer's requirements. Recess into external wall in sheltered area and flash to weatherproof to NZBC E2/AS1 fig 69. Arrange for meter installation and connection.

3.3 DISTRIBUTION BOARD

Fit to AS/NZS 3000 and board manufacturer's requirements. Recess into wall or surface mount and ensure fire containment properties of the enclosure are maintained.

3.4 CIRCUIT PROTECTION

Install MCBs at distribution board to AS/NZS3000 to protect each final sub circuit.

3.5 EARTH BONDS

Bond together and to earth all plumbing fittings not adequately isolated, to AS/NZS 3000, the Electricity (Safety) Regulations 2010 and the fitting manufacturer's requirements.

3.6 MAIN EARTH

Provide a plastic toby box to contain and protect the earth electrode. Fix the connecting earth wiring closely and securely against wall surfaces.

3.7 EARTH LEAKAGE PROTECTION

Install RCD protection to AS/NZS 3000.

3.8 DOMESTIC INSTALLATIONS

Install 30mA RCD protection at the distribution board for all final sub circuits to control socket outlets and lighting except for fixed or stationary cooking equipment, to AS/NZS 3000.

3.9 HIGH RISK AREA INSTALLATIONS

Install 30mA RCDs at the distribution board for areas not covered in Domestic installations, or using fixed wired RCD protected socket outlets in areas that may represent increased risk of electric shock to the user:

- Wet areas: bathrooms, laundries, kitchens.
- Near pools and water features.
- Where intended for use with cleaning equipment.
- Hand-held tools subject to movement in use, i.e. work-shops, garages.

3.10 SET-OUT

The position of outlets and equipment shown on drawings is indicative of requirements. Confirm documents and site conditions are not in conflict with other services or features. Resolve conflicts and discrepancies before proceeding with work affected. Confirm on site the exact location, disposition and mounting heights of all outlets, fittings, equipment, penetrations, and use of exposed wiring. Fix outlet items level, plumb and in line.

3.11 CABLING

Install wiring systems to AS/NZS 3000. All cabling run concealed. No TPS cable laid directly in concrete. Locate holes in timber framing for the passage of cables at the

centre line of the timber member. Install cable in conduits where required to pass through concrete or underground. In walls run cabling horizontally and vertically in straight lines. In ceilings either run cabling along ceiling framing or attached to catenary wires. Clip cabling to ceiling framing/catenary wires.

3.12 CABLING CIRCUITS

Install all circuits with the appropriately rated cable and circuit protection. Install with a maximum of 8 light switch units or 4 double or single switched socket units on any circuit. Minimum 2 lighting circuits per floor. Separate circuits for all electric heating appliances. Kitchen sockets to be on at least two different circuits.

3.13 WALL BOXES

Mount flush in cavity construction size to fit products selected. Fix vertically mounted wall boxes to studs. Screw fix horizontally mounted switched socket outlet wall boxes to solid blocking or nogs. Fix switch panel wall boxes to solid blocking.

3.14 SWITCH AND SOCKET UNITS

Fit all single and double switch units, all sockets to the following heights (to the centre of the unit) unless shown otherwise on the drawings.

Switch Units: 1000mm
Socket Units: 150mm above work benches
400mm elsewhere

Mount light switches and switch socket outlets vertically and socket units horizontally. Label all switch units that control electrical equipment or special lighting circuits by colour filled engraving on the switch. Use proprietary engraved switch mechanisms where applicable.

3.15 ISOLATING SWITCHES

Locate isolating switches in positions as confirmed by the owner, when not specifically shown on the drawings.

3.16 LIGHT FITTINGS

Install light fittings in locations and at heights specified and confirmed by the owner, in accordance with the fitting manufacturer's requirements. Install recessed fittings to NZECP 54.

3.20 SPACE HEATERS

Install to the heater manufacturer's requirements, and to AS/NZS 3000. Fit neatly and without damage to surrounding finishes. Ensure control switches and thermostats are fitted to appliance, or otherwise connect to a control switch located adjacent to the heater and a remote thermostat.

3.21 SMOKE ALARMS

Install Type 1 domestic smoke alarm system to NZBC F7/AS1 3.1 **Domestic smoke alarms**, AS 1670.6 and to the alarm manufacturer's requirements. Fit neatly and without damage to the surrounding finish.

3.22 SURGE PROTECTION

Install surge protection devices to manufacturer's requirements and in accordance with AS/NZS 3000 and AS/NZS 1768. When fitting IEC 61643 Class II protection at the switchboard, protect the device by a dedicated MCB.

3.23 ELECTRIC POWERED FITTINGS AND EQUIPMENT

Install and wire fittings and equipment to individual fittings and equipment manufacturer's requirements. Refer to the drawings for required layouts and locations for equipment. Refer to SELECTIONS for schedules of fittings.

3.24 BATHROOM ELECTRICAL FIXTURES

Install all electrical fixtures. Connect the following bathroom and toilet electrical items:

- Heated towel rails: Install to manufacturers requirements and installed in accordance with AS/NZS 3000 and the NZBC G9/AS1

- Mirror demisters:	Locate centrally above the wash hand basin(s). Connect wiring to room lighting unless specified otherwise.
- Exhaust fans:	Install exhaust fans to manufacturer requirements. Installed in accordance with AS/NZS 3000 and NZBC G4/AS1.

3.27 LABELLING

Include label under each controller, switch and circuit breaker on distribution boards. Include a warning notice if light dimmers are used in the installation. List the rating of each circuit.