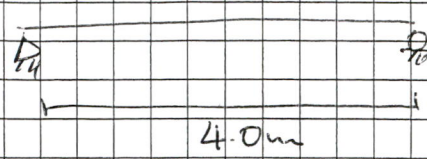
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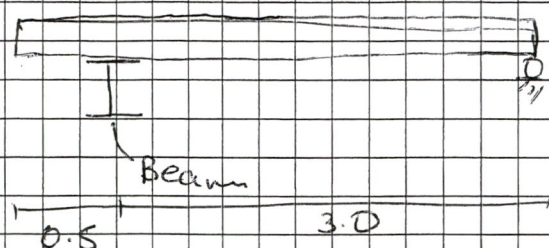
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Deck

BEAM 01



Loading



Dead load

Beam self weight Stg 180UB18 — 0.18 kN/m

Joists – $\left(\frac{0.15 \times 0.05 \times 5 = 0.09375\ kN/m^2}{0.4}\right) - 0.09375 \times \frac{3.5^2 \times 1}{2\ \ 3}$

— 0.19 kN/m

Bearers – $\left(\frac{0.05 \times 0.05 \times 5 = 0.0208\ kN/m^2}{0.60}\right) - 0.0208 \times \frac{3.5^2 \times 1}{2\ \ 3}$

— 0.04 kN/m

Plywood – $(0.0255 \times 5 = 0.13\ kPa) - 0.13 \times \frac{3.5^2 \times 1}{2\ \ 3}$

— 0.26 kN/m

Handrail – $(0.15\ kN/m) - \frac{0.15 \times 3.5}{3}$ — 0.175 kN/m

$\therefore$ G = 0.85 kN/m

Live Load Q = 2.0 kPa. or 1.8 kN

$\Rightarrow Q = 2.0 \times \frac{3.5^2 \times 1}{2\ \ 3} = 4.08\ kN/m$ or 2.1 kN @ Centre.

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For U.D.L $w_u = 1.6Q + 1.2G = 7.55\ kN/m$

$M^* = \frac{wL^2}{8} = \frac{7.55 \times 4^2}{8} = 15.1\ kNm$ $\quad V^* = \frac{wL}{2} = 15.1\ kN$

For Concentrated Load

$M^* = \frac{1.2 \times 0.85 \times 4^2}{8} + \frac{1.2 \times 2.1 \times 4}{2} = 7.08\ kNm$ $\quad V^* = 3.3\ kN$

Check Deflection $\quad EI = 205 \times 10^3 \times 12.10 \times 10^6 = 2.4805 \times 10^{12}$

$\Delta G = \frac{5}{384} \frac{wL^4}{EI} = 1.14mm$ $\quad \Delta Q = 5.48mm$

$\Delta G + \Delta Q = 6.6mm < \frac{4000}{500} = 8mm$ O.k.

O.k for Deflection.

Check Section Capacity

$M_s = f_y Z_e = 360 \times 157 \times 10^3 = 56.52\ kNM$

$\phi M_s = 50.87\ kNm > M^*$

for Restrained Beam Section Capacity $= \phi M_s$

O.k for Bending.

Check Shear $V^* = 15.1\,kN$

By inspection O.k.

Columns Try 89 x 89 x 6

$P^* = 15.1\,kN$ $L = 2.5m$ Say use $L = 3.0m$

ϕN_s, $\phi = 0.9$

$N_s = k_f A_n f_y = 1.0 \times 1870 \times 350 = 654.5\,kN$

$\phi N_s = 589.0\,kN. > P^*$ O.k.

ϕN_c; $N_c = \alpha_c N_s$

$L_e = k_e L = 1.0 \times 3.0 = 3.0$ $\alpha_b = -1.0$ Table 6.3.3(1)

$\lambda_n = \frac{L_e}{r}\sqrt{k_f}\sqrt{\frac{f_y}{250}} = \frac{3000}{33.2}\sqrt{1.0}\sqrt{\frac{350}{250}} = 106.9$

Table 6.3.3(2) $\alpha_c = 0.607$

$\therefore N_c = 0.607 \times 654.5 = 397\,kN$

$\phi N_c = 357\,kN > P^*$

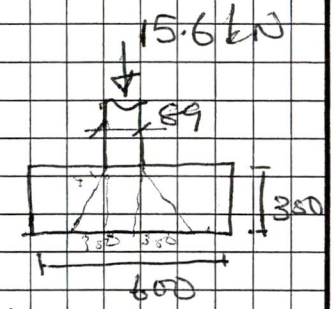
Use 89 x 89 x 6 SHS for Column.

Foundation

$P^k = 15.1\ kN + \frac{14 \times 9.81}{103} \times 3 = 15.6\ kN$

Column weight

Foundation for Isolated Column



Try 600 x 600 x 350 mm Pad.

$P = 15.6 + 0.6 \times 0.6 \times 0.35 \times 24.5 \times 1.2 = 19.3\ kN$

$q = \frac{P}{A} = \frac{19.3}{0.6 \times 0.6} = 53.6\ kPa < 100$ O.k.

Check for Punching $V = \frac{15.6 \times 10^3}{(4 \times 89 \times 269)} = 0.16\ N/mm^2$

O.k By inspection.

Provide Concrete Pad 0.6 x 0.6 x 0.35m
Grade 20MPa with 50mm Cover
+ Minimum Reinforcement 3 - D12 Both ways

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Foundation for Column in External Wall

Dead Load

Wall allow = 1.5 kN/m

Joists - $0.15 \times 0.05 \times \frac{1.8}{2} \times \frac{1}{0.4} \times 5$ = 0.08 kN/m

Bearers - $0.05 \times 0.05 \times \frac{1.8}{2} \times \frac{5}{0.6}$ = 0.02 kN/m

Plywood - $0.0255 \times 5 \times \frac{1.8}{2}$ = 0.115 kN/m

1.72 kN/m

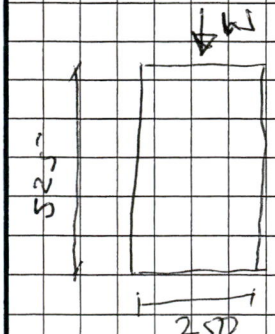
Live Load $Q = 2.0 \times \frac{1.8}{2} = 1.8$ kN/m or 1.8 kN

Ultimate load

$W_u = 1.6Q + 1.2G = 1.6 \times 1.8 + 1.2 \times 1.72 = 4.94$ kN/m

or $1.2 \times 1.72 = 2.06$ kN/m + 2.88 kN

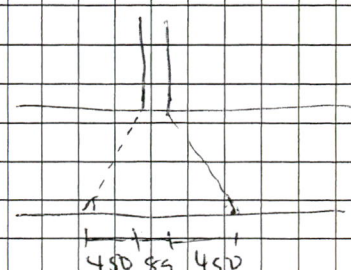
Critical load on Foundation Either.



$q = 1.2 \times 24.5 \times 0.525 + \frac{4.94}{0.25} = 35.2$ kPa

O.K.

Add Column load P = 15.6 kN.



$q_{add} = \frac{15.6}{0.989 \times 0.25}$

$q_{add} = 63.09$ kP

$q_{total} = 35.2 + 63.09$

$q_{total} = 98.29$ not O.K

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Increase Width to 400mm.

$q_{add} = \frac{15.6}{0.95 \times 0.4} = 39.43 \text{ kPa}$

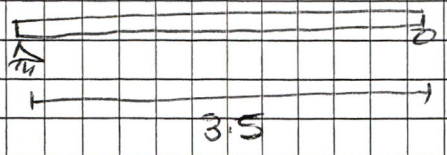
$q_{total} = 39.43 + 35.2 = 74.63 \text{ kPa} < 100 \text{ kPa}$.

Increase Width to 400mm for a distance of 500mm past the Column

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Beam End of Deck. BEAM 02



Loading

Dead

Self weight 18UB18 ~ 0.18 kN/m

Joists - $0.15 \times 0.05 \times \frac{1.8 \times 5}{2} \times \frac{}{0.4}$ ~ 0.08 kN/m

Battens - $0.05 \times 0.05 \times \frac{1.8}{2} \times \frac{5}{0.6}$ ~ 0.02 kN/m

Plywood - $0.0255 \times 5 \times \frac{1.8}{2}$ ~ 0.115 kN/m

Floor G = 0.40 kN/m

Wall

Wall allow - 0.33 kPa × 2.0 = 0.99 kN/m

Concrete tiles - 0.55 kPa × 2.5 = 1.4 kN/m

Rafter & Purlins - allow 0.3 kPa × 2.5 = 0.75 kN/m

Ceiling - $0.013 \times 5 \times \frac{1.8}{2}$ = 0.06 kN/m

Wall = 3.6 kN/m

G = 4.0 kN/m

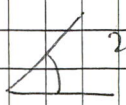
Live Load => Q = 2.0 kPa × 1.8/2 = 1.8 kN/m or 1.8 kN

or Roof Q = 0.25 × 2.5 kPa = 0.625 kN/m or 1 kN

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Wind



$q_u = 0.91\ kPa$ $C_{pe} = -0.7$

$C_{pi} = -0.3$ or 0

$C = -0.4$ or -0.7

$\therefore W_u = -0.7 \times 0.91 \times 2.5 = -1.59\ kN/m$

or $W_u = -0.4 \times 0.91 \times 2.5 = -0.91\ kN/m$

Ultimate Loading $W_u = 1.2 \times 4 + 1.6 \times 1.8 = 7.68\ kN/m$

$$M^* = \frac{wl^2}{8} = \frac{7.68 \times 3.5^2}{8} = 11.76\ kNm$$

$$V^* = \frac{wl}{2} = 13.44\ kN$$

Use 180UB18

Moment Capacity $\phi M_s = 56.2\ kNm > M^*$ O.K (Page 02)

Shear Capacity $\phi V > V^*$ O.K.

Check Deflection

$$\Delta G = \frac{5}{384}\frac{wL^4}{EI} = \frac{5 \times 4 \times 3500^4}{384 \times 2.48 \times 10^5 \times 10^2} = 3.15\ mm$$

$\Delta Q = 1.42\ mm$ $\Delta W = -0.55\ mm$

$$\Delta G = \frac{SPAN}{111} < \frac{SPAN}{500}$$ O.K.

O.K for Deflection

Use 180UB18 Beam

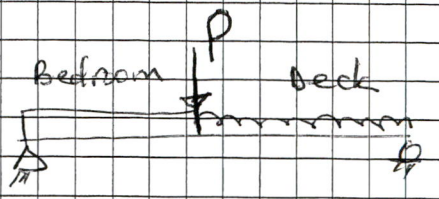
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BEAM 03

Lintel Windows 19.

L = 2.4m.



Load

Dead — Deck area

Wall — 0.33 * 3	=	0.99 kN/m
Roof tiles — 0.55 * 2.5/2	=	0.69 kN/m
Rafter + Purlin — 0.3kPa * 2.5/2	=	0.38 kN/m
Ceiling — 0.013 * 5 * 2.5/2	=	0.08 kN/m
Battens — 0.075 * 0.04 * 5 * 2.5/0.6	=	0.06 kN/m
Total	=	2.2 kN/m

Dead — Bedroom area

Joists — 0.25 * 0.05 * 5.8/2 * 5 * 1.8/0.45	=	0.725 kN/m
Floor — 0.22 * 5 * 5.8/2	=	0.29 kN/m
Ceiling — 0.013 * 5 * 5.8/2	=	0.19 kN/m
Battens — 1.8 * 0.075 * 0.04 * 5 * 5.8 * 1/2/0.6	=	0.0725 kN/m
Total	=	1.28

Live Load

Floor use Q = 2.0kPa * 5.8/2 = 5.8 kN/m or 1.8 kN

Use Q = 2.0kPa Same as Balcony load as the room opens to the balcony

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Concentrated Load

$G_p = 4.0 kN/m \times 3.5/2 = 7 kN$

$Q_p = 1.8 kN/m \times 3.5/2 = 3.15 kN$

$W_p = -1.59 kN/m \times 3.5/2 = -2.78 kN$

or $W_p = -0.91 \times 3.5/2 = -1.59 kN$.

Wind Load

$w_1 = -0.7 \times 0.91 \times 2.5/2 = -0.80 kN/m$

$w_2 = -0.4 \times 0.91 \times 2.5/2 = -0.46 kN/m$

Check Moment Capacity

$1.2G + 1.6Q$

$M^* = 13.859 kNm$ $V^* = 19.6 kN$

ϕM_n, $\phi = 0.8$ $M_n = k_1 k_4 k_5 k_8 f_b Z$

for 1.2G $k_1 = 0.8$, $k_4 = 1.14$, $k_5 = 1.0$, $k_8 = 1.0$

$f_b = 17.7$, $Z = 9.3237 \times 10^{-4}$

$\therefore M_n = 0.8 \times 1.14 \times 1.0 \times 1.0 \times 17.7 \times 9.3237 = 15.05 kNm$

$\phi M_n = 12.04 kNm < M^*$ Not O.k.

Use Steel Beam 180UB18

2

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Add 0.18kN as selfweight to dead load

∴ for $G_u + \Sigma Q_u$ loading

$M^* = 14.0$ kNm $\quad V^* = 19.9$ kN

$\phi M_s = 50.87$ kNm $> M^*$ (See page 02)

ϕV_v ; $\phi = 0.9$ $\quad V_v =$

$$\frac{d_p}{t_w} = 31.8 < \frac{82}{\sqrt{\left(\frac{f_c}{250}\right)}\sqrt{\frac{366}{250}}} = \frac{82}{} = 68.33$$

$V_{uv} = V_w = 0.6 f_y A_w = 0.6 \times 360 \times 159 \times 5 = 171.7$ kN

$\phi V_v = 154.5$ kN $>$ V^* O.k for Shear.

O.k for Section Capacity

Check deflection.

$\Delta G = 1.3$mm $\quad \Delta Q = 0.9$ mm

$\Delta G + \Delta Q = 2.2$mm $= \frac{SPAN}{1090}$ O.k.

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BEAM 04

Floor Beam $L = 5.8\,m$

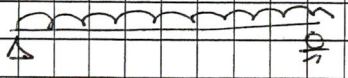
Loading

Dead

Self weight	~	0.18 kN/m
Joists $(0.25 \times 0.05 \times 3.5 \times 5 \times \frac{1}{0.45})$	=	0.49 kN/m
Battens $(0.075 \times 0.04 \times 5 \times \frac{3.5}{0.6})$	=	0.09 kN/m
Floor $(0.02 \times 5 \times 3.5)$	=	0.35 kN/m
Ceiling $(0.013 \times 5 \times 3.5)$	=	0.23 kN/m
		1.34 kN/m

Live $Q = 1.5\,kPa \times 3.5 = 5.25\,kN/m$ or $1.8\,kN$.

Analysis



Ultimate Loading $W_u = 1.2G + 1.6Q = 10.01\,kN/m$

$$M^* = \frac{Wl}{8} = \frac{10.01 \times 5.8^2}{8} = 42.09\,kNM. \qquad V^* = \frac{Wl}{2} = 29.03\,kN$$

Check Deflection

$$\Delta = \frac{5}{384}\frac{WL^4}{EI}, \quad EI = 2.4505 \times 10^{12}\,Nmm^4$$

$\therefore \Delta G = 7.96 \qquad \Delta Q = 3.118$

$$\Delta G = 7.96 = \frac{SPAN}{728} < \frac{SPAN}{500} \quad O.K.$$

DL3
UBEJ

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ΔQ, $Q = 1kN$ $\Delta Q = \frac{PL^3}{48EI} = \frac{1000 \times 5800^3}{48EI} = 1.671mm$

Not O.K.

Try 200UB30 $EI = 205 \times 10^3 \times 29.10 \times 10^6 = 5.9655 \times 10^{12}$

$\Delta Q = 0.68 < 1mm$ O.K.

ΔG & $\psi_s \Delta Q$, $\Delta G = 3.3mm$ $\Delta Q = 12.9mm$

$\Delta G + 0.7\Delta Q = 12.4mm = \frac{SPAN}{467.7} < \frac{SPAN}{400}$ O.K.

Use 200UB30 BEAM.

Check Moment Capacity

$\phi M_s = 0.9 \times 360 \times 316 \times 10^3 = 102.4 kNm > M^*$

Beam is restrained over its entire length O.K.

Check Shear Capacity

$\phi V_v = 0.9 \times 360 \times 0.6 \times 188 \times 6.3 = 230 kN > V^*$

O.K.

Use 200UB30

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Lintel BEAM 05

L = 3.0m

Loading

☐ Dead

Selfweight Beam	~	0.18 kN/m
Deck Joists $(0.15 \times 0.05 \times 1.6 \times \frac{5}{0.4})$	=	0.15 kN/m
Battens $(0.05 \times 0.05 \times 5 \times \frac{1.6}{0.6})$	=	0.03 kN/m
Plywood $(0.0255 \times 5 \times 1.6)$	=	0.20 kN/m
Wall $- 0.33 \times 3$	=	0.99 kN/m
Roof Tiles $- 0.55 \times 3.6$	=	1.98 kN/m
Rafters + Purlins $- 0.3 \times 3.6$	=	1.08 kN/m
Ceiling $- 0.013 \times 5 \times 2$	=	0.13 kN/m
Battens $- 0.075 \times 0.04 \times 5 \times \frac{2}{0.6}$	=	0.05 kN/m
	G =	4.79 kN/m

Live Load $Q = 2.0 \times 1.6 = 3.2$ kN/m or 1.8 kN

Wind Load Roof $\angle 20°$ $q_m = 0.91$ kPa $C_{pe} = -0.7$
$C_i = -0.3$ or 0

$\therefore C = -0.4$ or -0.7
$w_m = +0.7 \times 0.91 \times 3.6 = -2.29$ kN/m

Deck:

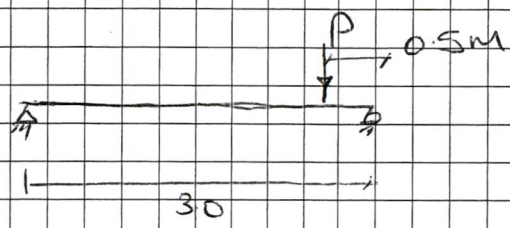
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Concentrated Load

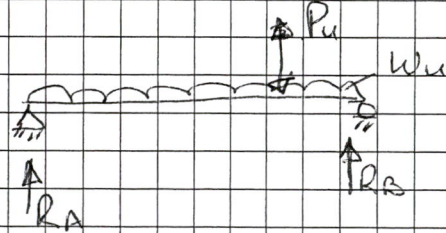
From Steel Beam

$G_p = \frac{1.34 * 5.8}{2} = 3.89 kN$ $\quad Q_p = \frac{5.23 * 5.8}{2} = 15.17 kN$

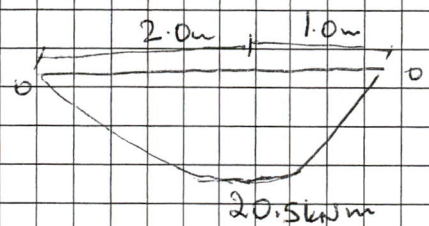


Critical loading

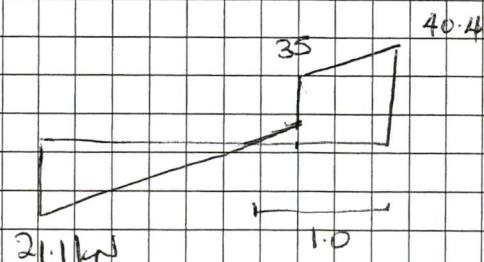
$1.2G + 1.6Q$



B.M.D



S.F.D



Deflection

$\Delta G = 2.5mm$ $\quad \Delta Q = 3.0mm$

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Section Capacity $M^* = 20.5\,kNm$ (Use 180UB18)

Fully Restrained member

$M_s = f_y Z_e = 56.52\,kNm \quad \phi = 0.9$

$\phi M_s = 50.87\,kNm > 20.5\,kNm$ O.k.

Shear Capacity $V^* = 40.4\,kN$

$V_v = 0.6 A_w f_y = 0.6 \times 159 \times 5 \times 360 = 171.7\,kN$

$\phi V_v = 154.5\,kN > V^*$ O.K.

Check Deflection

$\Delta G = 2.5mm \quad \Delta Q = 3.0$

$\Delta G + \Delta Q = 5.5mm = \frac{SPAN}{545} < \frac{SPAN}{500}$ O.k.

$\Delta G = 2.5 = \frac{SPAN}{1200}$ O.k ~~ΔQ~~

O.k for deflection.

(Use 180UB18)

Columns $P^* = 40.4\ kN$

Try 89x89x6 SHS $L = Say\ 3.0m$

$N_s = k_f A_n f_y = 1.0 \times 1870 \times 350 = 654.5\ kN$

$\phi = 0.9$

$\therefore \phi N_s = 589.0\ kN > P^*$ O.k.

$N_c = \alpha_c N_s$ $L_e = k_e L = 1.0 \times 3.0 = 3.0$ $\alpha_b = -1.0$ Table 6.3.3(1)

$\lambda_n = \frac{L_e}{r}\sqrt{k_f}\sqrt{\frac{f_y}{250}} = \frac{3000}{33.2}\sqrt{1.0}\sqrt{\frac{350}{250}} = 106.9$

From Table 6.3.3(2) $\alpha_c = 0.607$ $\therefore \phi N_c = 0.607 \times 654.5 = 397\ kN$

$\phi N_c > P^*$ O.k.

Use 89x89x6 SHS for Columns

Foundation

$P^* = 40.4\ kN$

Foundation stress due to foundation strip & wall.

$$q_{wall} = 1.2 \times 24.5 \times 0.525 + \frac{4.94}{0.5} = 27.8\ kPa.$$

$$q_{pad} = \frac{P}{A} = \frac{40.4}{1.11 \times 0.4} = 90.99\ kPa.$$

$$q_{total} = 118.8\ kPa > 100 \quad \text{not o.k.}$$

Try $b = 0.5$

$$q_{wall} = 15.44 + \frac{4.94}{0.5} = 25.32\ kPa$$

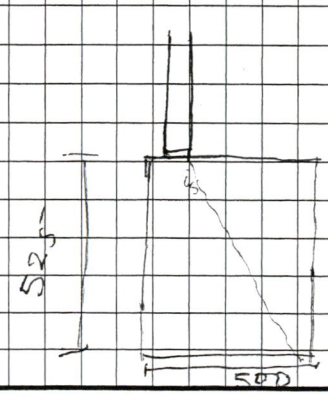
$$q_{pad} = \frac{40.4}{1.11 \times 0.5} = 72.79\ kPa$$

$$q_{total} = 98.11\ kPa < 100 \quad \text{o.k.}$$

Check Punching $\quad V = \frac{40.4 \times 10^3}{3 \times 450 \times 450} = 0.07\ N/mm^2$ o.k. BS

Inspection.

P. Increase Foundation to 0.5m for 0.5m Part the Column



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Project Pallet Frame BBA

Beam 06

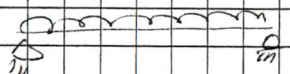
L = 4.0m

Dead Load

Self weight ~	=	0.18 kN/m
Joist $(0.25 * 0.05 * 2.3 \times 5 * \frac{1}{0.45})$	=	0.32 kN/m
Battens $(0.05 * 0.04 \times 5 * \frac{2.3}{0.6})$	=	0.06 kN/m
Floor $(0.02 \times 5 \times 2.3)$	=	0.23 kN/m
Ceiling $(0.013 \times 5 \times 2.3)$	=	0.15 kN/m
		0.94 kN/m

Live Q = $1.5 * 2.3 = 3.45$ kN/m or 1.8kN

Analysis



$w_u = 1.2G + 1.6Q$ ULS

$\therefore w_u = 1.2 \times 0.94 + 1.6 \times 3.45 = 6.65$ kN/m

$M^* = \frac{wL^2}{8} = \frac{6.65 \times 4^2}{8} = 13.3$ kN m $V^* = 13.5$ kN

Check Deflection $\Delta = \frac{5}{384} \frac{wL^4}{EI}$, $EI = 2.4805 \times 10^{12}$ Nmm²

$\therefore \Delta G = 1.26$mm $\Delta Q = 4.64$mm

$\Delta G = 1.26\text{mm} = \frac{SPAN}{3174} < \frac{SPAN}{500}$ O.K.

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ΔQ , $Q = 1kN$ $\quad \Delta Q = \frac{PL^3}{48EI} = \frac{1000 \times 4000^3}{48EI} = 0.54mm < 1m$ O.k.

O.k to Use 180UB18

Check Section Capacity $\quad M^* = 13.3 kNm$

$M_s = f_y Z_e = 360 \times 157 \times 10^3 = 56.52 kNm$

$\phi M_s = 50.87 kNm > 13.3 kNm$ O.k.

for restrained Beam $M_b = M_s$.·. O.k.

Check for Shear $\quad V^* = 13.3 kN$

$\phi V_v = 0.9 \times 0.6 \times 5.0 \times 159 \times 360 = 154.5 kN > V^*$ O.k.

Use 180UB18

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Project Pallet-Frame BBA

DOCUMENTS SCANNED

Dimension L x b = 7 x 5.5
7.5 x 5.2 m

From NZS 3604:1999

Table 8.2 - Studs in load bearing walls

Single or top storey - Heavy Roof

Wind Zone - Medium - High

Stud Maximum length 4.8m - provide 150x75 @ 400 mm c/c

Loaded dimension = 6.0m.

Check Calcs for 5.5m long Stud.

Dead Load (see Page 07)

Concrete tiles	$0.55 \times \frac{7.5}{2}$ =	2.06 kN/m
Rafters + Purlins	$0.3 \times \frac{7.5}{2}$ =	1.12 kN/m
Ceiling	$0.013 \times 5 \times \frac{7.5}{2}$ =	0.24 kN/m
Wall	0.33×5.4 =	1.78 kN/m
	G =	5.2 kN/m

Live Load $Q = 0.25 \times \frac{7.5}{2} = 0.94$ kN/m or 1 kN

Wind Load $w = +0.9 \times 0.91 \times \frac{7.5}{2} = +2.39$ kN/m

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Page 2 of 5
Project Pallet-Crane

150×50 @ 900 mm c/c

$P_u = 1.2G + 1.6Q = 1.2 \times (0.4 \times 5.2) + 1.6 \times 1.0 = 4.10$ kN

$P_u = 1.4G = 1.4 \times 0.4 \times 5.2 = 2.91$ kN

$L = 5.4$ m $L_e = 1.0 \times 5.4$ m Try 150×50 studs

$S_2 = \frac{L}{d} = \frac{5.4}{0.144} = 37.5$ $S_3 = \frac{L}{b} = \frac{5.4}{0.044} = 122.7$

$k_s = 23.5 \times 122.7^{(-1.237)} = 0.021$, $k_1 = 0.6$ or 1.0

$N_{ucy} = k_1 k_s f_c A$

For $P_u = 1.4G$ $N_{ucy} = 0.6 \times 0.021 \times 20.9 \times 44 \times 144 = 1.67$ kN

$\phi N_{ucy} = 1.33$ kN $< N^* = 2.91$ kN not o.k.

Try 2 No. 150×50 studs $\phi N_{ucy} = 2.66 < N^* = 2.91$ not o.k.

Try 2 No. 150×50 @ 300 mm c/c

$P_u = 1.4 \times 0.3 \times 5.2 = 2.18$ kN $< \phi N_{ucy}$ o.k.

For $P_u = 1.2G + 1.6Q$ $\phi N_{ucy} = 4.43$ kN

$P_u = 1.2 \times 0.3 \times 5.2 + 1.6 + 1.0 = 3.47$ kN $< \phi N_{ucy}$ o.k.

Check for Wind loading. $C = 0.7 + (+0.3) = 1.0$

$W_u = 1.0 \times 0.91 \times 0.3 = 0.27$ kN/m

$M_y^* = \frac{0.27 \times 5.4^2}{8} = 0.98$ kNm $N_c^* = 1.2G = 1.87$ kN

$M_{ux} = k_1 k_4 k_5 k_8 f_m Z = 2.0 \times 1.14 \times 1.0 \times 0.45 \times 17.7 \times \frac{144^2 \times 44}{6} = 1.38$ kNm ×2

$\phi M_{ux} = 1.1$ kNm ×2 = 2.2 kNm

A

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$$\left[\frac{M_x^*}{\phi M_{ux}}\right] + \left[\frac{N_c^*}{\phi N_{cx}}\right] \leq 1.0$$

$$\Rightarrow \left[\frac{0.98}{2.2}\right] + \left[\frac{1.87}{4.43}\right] = 0.86 \leq 1.0 \quad \text{O.k.}$$

$$\left[\frac{M_x}{\phi M_{ux}}\right]^2 + \left[\frac{N^*}{\phi N_{cx}}\right]^2 = 0.62 < 1.0 \quad \text{O.k.}$$

O.k to use 2 No 150 x 50 x 300 mm lg

or Alternatively – see over

A

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Project Pallet frame

$P_u = 1.2G + 1.6Q = 1.2\times(0.4\times5.2) + 1.6\times1.0 = 4.10$ kN
$P_u = 1.4G = 2.91$ kN

$L = 5.4$ $L_e = 1.0\times5.4 = 5.4$M

$S_2 = \frac{L}{d} = \frac{5.4}{0.144} = 37.5$ $S_2 = \frac{L}{b} = \frac{5.4}{0.069} = 78.3$

$S_3 = \frac{8.5d}{b} = 7.3$

$N_b^* = 4.10$ $\phi N_{nb} = \phi k_1 k_3 f_p A_p$

$k_1 = 0.6$ or 1.0 $k_3 = 1.0$ (parallel to grain)

$\phi N_{nb} = 0.8\times0.6\times8.9\times144\times69 = 42.44$ kN $> 1.4G_u = 2.91$kN

$\phi N_{nb} = 0.8\times1.0\times8.9\times144\times69 = 70.7$ kN > 4.10 kN o.k

$N_c^* \le \phi N_{ncy}$

$N_{ic}^* \le \phi N_{ncx}$ $N_c^* = 4.10$kN $1.2G + 1.6Q$

$N_{ic}^* = 2.91$kN $1.4G$ $k_s = 235.5 * 78.3 - 19.37$

$k_s = 0.05$

$N_{ncy} = k_1 k_s f_c A = 0.6\times0.05\times20.9\times144\times69$

$N_{ncy} = 6.23$kN $\phi N_{ncy} = 4.98$kN > 2.91kN o.k.

Or $P_u = 1.2G + 1.6Q = 4.10$kN $\phi N_{ncy} = 1.0\times0.05\times20.9\times144\times69 = 10.88$kN

$\phi N_{ncy} = 8.31$kN $> N^* = 4.1$kN o.k.

B

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Project Pallet - frame

Wind loading $C_p = 0.7 - (-0.3) = 1.0$

$w_u = 1.0 \times 0.91 \times 0.4 = 0.36\ kN/m$

$M^* = \frac{0.36 \times 5.4^2}{8} = 1.33\ kNm$

$\phi M_{sx} = 0.8 \times 0.8 \times 1.0 \times 1.0 \times 0.38 \times 17.7 \times \frac{144^2 \times 69}{6} = 2.97\ kNm$

$\left[\frac{1.33}{2.97}\right] + \left[\frac{1.2 \times 0.4 \times 5.2}{4.98}\right] = 0.94 < 1.0$ O.K.

O.K. use 150×75 @ 400 mm c/c.

Floor Joists under Bath

Span ≈ 2.2m (250×50 @ 450 c/c)

NZS 3604 ⇒ allowable span of 3.5m for 3.0kPa floor load

Load of Bath ≈

Bath ≈ 50kg (0.5 kN)
Water ≈ 500kg (5.0 kN)

spread over ≈ 1.4 m² ⇒ 1.2×0.5 + 1.6×5.0

= 8.6 kN / 1.4² ⇒ 4.4kPa

Check

$\phi M_n = 0.8 \times 0.8 \times 1.0 \times 17.7 \times 10^6 \times 4.664 \times 10^{-4}$ ~~5.3kNm~~

$M^* \simeq (4.4 \times 0.45) \times 1.4 \times 2.2/4 = 1.52\ kNm$ ok

Δ < 1.35mm ⇒ span/1628 ∴ ok

Use 250×50 @ 450 c/c

B

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2 4 APR 2006
Manawatu District Council

DAVE MILLER
Environmental Engineer

I design septic tank and sewage treatment systems

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email:davemiller@xtra.co.nz
www.davemiller.co.nz

PERMIT NUMBER. 116715/1

IN DOC No 75835
FILE No. BC116715/1
DIVISION | ACTION | FILE
CEO

PALLET-FRAME HOUSE

POHANGINA VALLEY ROAD EAST

POHANGINA

WASTEWATER DISCHARGE REPORT

Date: 12 March2006 Reference: 30905

CLIENT: John & Margaret Pallet Frame
CONTACT: John & Margaret Pallet Frame
JOB DETAILS: Existing Wastewater System Review

Designed by
DAVE MILLER
Environmental Engineer

INTRODUCTION

The original homestead at the Pallet-Frame property burnt down and is being replaced with at 4 bedroom dwelling. The original septic tank is only 1 metre away from the new dwelling and will need to be replaced. The existing effluent line from the original septic tank discharges over a cliff and this report considers the impact of this method of discharge and recommends practical steps to mitigate the effects of this discharge and ensure the environmental effects will be less than minimal.

PILGRIMS REST TEA ROOMS

In addition to the dwelling, the site also houses the Pilgrims Rest tea rooms which open on weekends. Up to 50 people use the tearooms on a good trading day for essentially coffee, tea and scones. A single detached toilet is provided for ablutions and the dishes are washed in the dwelling after closing time. The wastewater usage from this activity is intermittent and minimal.

WATER USAGE

The water usage, based on AS/NZS 1547:2000 for a 4 bedroom house with up to 6 occupants, each using 140 litres of water per day is 840 litres per day. The tea rooms, catering for up to 50 people, could produce up to 10 litres per person per day (TP 58 – August 2004 edition) giving a theoretical volume of 500 litres per day for two days over a weekend.

EXISTING EFFLUENT DISPOSAL

The current effluent disposal area is approximately 4 hectares of heavy bushed area with creepers and undergrowth that severely inhibits human intrusion. A site inspection involved bush bashing down the steep bank where the effluent flowed and following its path for as long as it could be determined.

The effluent flow was under a thick canopy of trees and shrubs with extensive creeper cover which effectively sealed the effluent disposal area from contact with air movement. There was no sign of tracks, either from humans or deer, which confirmed the visual impression of this area being effectively shut off.

The soil type was predominately well weathered river loam material intermingled with rocks and leaf debris. The soil appeared to be of moderate soakage and the effluent flow path very quickly spread out and disappeared into the soil some 15-20 metres into the bush area from the discharge point. No surface flow path could be determined past this point. Photographs of this area are attached to this report.

An earthen bund was located running parallel to the road, approximately 50 metres away, which would prevent any surface water reaching the roadside drain except in an extremely heavy flood.

Given the isolated nature of the area, the significant impediment to human intrusion due to the heavy bush together with good soakage and the transpiration ability this vegetation provides, the environmental effects of this method of discharge appear to be less than minimal and suitable for continued use subject to the following proposal.

NEW SEWAGE SYSTEM PROPOSAL

This proposal is for a new 2 chamber septic tank as shown where the second chamber will initially be used for additional settling prior to gravity discharge to the existing outfall. The effluent will be of as higher quality as can be achieved from a filtered septic tank and the second chamber can be used for pumping to an LPED disposal system in the future if desired or required.

1. The new septic tank shall be 6000 litres combined septic tank-pump chamber with a 4500 litres septic tank and an additional 1500 litre settling chamber which can be used as a pump chamber in the future. The septic tank is fitted with an *ORENCO* effluent filter with a sealed access riser brought to the surface.

   This design incorporates the *ORENCO* (OSI) effluent filter which protects the effluent trenches from carry over solids by reducing the total suspended solids (TSS) from the septic tank from 125 to 33 parts per million. Tests from over 4800 septic tanks over a 15 year period confirm the reliability and validity of this filters performance. As this is a proprietary computer design specifically designed for OSI filters, substitution of other brands of effluent filter is not permitted.

2. Connect the outlet junction from the second chamber to the existing effluent line if possible. If the tank outlet is lower then a new line will need to be dug to the current position of the overflow exit point above the current effluent soakage area.

3. Lay a solid Novaflow pipe over the bank to convey the effluent under the thick bush canopy so that effluent does not come in contact with moving air mass. Cut slots in the last 10 metres of the Novaflow under the bush canopy to assist more even spread of effluent over a greater distance than would occur by a single point discharge. Attach Novaflow as required.

4. In the future, if desired or required, the effluent can be pumped from the pump chamber to a series of Low Pressure Effluent Dosing (LPED) trenches which can be located in the farmland adjacent to the driveway or elsewhere on the property. This option, if required, will necessitate a separate wastewater design.

MAINTENANCE

The filter should be inspected on an annual basis and I enclose a leaflet on the filter maintenance procedure for your information.

This work may be carried out by the owner or the installing plumber upon request.

The Territorial Authority may request or require this to be carried out as a condition of the building consent.

Should you have any queries or require any additional information please do not hesitate to contact me.



Dave Miller
Environmental Engineer



Figure 1: Effluent Disposal Area looking up bank towards discharge position



Figure 2: Effluent Disposal - Soak away area under bush

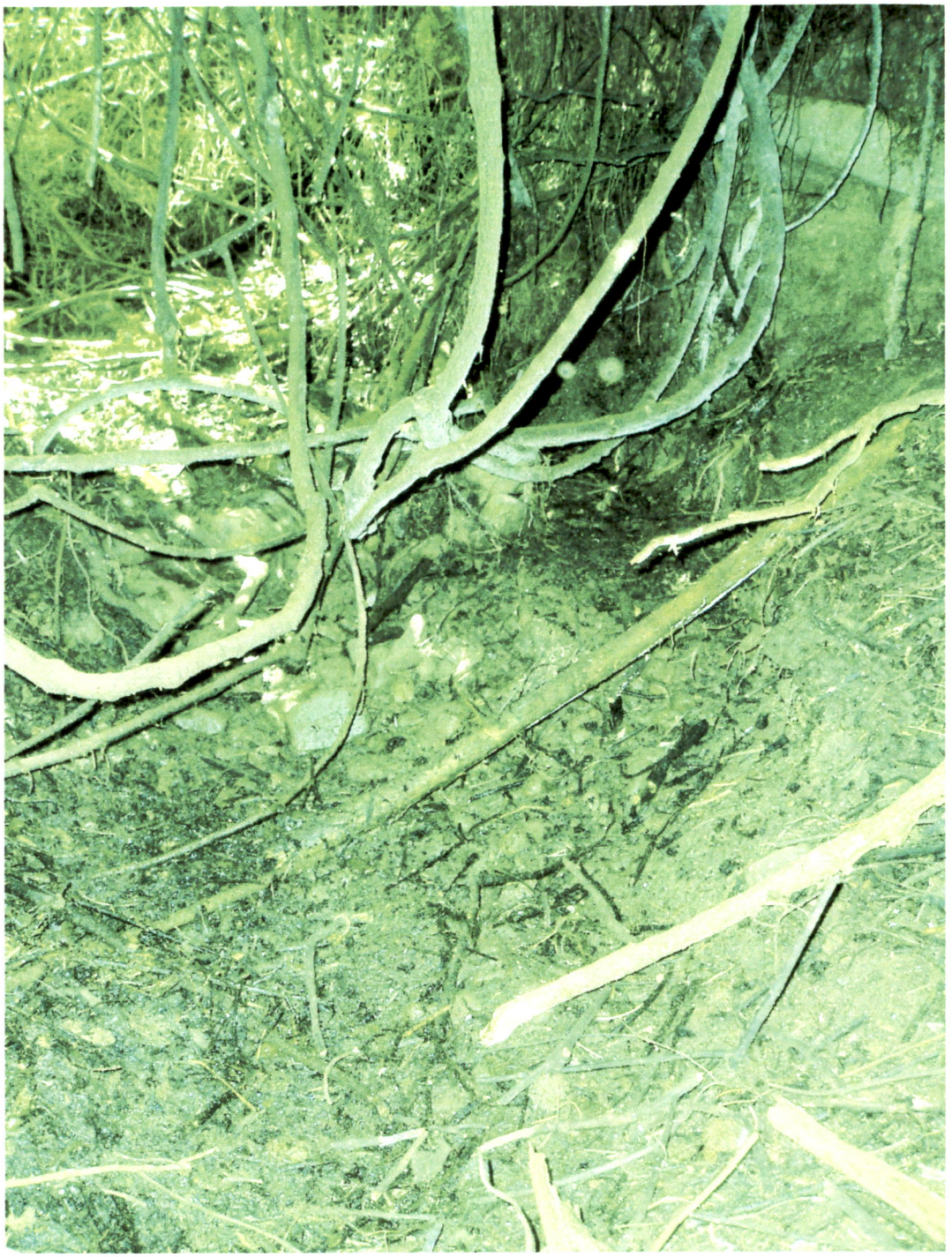


Figure 3: Effluent Soakage Away Area under Bush – no surface effluent was detected after this point

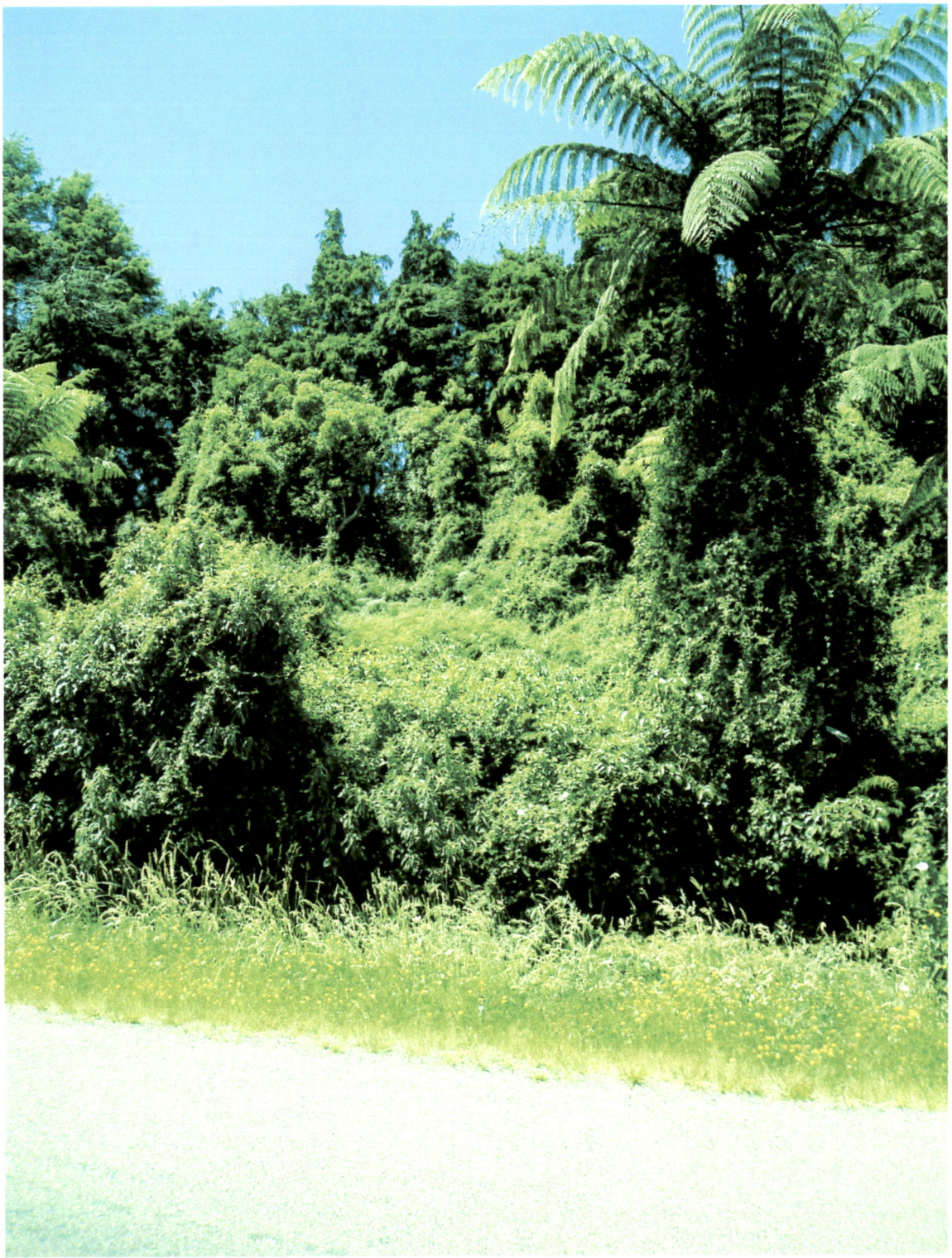
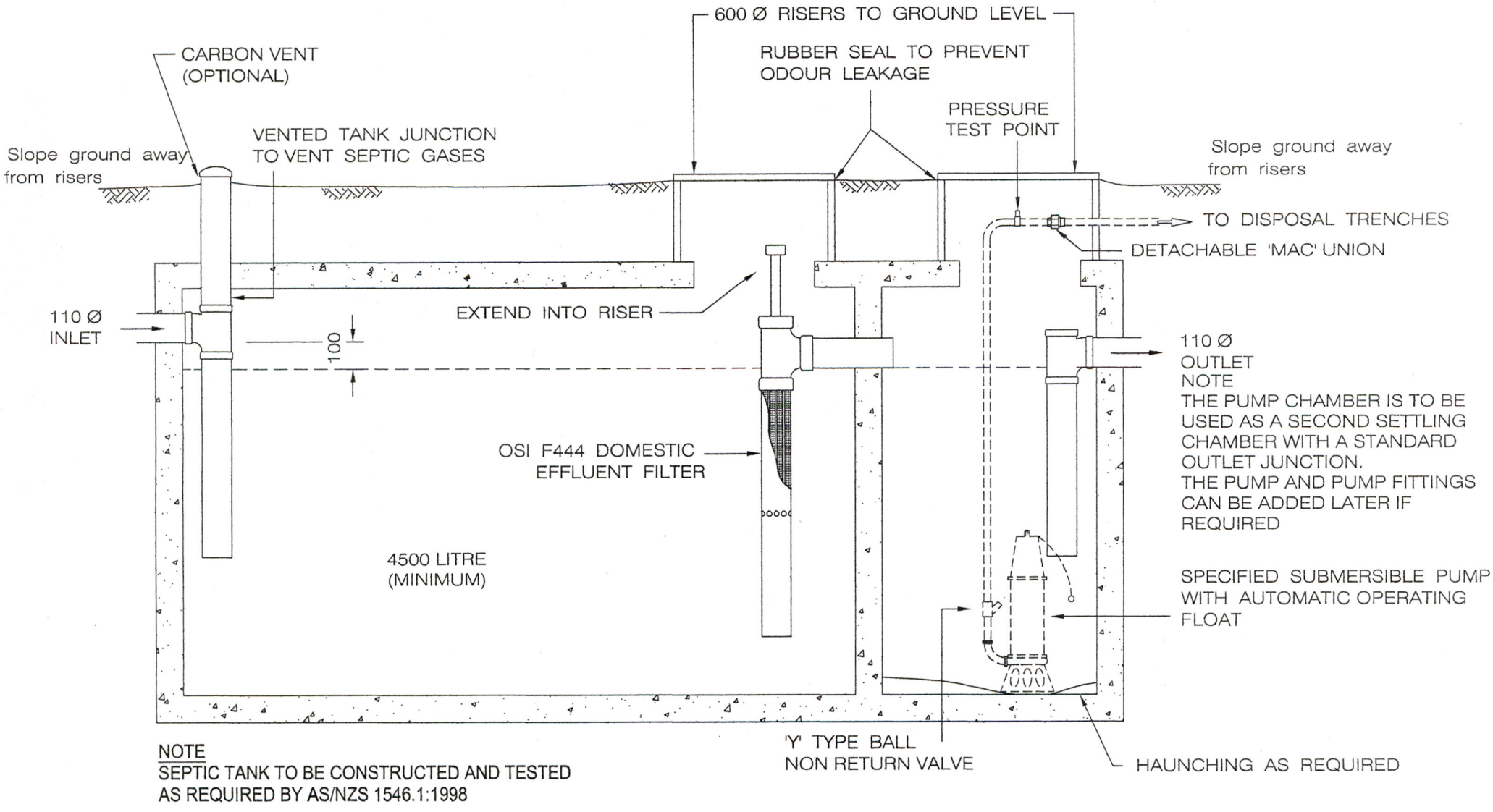


Figure 4: Effluent Disposal Area From Road – discharge point below taller trees at rear of picture

DAVE MILLER
Environmental Engineer



NOTE
SEPTIC TANK TO BE CONSTRUCTED AND TESTED AS REQUIRED BY AS/NZS 1546.1:1998

'UNICLEAR'™ 6000 LITRE SEPTIC TANK, OSI EFFLUENT FILTER AND PUMP CHAMBER FOR POSSIBLE FUTURE USE

Scale 1:20 approx

INNOFLOW TECHNOLOGIES LIMITED

INNOVATIVE WASTE WATER TREATMENT AND DISPOSAL SOLUTIONS

Biotube® Effluent Filter

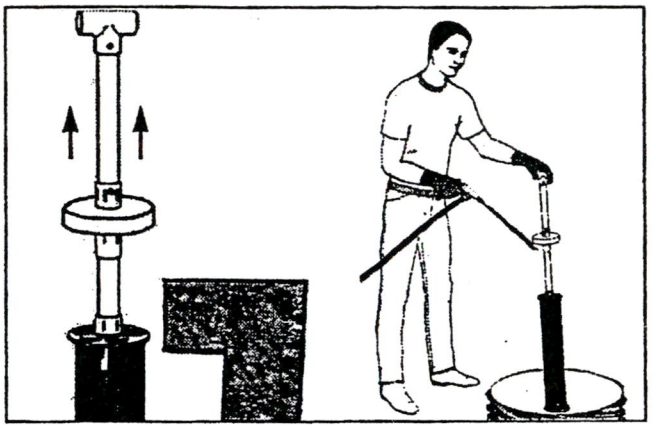
Maintenance Instructions

How to Clean the Cartridge

(Be sure to use protective equipment).

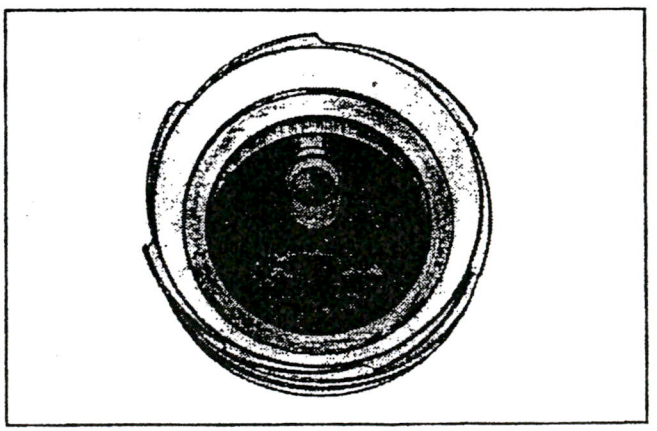
Inspect the filter at least once a year, to ensure it is functioning properly.
The filter cartridge should be cleaned if its starts to plug and whenever the tank is pumped.
(A biological growth will occur on the filter. This growth is natural and should not be removed until clogging sufficiently impairs the discharge rate.)

1. Remove the filter cartridge by lifting it out of the vault.



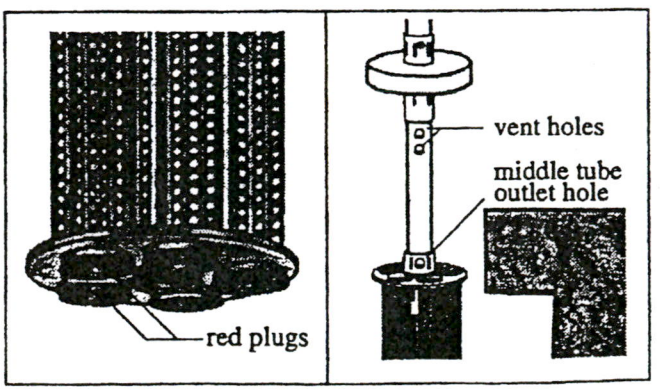
2. Spray the cartridge tubes with a hose to remove any material sticking to them. Make sure the rinse water runs back into the tank, but NOT inside the biotube vault.

3. Inspect the modulating orifices. Spray them clear of debris.

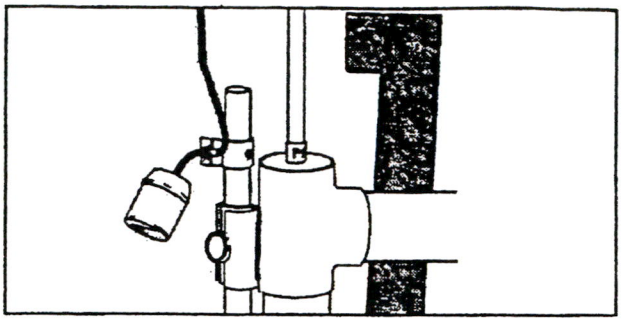


4. Ensure the red plugs are secure at the base of cartridge. Clear the vent holes of any debris.

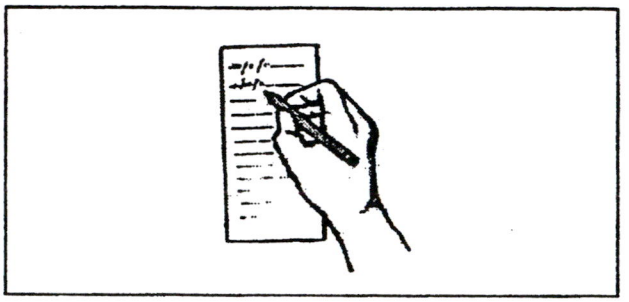
Replace the cartridge into the vault.



Biotube® Effluent Filter
Maintenance Instructions Continued



5. If you have an alarm, check to make sure that the alarm is working. An alarm is optional and will give notice that the filter needs attention before sewage backs up into the building. Example Alarm models: AHW, ALHW, SENTINEL I, SENTINEL II.



6. Record that you have cleaned the filter and, if applicable, checked the alarm. Also comment any other observations about the tank or system.

Make sure to clean up thoroughly when finished.

Biotube® Inspection/Maintenance Form

Biotube Model: FT0444

Date Installed: _____ Installer: _____

Tank Model: _____ Size: _____ Single/Double Compartment: _____

Date Inspected	Cleaned?		Notes
	Yes	No	

bba bruce barry ARCHITECTS ltd.

PO BOX 4143
PALMERSTON NORTH

20th march 2006

RECEIVED
2 1 MAR 2006
Manawatu District Council

Pohangina

IN DOC No 75115
FILE No. BC116715/1
DIVISION ID 14444 FILE
CEO
E

Building Services
Manawatu District Council
Private Bag 10 000
FEILDING

Attention: Mr Geoff Cockery

Dear Geoff

RE: NEW HOUSE FOR MR & MRS PALLET-FRAME AT POHANGINA

Find enclosed the amended Bracing Plans for the above project. A copy has also been sent to the Main Contractor, Keith Tunnicliffe.

Yours faithfully
Bruce Barry Architects Ltd

Jo Barry

Cc Cambria Commercial Ltd

T 06 356 5946 F 06 359 1840 E bruce@bba.net.nz

NEW HOUSE FOR
MR & MRS PALLET-FRAME
POHANGINA VALLEY

SPECIFICATION

OF WORK TO BE DONE

AND

MATERIALS TO BE SUPPLIED

IN CONNECTION WITH

A

NEW HOUSE

FOR

VERO INSURERS

AT

POHANGINA VALLEY

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CONTRACT AGREEMENT

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FLOOR FINISHES PLAN

TRADE SUMMARY

PROJECT: NEW HOUSE FOR MR & MRS PALLET-FRAME

CONTRACTOR:

Preliminaries	$.....
Siteworks	$.....
Concretor	$.....
Sructural Steel Worker	$.....
Blocklayer	$.....
Carpenter	$.....
Joiner	$.....
Roofer	$.....
Membrane Roofer	$.....
Gasfitter	$.....
Drainlayer	$.....
Plumber	$.....
Electrician	$.....
Metal Window Manufacturer	$.....
Painter	$.....
Glazier	$.....
Rockote System	$.....
Solid Plasterer	$.....
Tiler	$.....
Floorlayer	$.....
Monetary Allowances	$.....
Total Tender Price (exclusive of GST)	$.....

PRELIMINARIES

PR 01 PRELIMINARIES

The Principal is Mr J and Mrs M Pallet-Frame.

PR 02 SITE

The site is at Old Ruahine Deer Park, Pohangina Valley East Road, Komako, RD 4 Ashhurst.

PR 03 VISIT SITE

All contracting parties are advised to visit and inspect the site prior to tendering as no claims will be allowed on the basis of ignorance of conditions under which the work will be executed.

PR 04 EXTENT OF WORK

The work consists of the supply of labour and all materials together with services for the house as drawn and specified leaving the same complete and ready for occupation.

PR 05 ACTS AND REGULATIONS

Comply with the N.Z. Building Code 2004 and all relevant Acts and Regulations pertaining thereto.

PR 06 BUILDING CONSENTS & CODE COMPLIANCE

The Main Contractor will obtain all required building consents and pay all fees in relation to this contract and shall arrange for the issuing of the Code Compliance Certificate once the final completion inspection has been carried out.

PR 07 SITE INSPECTIONS

The Main Contractor shall liaise with the Local Authority with respect to site inspections carried out as required.

PR 08 STANDARD OF WORK

Unless otherwise provided in the contract documents, all materials and fittings shall be new and of normal size and pattern suitable for their purpose. They shall comply with the relevant by-laws and N.Z. Standards. Workmanship shall conform to good trade practice and the relevant codes of practice and only competent workers employed.

Unless otherwise stated in the contract documents, the Contractor shall supply all labour, materials, services, equipment and plant required for the proper execution of the works. Defective work, materials and fittings shall be replaced at the Contractor's expense.

The Contractor shall attend on, cut away for and make good after all trades.

PR 09 MATERIALS AND FITTINGS

All materials and fittings **MUST BE OF THE BRANDS SPECIFIED**. Substitution of materials or fittings shall be made only with the written authority of the Principal or his agent.

As soon as the contract is let the Contractor must place on order the materials and fittings specified to ensure that there is no delay in their supply. If the Contractor is aware of any reason that could delay the completion of the contract, he shall immediately notify the Principal who may order a substitution to ensure completion of the contract on time.

The Principal should be advised as soon as possible when colour and material selections are required who will advise the Contractor of their selections within 10 working days of his request.

PR 10 TRADE SECTIONS

This specification has been divided into Trade Sections for convenient reference only and it shall not be construed that each trade section is a complete and separate contract.

All Sub-contractors must refer to the Preliminaries section of this Specification, which is equally binding on all trades.

Whilst reasonable care has been taken to classify relevant items under each trade no claims will be admitted from sub-contractors for work not specifically mentioned in a trade section, but which is provided for either expressly or implied elsewhere in the specification or shown on the drawings.

PR 11 GUARANTEES

Whenever required under the Trade Sections or otherwise by this Specification the Contractor shall provide written guarantees for the conditions and periods stated.

Where the contract fails to specify the terms of the guarantee those terms shall be to the effect that the material or process shall withstand undue deterioration and perform the service intended. At the Principal's request the Guarantor shall remedy any fault or deterioration to the standard required by this contract.

If the Contractor fails to provide the required guarantee before certified completion he shall still be liable to the terms of this clause.

Every guarantee shall be in favour of the Principal and shall be capable of being assigned by the Principal. Failure to provide the guarantees will not reduce the liability under the terms of the guarantee called for in that specific section of work.

PR 12 WEATHER & WATER TIGHTNESS

A guarantee is required from the Contractor for a minimum period of 2 years covering the weather tightness of the structure and the water tightness of all liquid supply and disposal systems and fittings to the extent of work undertaken. This general guarantee is in addition to any specific guarantees required.

PR 13 MONETARY ALLOWANCES

Allow the following Provisional Sums in the contract price.

Wardrobe Systems	$ 2,000.00
Door Hardware	$12,000.00
Miscellaneous Hardware	$ 2,000.00
Kitchen Joiner	$15,000.00
Vanity Units	$ 2,200.00
Plumbing Fittings	$20,000.00
Security System	$ 3,000.00
Fire Sprinkler System	$ 5,000.00
Carpet	$ 55.00 p/M²
All Tiles	$ 75.00 p/M²
Exterior Pavers	$ 60.00 p/M²

The above sums are GST inclusive and will not incur a Builder's margin. These sums will only be expended on the direction of the Principal and adjustments made at completion of the contract.

PR 14 PRINCIPAL SELECTED ITEMS

All flooring plus the following listed items shall be selected by the Principal.

Hardware

a) Door locks and latches including furniture
b) Toilet Roll holders
c) Towel Rails
d) Cupboard Handles
e) Door Stops
f) Kitchen Joinery units
g) Handrail brackets

Plumbing items

a) waste disposal
b) all taps including shower roses and mixing valves

c) spa bath
d) vanity units & hand basins
e) laundry tub
f) all w.c. pans and cisterns
g) gas fire

Electrical Fittings

a) Stove
b) Rangehood
c) Heated Towel rails
d) Tastic combination heat/light/exhaust systems
e) All whiteware

Installation of all above listed items plus items covered by Monetary Allowances will be the responsibility of the respective sub-trades and will be included in their tender submission under this contract.

PR 15 CONDITIONS OF CONTRACT

The work shall be carried out as set out in the contract documents including the Drawings and Specifications prepared for McLarens Young Insurers by Bruce Barry Architects Ltd.

PR 16 INSURANCE

The Principal shall arrange contract Works Insurance. The Contractor shall have appropriate insurance coverage for Public Liability.

PR 17 SCAFFOLDING

The Main Contractor shall supply all scaffolding for all sub trades, complete for the proper carrying out of the contract works. All scaffolding erected for the works is to be in strict accordance with the Scaffolding Act, and with OSH requirements.

PR 18 CONTRACT COMMENCEMENT AND COMPLETION

A starting date and estimated completion date are to be included in the tender submission.

The Contractor is required to commence work within a reasonably short time of acceptance of a tender and to remain on the job in an endeavour to complete all contract works within the estimated time frame.

PR 19 SANITARY CONVENIENCES

Make all arrangements necessary for the provision of temporary toilet facilities for the use of all workmen on site in accordance with Local Authority requirements.

Maintain and keep in a clean and sanitary condition. Temporary facilities where provided shall be removed on completion of the Contract.

PR 20 TEMPORARY SERVICES

Confirm which services are existing at the site and allow to install any necessary temporary services required for the execution of the contract. Remove on completion of the contract.

PR 21 CLEANING

All contracting parties are required to clean up at completion of their respective works, and remove all waste materials and the like from the building site.

All glass shall have stickers removed and all surfaces within the house thoroughly cleaned at completion of the contract and possession by the Principal.

PR 22 AMBIGUITIES

Should there be any ambiguity or doubt as to the meaning of any portion of the drawings or specifications, the contracting parties shall submit written particulars of such items with their tender so that any adjustments may be made before acceptance of a Tender.

PR 23 DIMENSIONS

The Contractor shall be responsible for checking all dimensions and any discrepancies referred to the Architect before commencing work.

PR 24 PROTECTION

Allow for the protection of any finished surfaces by other trades. Immediately report and make good any damage that may occur.

PR 25 INFERIOR WORKS

The Principal may suspend any work that is not up to standard. The Contractor concerned shall rectify such works within 10 days of notice of defect. If this work is not carried out within the stipulated time, the Principal has the right to suspend the persons involved and nominate another Contractor to complete the works and deduct the costs from the original contract.

PR 26 DEFECTS LIABILITY PERIOD

The Defects Liability period shall apply for eight (8) weeks after reaching the stage of Practical Completion. The Principal shall notify the Contractor of any defects during this period. Remedial work shall be carried out within ten (10) working days of receipt of notice or at such times as will avoid unnecessary inconvenience to the Occupiers. The costs of such remedial works shall be borne by the Contractor.

PR 27 PROGRESS PAYMENTS AND RETENTIONS

The Contractor shall prepare and submit monthly progress payment claims to the Principal for payment. The Principal shall deduct from the progress payments a performance defects liability retention of 10% of the claim. 60% of this retention will be released at practical completion and the remainder on completion of the 8 weeks defects liability period.

PR 28 MARKET FLUCTUATIONS

This contract shall be a fixed lump sum price contract without market fluctuations.

PR 29 VARIATIONS

The Principal shall be entitled to direct the Contractor to carry out Variations. No variation shall vitiate the contract. Variations will not be issued for extra work unless such work is clearly outside the spirit and meaning of the Contract documents.

Any cost implications arising as a result of an approved variation must be presented to the Principal in writing prior to undertaking such variations. No variations to the contract shall be carried out without the consent of the Principal or his agent.

PR 30 LEVELS

The Contractor must verify all levels with the Principal before any framework is set out and before any concrete is poured.

PR 31 HEALTH AND SAFETY ACT

Tenderers are required to submit a health and safety plan identifying but not limited to:

- Company's safety policy
- Company's safety training procedures
- Company's recent safety record
- Site safety management organisation
- Procedure for identifying and assessing hazards
- Procedure for recording of accidents

- Procedure for dealing with emergencies that may arise while employees are at work
- Procedure for monitoring health and safety performance.
- Procedure for monitoring the health of employees where they are exposed to hazards.

For the period between being given access to the site and the issue of the Maintenance Certificate, the Contractor agrees with the Principal that the Contractor will diligently fulfil his/her obligations under the Health and Safety in Employment Act of 1992, and comply with the reasonable requests and site requirements of the Principal on the site.

EXCAVATOR

Refer to the Preliminaries section of this Specification, which is equally binding on all trades.

EX 01 EXTENT OF WORK

Provide all plant and materials necessary for the complete and proper execution, maintenance and protection of all excavation and fill as specified hereafter and/or shown on the drawings.

Allow to excavate the following:

(a) Building Platform
(b) Extension to existing sewer and stormwater drains
(c) Extension to existing water storage tank supplies

EX 02 PROTECTION OF WORKS

All excavations, openings etc. shall be properly railed off, boarded or otherwise guarded and adequately lighted during the progress of the work. The Contractor shall not interfere with any underground or aerial services of any local body or Government Department, without the written approval of the Authority concerned.

Secure and maintain the sides of all excavations, and keep clear of water and fallen material at all times.

EX 03 INSPECTIONS

As soon as foundation excavations are opened up, the Building Inspector/Engineer shall be notified to enable testing of ground immediately below the footings. Any soft areas found shall be dug out and treated in one of the following ways as directed at the time by the Building Inspector/Engineer.

(a) Small areas shall be filled with 14 MPa (2000 psi) concrete.

(b) Large areas shall be filled with selected hardfill, compacted in 150mm maximum layers in accordance with relevant NRB Specifications, M5 or B3 as appropriate.

EX 04 EXCAVATION

(a) Driveway

Allow to excavate for driveway including garage forecourt by stripping topsoil. Reduce driveway gradient to slope falling away from the house.

(b) Building Platform

Excavate to the levels required for all foundations and services requiring trenches. Excavation is to be taken out to minimum sizes practicable. Provide any requisite shoring, strutting, underpinning and timbering etc. as required. All excavations shall be large enough to allow for all necessary formwork and/or timbering outside the net sizes shown on the drawings. Formwork shall be used for all vertical faces.

Unless otherwise directed remove all vegetation, rubbish, etc., together with surplus excavation from site.

(b) Septic Tank & Drain

Allow to excavate as necessary to connect new fittings into existing septic system. Excavate for all associated drains shown in the drawings.

(c) Water Storage Tanks

Allow to excavate for two (2) 5,000 gallon capacity water storage tanks supplied by the Drainlayer and located where directed on site. Excavate to a depth which will allow the water storage tanks to protrude one metre above ground.

Liaise as necessary with the Drainlayer.

(d) Drains

Excavate for drains associated with the new house and site drainage as required.

All insitu materials shall be removed from the building area to 250mm below ground level. The excavation shall be carried 0.5 metres outside the building line. All footings shall be hand trimmed.

EX 05 MAINTAIN EXCAVATIONS

Secure and maintain the sides of all excavations and keep same clear of water and fallen material. Provide and maintain all shoring, sheetings, planking and strutting, pumping and baling as required.

Clean out excavations prior to placing reinforcing steel and maintain same both clean and dry until concrete is poured. No concrete shall be placed under water.

EX 06 BACKFILL

Backfill around foundations and trenches in 150mm layers, thoroughly compacting each layer.

All backfilling shall be approved riverrun hardfill compacted to give a minimum "Scala" Penetrometer value of 5 blows for 75mm (3") or alternatively to comply with NRB Specification M5 and B3 as appropriate.

A 25mm layer of clean sand shall then be placed on the hardfill.

Prop foundation walls as necessary during backfilling operations. The props shall remain until the concrete floor slab has been placed.

EX 07 BACKFILLING DRAINS

Particular care shall be taken to ensure that all drainage, plumbing and other cuts are adequately compacted to the Standard detailed in NZS 4452:1986 "Construction of Underground Pipe Sewer and Drains".

Before compacting a drainage trench the Contractor shall ensure that the pipe is properly backfilled.

EX 08 HARDFILL

Hardfill under concrete slabs shall be as follows:

(a) Hardfill shall consist of river shingle graded in approximately equal proportions of all sizes from 50mm down.

(b) Spread in layers not more than 150mm deep thoroughly compacting each layer in turn. Compact by means of water and power operated vibrating rollers until compaction is at least 95% AASHO.

(c) Spread 50mm layer of river sand as blinding and compact by wetting and rolling to a firm level surface suitable for damp proofing film.

EX 09 SURPLUS TOPSOIL

All surplus topsoil shall be stockpiled where directed on site.

CONCRETER

Refer to the Preliminaries section of this Specification, which is equally binding on all trades.

CO 01 SCOPE

This section includes the setting out, boxing and placing of all concrete necessary for the completion of the concrete foundations, footings, floor slabs, recessed floor to ground floor shower, walls, beams and bands and any other concrete work as shown on the drawings.

The exterior paving, fencing etc is included in this contract. Refer to post footing details for site wall on Sheet 3 and liaise with the Blocklayer, providing all concrete as required by that trade.

CO 02 STANDARDS

The following standards shall apply unless noted otherwise in this Specification:

NZS 3124 : 1987 Specifications for the Concrete Construction for Minor Works.
NZS 3109 : 1987 Concrete Construction.
NZ Building Act 2004

CO 03 MATERIALS

Cement, aggregates and water shall comply with the provisions of NZS 3109.

Concrete

All concrete shall satisfy the requirement of NZS 3109 and NZS 3104 with a specified strength of 17.5Mpa at 28 days standard cure unless otherwise noted on the drawings. All concrete shall be supplied by an approved ready mixed concrete supplier.

Reinforcing

All reinforcing shall comply with NZS 3402:1973 and NZS 3422. All bends are to be made cold, without fracture. All reinforcing is to be accurately placed, tied with 16 gauge black wire and well secured against displacement. Do not weld reinforcement.

Continuous Vapour Barrier

Lay 0.25 polythene continuous vapour barrier complying with NZS 4229 Appendix E6 to all slabs except terraces, driveways, footpaths and carport slabs. Lapp all joints and seal with pressure sensitive tape recommended by the polythene Manufacturer. Seal all penetrations and tears before pouring concrete.

CO 04 SURFACE FINISH (FORMED SURFACES)

The surfaces of all concrete placed against formwork shall be worked during placing so as to force all coarse aggregate back from the surface and work the mortar against the forms to produce a smooth finish free from air pockets or "honeycomb".

Air trapped near the sides of forms shall be removed by slicing the concrete with a suitable slice in the area of vibration. As soon as the Architect has given approval the forms shall be removed carefully and all openings or depressions resulting from the removal of metal ties or from other causes shall be pointed within 24 hours by properly qualified tradesmen with a mortar of sand and cement in the same proportions as has been used for the concrete.

Should defective areas be found to exist, under no circumstances shall the Contractor undertake remedial measures without the knowledge and approval of the Architect or his representative. If the defective depth is more than half the specified cover, the concrete shall be cut out and replaced by new concrete. Superficial defects shall be repaired by mortar applied by "bagging in" and where a uniform appearance is required, finished off by rubbing down with a carborundum stone.

CO 05 UNFORMED SURFACES (FLOORS)

The Concreter must be working with approved tools. The concrete shall be compacted thoroughly by vibrators and a slight excess shall be struck off with a screed. While the concrete is still plastic the Contractor shall take steps to correct any irregularities so that the finished surface meets the requirements.

No "driers" may be used in finishing the slabs. Where falls are shown or specified, the surface shall be puddle free. It is recommended that a dumpy level be used frequently while concrete is being poured to ensure that slabs are finished to correct levels, and that final screeding be carried out in two directions at right angles. Concrete surfaces which do not meet with the requirements shall be ground mechanically to the Architect's approval.

Great care shall be taken to obtain a proper surface finish, the slab being finished by skilled and experienced finishers to comply with the following requirements unless otherwise directed.

The surface shall be brought up to the steel trowel finish and again trowelled after the surface has nearly hardened, using firm pressure and trowelling until the surface is hard and almost glossy. Normally a steel float and compacting machine, consisting of a rotating steel disc and steel hammers to compact concrete of low water content, shall be used to provide a floor of high wear resistance.

Form 15mm rebate to garage door. Check length and position to suit installation. Ensure area of slab adjacent to door has slight fall to exterior.

CO 06 TOLERANCES

Construction practices shall be such that concrete surfaces conform to the following tolerances:

Variation from the level or from the grades indicated on the drawings.	At any point +/- 10mm from true elevation but not more than 5mm variation between two points within 6m in a horizontal plane.

Variation of the Linear building lines from established position in plan and related position of columns, walls and partitions:

In any bay or 6m maximum	10mm
In 12m or more	25mm

Footings:

(a)	Variation in dimensions in plan	+25mm -10mm
(b)	Misplacement or eccentricity: 2 percent of the footing width in the direction of misplacement but not more than	+25mm
(c)	Reduction in thickness	Minus 5% of specified thickness

CO 07 PLACING AND FASTENING OF REINFORCEMENT

Reinforcement generally to be as required by NZS 3109:1980.

Whether shown on the drawings or not, the Contractor shall allow for and provide sufficient supporting rods or other aids to hold the steel in its correct position until the concrete is able to do so. In any case, no extras will be recognised for placing and holding the steel accurately and firmly with covers as shown or specified. No boxing that would interfere with accurate fastening of reinforcing shall be fixed in position until the steel is firmly fixed.

THE PLACING OF ANY CONCRETE SHALL NOT COMMENCE UNTIL THE FIXING OF THE REINFORCEMENT HAS BEEN APPROVED BY THE ARCHITECT OR HIS AGENT.

Concrete placed in violation of this shall be liable to rejection and removal. During concreting at least one competent employee shall be in attendance to re-support or fix any rods displaced from correct cover due to concreting operations.

The Contractor shall also make provision for workmen to reach any position of the work without damaging or displacing the reinforcing. Stirrups to footings shall be R10 at 600 crs.

CO 08 COVER

All rods shall have the cover shown on the drawings but where the cover is not specifically mentioned, it shall be in accordance with the values tabulated below:

To main rods in concrete below ground but cast against formwork or blinding concrete, cover shall be 50mm.

To main rods in foundations cast against natural or filled ground, cover shall be 75mm.

To rods in walls cast against natural or filled ground, cover shall be 50mm.

Concrete cover shall not be reduced where the surface is plastered.

Tolerances in covers shall be:
-0 + 6mm except for slabs, which shall be -0 + 3mm

CO 09 FORMWORK

The formwork shall be as necessary to obtain the finishes specified and approved by the Architect and so constructed as to remain rigid and true to line and level and mortar tight during placing of the concrete.

Where not varied by this Specification, formwork shall comply with the provisions of NZS 3109:1997. The Contractor shall be responsible for the sufficiency of the formwork and its supports.

Forms which have once been used shall have the surfaces which are to be in contact with concrete thoroughly cleaned and any damage made good, before being used again. Where portions of the concrete beams and columns adjoin sashes etc., they shall be boxed so as to form a rebate as required; the rebate is to be formed by the addition of concrete and not be the reduction of the cover to the steel.

No timber shall be left in the ground without the Architect's approval.

CO 10 DAMP PROOF COURSE

Under floor slabs, laid on the sand blinding layer and carried on and up to tops of exterior foundation blocks, provide a damp proof course of 0.25mm Polythene, lap all joints and seal with pressure sensitive tape. All penetrations shall be sealed.

CO 11 UNDER SLAB SERVICES

Liaise and cooperate with other trades over installation of services under or within floor slab, ie. waste pipes and drains. Provide adequate holes, chases, and built-in pipes and fittings as required by other trades.

CO 12 CONCRETE STRENGTHS

Concrete cylinder strengths at 28 days shall be not less than 17.5 MPa for all foundations and ground floor slab.

CO 13 SUPPORT OF LOAD BEARING INTERNAL WALLS

All load bearing internal walls that support either two floors and a light roof or one floor and a heavy roof, shall have a thickening in the floor beneath them of 200mm over a minimum width of 450mm and reinforced with two D12 bars. Refer to NZS 4229 Clause E8.

CO 14 PLACING AND CURING OF CONCRETE

Protect fresh concrete from premature drying and extremes of temperature. Use suitable methods of limit evaporation drying and keep damp for not less than seven days. Ensure curing controls on slabs commence as soon as possible after final finishing by the use of continuous water sprays, ponding, or the application of a curing membrane. Ensure any membrane used will not affect subsequent applied finishes.

CO 15 CASTING IN BOLTS ETC.

Allow to build in all holding down bolts, pipes, sleeves, vents, timber grounds etc as required by NZS 4229, NZS 3604 and other trades prior to pouring the concrete. All plumbing wastes and drains, electrical and telephone conduits laid under slabs shall be laid in sand prior to laying continuous vapour barrier. Box out for all WC, bath, shower and other waste pipe outlets.

STRUCTURAL STEEL

Refer to the Preliminaries section of this Specification, which is equally binding on all trades.

SS 01 SCOPE

The work of this trade and included in this section is for the supply of all plant, labour and materials for the fabrication and erection of all structural steelwork. Holding down bolts, cleats and bolts connecting structural members are likewise included in this section.

SS 02 STANDARDS

All materials and workmanship shall comply with NZS 3404 and the standards referred to in Appendix A and C of NZS 3404.

AS 1110	ISO Metric Hexagon Precision Bolts and Screws
AS 1111	ISO Metric Hexagon Commercial Bolts and Screws
AS 1112	ISO Hexagon Nuts including thin nuts, slotted nuts and castle nuts
AS 1163	Structural Steel Hollow Sections
AS 1204	Structural Steels – Ordinary Weldable Grades
AS 1252	High Strength Steel Bolts with Associated Nuts and Washers for Structural Engineering
AS 1538	Cold Formed Steel Structures Code
AS 1554	SAA Structural Steel Welding Code
AS 1594	Hot Rolled Steel Flat Products
AS 1627	Metal Finishing – Preparation and Penetration of Steel Surfaces
AS 3678	Structural Steel – Hot Rolled Plates etc
AS 3679	Structural Steel Part 1 Hot Rolled Bars and Sections Part 2 Welded Sections
AS 1650	Galvanised Coatings
NZS 3404	Steel Structures Standard
BS 4	Structural Steel Sections: Part 1: Hot Rolled Sections
BS 4360	Weldable Structural Steels
BS 4848	Hot Rolled Structural Steel Sections Part 2: Hollow Sections Part 4: Equal and Unequal Angles
BS 639	Covered Electrodes for Manual Metal Arc Welding of Mild Steel
SIS 05 59 00	Pictorial Surface Preparation Standards for Painting Steel Surfaces (Swedish Standards Institute)

The Contractor may be required to report the origin of all steel and provide test certificates if required.

SS 03 DRAWINGS & DIMENSIONS

The Contract Drawings indicate the general arrangement and dimensions of the Structural Steelwork. In general the structural sketches are not to scale. Scaled dimensions shall not be used. If all the distances and dimensions required are not given in figures, the Sub-contractor shall check all dimensions on site and assure himself that there are no inconsistencies in the measurements given and any inconsistencies or disagreements found shall be immediately referred to the Engineer. The Contractor shall be responsible for the correct setting out of all the steelwork as the work proceeds.

SS 04 MATERIALS

Steel of the grades noted below complying with the relevant standards and requirements of NZS 3404 shall be used throughout unless noted otherwise. The Contractor shall report the origin of all steel and provide the Manufacturer's test certificates before fabrication commences.

Steel Grades

Hot Rolled UB and UC Sections	Grade 300
Other Hot Rolled Sections	Grade 250
Rectangular and square Hollow Sections	Grade 350
Round Hollow Sections/Pipe	As noted on Drawings

SS 05 WORKMANSHIP

The whole of the works shall be carried out in accordance with the best modern practice and in no respect inferior to the relevant provisions of the Standard Specification NZSS 3404. Qualified welders must do welding to radiographic standards. All subsequent clauses in this specification are additional requirements.

SS 06 OTHER TRADES

Cooperate with other trades and supply materials and items at times agreed with the Contractor.

SS 07 DAMAGE

Supply all items to the site undamaged. Protect all existing work and make good immediately all damage and prevent damage to work during the currency of the contract.

SS 08 TOLERANCES

All dimensions shall be verified by actual measurements on the job.

Tolerances and clearances shown on the drawings are to be taken in preference to tolerances and clearances specified in the standard specification given in Clause 7.3 above. All lengths shall be generally within 1mm, however this tolerance shall not be in addition to any tolerance or clearance given on the drawings.

Column positions shall be within tolerances set out in Clause 15.3 of NZS 3404. All steel shall be straight and shall not deviate from straightness by more than the tolerances set out in Clause 14.4 of NZS 3404.

In all cases allowances shall be made for dead load deflections and if these are not detailed on the plan, the Contractor shall obtain from the Engineer a list of critical dead load deflections before commencing the work.

All purlin and grit cleat dimensions and all other cleats which are required by the Carpentry and other trades shall be checked for position with the Main Contractor. Before starting shop fabrication all holding down bolts shall be checked on the site.

SS 09 SETTING OUT

The positioning and levelling of all steelwork and the placing of every part of the structure shall be accurately carried out in accordance with the drawings and to the satisfaction of the Engineer.

The steelwork Sub contractor shall carefully check and satisfy himself of the accuracy of the setting out of all holding down bolts and dowels in the foundations and other concrete work before proceeding with the steelwork erection. Where any discrepancy exists the Engineer's approval of proposed remedial measures shall be obtained before proceeding.

SS 10 INSPECTIONS

The Contractor shall notify the Engineer when fabrication is being commenced. Before the welds on the eaves and apex joints of main structural frames are begun, the Engineer shall inspect the weld preparation and his approval shall be obtained. The method of preparation and welding shall in all cases be approved before work is begun.

The Contractor shall notify the Engineer (with 24 hours notice) when all shop and site welds will be completed. Allowances should be made for the Engineer to inspect all such welds prior to those welds being closed in or hidden by other work, or covered with paint.

SS 11 CUTTING & DRILLING

Sheared and cropped edges shall be dressed to a neat finish free from distortion. Where flame cutting is to be used the torch shall be moved mechanically or shall be guided by a template moved at a uniform speed. The edges shall be dressed to a neat finish. Bolt holes shall be drilled and have the burr removed. Cutting holes or enlarging holes by flame cutting is prohibited.

SS 12 WELDING GAUGES

At all times during the progress of the work the Contractor shall have available on the site an approved set of welding gauges.

SS 13 WELDING

The Contractor shall satisfy the Engineer that the welding operators are suitable for the work upon which they are employed and that they are conversant with the requirements of AS 1554. Welding operators must be qualified in accordance with the requirements of AS 1554 and the Contractor shall furnish evidence to the Engineer that these operators hold current certificates to that effect. The Contractor shall supply at his own expense all materials and tests as are called for under AS 1554. The employment of any particular welder on the work will be subject to the approval of the Engineer.

Welding hall be done in the down-hand position wherever possible. Field welding is to be of the same standard as welding in the shop and the Contractor must satisfy the Engineer that his equipment is such that this standard can be achieved. Where not otherwise specified on the drawings all welded joints shall be properly sealed from the atmosphere by continuous 5mm fillet welds.

Welding shall not be done under weather or other conditions, which in the opinion of the Engineer, might adversely affect the efficiency of the weld.

At all times during the welding the Contractor shall have on the site a competent supervisor who is responsible for the welding operations.

SS 14 STRAIGHTENING MATERIAL

Rolled material shall be straight before fabrication. If straightening is necessary it shall be done by approved methods that will not injure the materials. Sharp bends and kinks shall be cause for rejection of any material.

SS 15 TRANSPORTING & ERECTION

Erection shall in general comply with NZS 3404 together with the following.

When transporting steelwork from place of fabrication to site for erection, it shall be loaded, stored and unloaded in such a manner so as to obviate straining of any of the parts or damaging projecting gussets and connections. Generally members shall be supported at ¼ span points except for trusses.

During erection each part shall be slung so as to prevent straining and shall be fixed true to line and grade and secured in such a manner that it remains so until baseplates and bolts are grouted into position and sufficient structure is completed to provide stability to the steel skeletal frame.

The stability of steelwork during erection shall be the Sub contractor's responsibility and his attention is directed to the necessity of temporary support against side loads in the erection of braced frame structures. Any erection devices required by the Sub contractor because of his fabrication or transport techniques shall be included in the cost of the work. Any damage caused by the use of such devices shall be made good after erection.

After the steelwork is erected and has been finally plumbed by means of steel wedges, bedding mortar may be placed. Mortar shall be mixed and placed in accordance with Manufacturer's recommendations. Wedges may be removed 48 hours after mortar has been placed and any gaps filled as directed by the Engineer.

SS 16 BOLTS & BOLT HOLES

All bolts shall be galvanised. All bolt holes shall be cylindrical, perpendicular to the member and otherwise in accordance with NZS 3404.

SS 17 HOLDING DOWN BOLTS

All holding down bolts and nuts shall be hot dipped galvanised and are to be fabricated to the sizes and dimensions shown on the drawings. The material shall be mild steel and conform with BS 4360 Grade 43A. Threads are to be standard ISO Series unless otherwise approved.

All bolts set in concrete are to be accurately centred to templates supplied by the Steel Sub contractor. Bolts shall be adequately secured so that their position remains unaltered during the concreting. Corrective measures for accuracy shall be at the Contractor's own expense. Minimum lengths of embedment in concrete of holding down bolts shall be as shown on the plans - where not shown the Engineer shall advise the length required.

The Contractor is to ensure that all holding down bolts protrude sufficiently to allow for bedding mortar, baseplate thickness, washer and nut depth, plus at least two threads.

SS 18 FIXING FOR OTHER TRADES

Attend upon other trades and supply all brackets, bolt holes, cleats etc as may be required for fixing other materials to steelwork, whether or not expressly shown on the drawings. Structural steelwork Sub contractor to check on this item before commencing fabrication.

SS 19 PAINTING STEELWORK

General

All steelwork not encased in concrete shall be painted except pool roof support beams and fixings exposed to the weather which shall be hot dip galvanised as specified below.

i) Painting - Prior to painting all surfaces shall be thoroughly cleaned as follows;

a) Exposed Steelwork = Abrasive Blast to SSPC SP-10 (Sa2½)
b) Enclosed Steelwork = Abrasive Blast to SSPC SP-6 (Sa2)

Oil and grease shall be removed by wiping with turpentine or petrol. The protective coating should only be applied after the surface has been approved by the Engineer as complying with the above standards.

ii) Conditions for Painting – No painting shall be done until the surface has been passed by the Engineer as satisfactory. No paint shall be applied to any surface which is not perfectly dry or under weather conditions which, in the opinion of the Engineer, are likely to be harmful to the paint. Sufficient time must be allowed between coats for the paint to harden and this time shall not be less than 24 hours. All shop painting shall be done under cover and kept protected from dust and sand and free from moisture. Spreading rates shall not exceed the paint Manufacturer's recommendations.

The final finishing coat shall not be applied while there is a danger of it being damaged by carrying out other work.

iii) Application of Primer – Apply one (1) coat of zinc rich shop primer to a dry film thickness of 50 microns.

Where two surfaces shall be in permanent contact after fabrication, each of them shall receive, immediately before being assembled and after being thoroughly cleaned, the application as above, and the surfaces shall be brought together while the paint is still wet.

Where surfaces are so placed that after fabrication they will be inaccessible for painting, all coats shall be applied before assembly. After erection all damaged paint shall be made good by spot painting to the same specification.

SS 20 GALVANISING

i) Cleaning of surfaces

All surfaces to be galvanised shall be cleaned by blast cleaning. Blast cleaning shall be carried out in accordance with BS 4232 to second quality surface finish. Weld spatter and any blasting material adhering to the steelwork in corners or elsewhere shall be removed before galvanising.

ii) Protective Treatment Before Delivery to Site

Where galvanising is specified, all steelwork including bolts, nuts and washers is to be hot dip galvanised in accordance with British Standard 729 Part 1. Galvanising is to be carried out after completion of all fabrication of individual components and after all weld slag and spatter has been removed.

Vent holes in sealed sections may be drilled in positions agreed by the Engineer. The zinc coating is to be uniform with thickness corresponding to a deposit of 650gm per square metre. The minimum thickness of coating shall be 0.08mm.

In the case of surfaces to be welded, the steel shall not be metal coated within a suitable distance of any edge to be welded if the metal coating would be harmful to welders or impair the quality of the welds.

Welds and adjacent parent metal shall not be painted prior to deslagging, inspection and approval.

iii) Repair of Damage to Galvanising

After erection or installation of galvanised steel components all damaged areas where steel is exposed or rusting is visible shall be treated as follows.

Thoroughly clean by hand wire brushing, scraping, chipping and degreasing as necessary followed by two coats of an approved inorganic zinc silicate paint.

Apart from accidentally damaged areas, this treatment shall also apply generally to bolts and nuts where the galvanising has been affected by tools.

SS 21 COMPLETION

Remove from Site all gear, rubbish and surplus materials associated with structural steelwork on completion of work.

BLOCKLAYING

Refer to Preliminaries section of this Specification, which is equally binding on all trades.

BL 01 GENERAL

Refer the Conditions of Contract and to the Preliminaries section of the Specification which are binding on all trades. Protect from damage the work of the trades; make good at own expense any such damage to work or material.

BL 02 SCOPE

The work of this trade consists of the construction of a concrete block site wall including the pillars as shown on the drawings. Liaise and cooperate with the supplier of Wrought Iron insets for the fence and attend as necessary. Refer to Sheet 3 for details.

BL 03 STANDARDS & MATERIALS

All materials and workmanship shall comply with the requirements of NZS 4210P:1981 and with the requirements of all Standards referred to therein. Where any Standard is referred to it shall mean the latest version of that Standard or any Standard in substitution thereof.

(a) Blocks
Blocks shall be hollow concrete blocks complying with NZS 3102P and shall be fully cured before being brought on to the job.

(b) Mortar
Mortar shall consist of one part of cement to a quarter of lime, to three and a half parts of sand. If the blocks are Onoda NN waterproofed, the mixing water shall have Onoda NN waterproofing compound added in the proportion recommended by the block Manufacturer. Mortar, it's mixing and testing shall comply with NZS 3102P.

(c) Damp Proof Course
Wherever blocks are laid on or against concrete, the first course shall be laid on a mortar bed which has been internally waterproofed with an additive to form a damp proof course.

(d) Reinforcing
Reinforcing shall be of the quality specified under the Concretor section of this Specification.

(e) Concrete
Concrete materials shall be as specified under the Concretor section with addition of "Darexpand" added strictly in accordance with the Manufacturer's recommendations.

BL 05 HANDLING AND STORAGE

Blocks shall be stacked on the job as near to their final position as possible. They shall be delivered properly cured and dry, and waterproof sheets shall be available on the site sufficient to cover all blocks in wet weather and overnight. At the time of laying, the moisture content shall not be greater than permitted by NZSS 3102P. All materials for laying and concreting shall be protected from frost effects, or not used until properly thawed out.

BL 06 LAYING

(a) Joints

Blocks shall be laid with the thicker edge of the face shell upwards, except for bond beam blocks. All joints, both bedding and vertical, shall be filled solid for full thickness of face shells, edge thickness shall be 10mm. At junction of walls with concrete, full joints shall be struck.

(b) Damp Course

Damp course shall be provided as and where specified above and vertical joints shall be raked out in first course above the damp course.

(c) Stability

The Contractor shall support walls adequately against wind and earthquake or other forces.

BL 07 REINFORCEMENT PLACE

Reinforcement shall be placed as shown on the drawings, to tolerances as given in Clause 6.5 of NZS 4210P:1981. All reinforcement shall be supplied by the Main Contractor, who shall also fix in place any bars cast into previous concrete work. The Sub-Contractor shall allow to inspect the placing of this reinforcement for positioned tolerances and if the requirements of Clause 605 of NZS 4210P are not complied with, he shall advise the Engineer and the Main Contractor before commencing any work.

Vertical steel shall always be placed ahead of blockwork and shall be tied at all laps. Horizontal steel in walls shall have laps staggered so that no two adjacent courses have laps at the same horizontal location.

BL 08 REINFORCED & FILLED BLOCKWORK

All workmanship in connection with reinforced blockwork shall conform to the relevant clauses of NZS 4210P:1981.

When filling the blocks the concrete shall be placed in lifts of not more than 1.200mm unless the High Lift Grout method is used, and shall be compacted thoroughly by means of a 12mm diameter bullet nosed rod. The rod must reach the bottom of the lift and be withdrawn slowly with an up and down motion to ensure that the cavity left by the rod is filled as the rod is withdrawn.

The filling of a cavity should stop approximately 25mm below the top cavity. Concreting of beams over openings shall be continuous. The concrete for filling reinforced cavities shall consist of 1 part of cement, 2 of sand, to 2.5 of 20mm maximum size rounded stone, all by weight. Unless noted on the drawings, all cells shall be filled.

Blocks shall be laid to the vertical reinforcing using open ended blocks.

BL 09 POINTING AND CLEANING DOWN

All blockwork shall be finished with neat concave ruled joints to approval at time of laying. Keep blockwork cleaned down as laying proceeds, and leave the whole thoroughly clean on completion.

BL 10 INSPECTION AND TESTING

All blockwork shall, unless otherwise specified, be of Grade B as defined in BZS 4210, Part B, Clause 2.2, Grade B masonry, and Grade A if used, shall be subject to the level of observation required to ensure the required level of workmanship is maintained. The Blocklayer shall, if required, make samples for strength tests on mortar and filling concrete.

BL 11 HIGH LIFT GROUT METHOD

(a) General

The following requirements are in addition to, or in substitution for, the foregoing clauses.

(b) Grout

(i) The nominal proportions of the grout mix shall be 1 cement: 2.4 (maximum) sand : 1.6 (maximum) coarse (12mm) aggregate. Allow 385kg cement per m^3 concrete. This mix may be varied to suit the equipment being used.

(ii) The grout shall be supplied by an approved ready-mix concrete supply firm, brought to the site in agitator/mix trucks.

(iii) The grout shall be as fluid as possible without segregation having approximately 280mm slump.

(iv) The grout shall have a minimum 28 day crushing test of 17.5 MPa.

(c) Method of Construction

(i) The High Lift Grout Method does not limit the height of pour if grouting is done in lifts continuously, in one day. Lifts shall be 1.2 in height, with a waiting period between lifts of fifteen to sixty minutes, depending upon weather conditions.

(ii) The rate of pour is limited primarily to prevent hydrostatic blow-outs. During the waiting periods, excess water in the grout will be absorbed, thus reducing the hydrostatic pressure.

(ii) Placing Grout - The grout shall be placed in it's final position not over one and a half hours after the first water is added to the batch. Grout shall be handled to the final place of deposits by methods which prevent segregating and/or loss of ingredients, preferably by pumping.

(iii) Laying - All blocks shall be full bedded. All head and bed joints shall be filled solidly with mortar for the full thickness of the face shell. Open-ended blocks shall be arranged so that their closed ends are not abutting.

(iv) Horizontal Construction Joints - Intermediate horizontal construction joints are not permitted, and work shall be planned to prevent interruptions exceeding 60 minutes. Should blow-out, a breakdown in equipment, or any other emergency halt the grouting operation, an alternative procedure may be used with the consent of the Engineer.

(v) Grout Pour, Consolidation and Reconsolidation - To prevent blow-outs, the grout shall not be poured until mortar is set. Boxing shall be adequately braced. Grout shall first be poured to a height of one lift and rodded or vibrated to fill thoroughly all voids, spaces and interstices. After a waiting period, a second lift shall be poured to the same depth and all cells again rodded (or vibrated) with the rod penetrating 300 - 450mm into the proceeding lift and refill any voids or plastic cracks. Reconsolidation is a most important feature of this method. Repeat the waiting, pouring and reconsolidation steps until the top of the wall is reached. The top lift shall also be reconsolidated after a waiting period, and topped up as necessary.

(vi) Cleaning - Immediately after grouting, any scum or stains on the wall shall be scrubbed and hosed off (unless the blockwork is to be plastered or otherwise hidden).

(vii) Curing - Particular attention must be given to proper curing of the mortar and grout. Rapid drying must be prevented, by dampening using methods generally similar to those specified for the curing of concrete.

(viii) Bond Beams - Due to the problems arising from High Lift Grout method in pouring through bond-beams, no construction shall take place above a bond-beam until that beam and all cells below it have properly filled.

BL 12 DAMP PROOF COURSE

All masonry surfaces that are to be filled against shall be waterproofed by application of 2 coats of Mulseal or equal approved coating applied according to Manufacturer's written instructions. Ensure that coverage is complete to all areas below ground to be filled, with generous margin at extremities.

CARPENTER

Refer to the Preliminaries section of this Specification, which is equally binding on all trades.

CA 01 SCOPE

This section includes the supply of all materials and labour, nails and general fixings and all plant and scaffolding and all materials as further specified or shown on drawings.

CA 02 STANDARDS

The following standards shall apply unless stated otherwise in this Specification:

NZS 3601:1973	Timber Metric dimensions.
NZS 3602:2003	Code of Practice for Specifying Timber and Wood Based Products.
NZS 3603:1993	Timber Design Code.
NZS 3604:1999	Code of Practice for Light Timber Framed Buildings not requiring Specific Designs.
NZS 3616:1978	Finger Jointed Timber.
NZS 3617:1979	Profiles of Weatherboards.
NZS 3631:1988	National Timber Grading Rules.
NZS 3640:2003	Minimum Requirements of the NZPTA Council.
NZS 4203:1992	Code of Practice for General Structural Design and Design Loadings for Buildings.

NZ Building Act 2004

CA 03 TIMBER

Timber species, grades and quality shall comply with the requirements and recommendations of the above standards where appropriate, unless otherwise stated.

Timber sizes shall be nominal call sizes unless specified as finished size (abbreviation :fin). Framing timbers shall be gauged to width and thickness. Exposed timbers shall generally have band saw finish.

Moisture content of framing timber shall be maximum 24% before fixing internal linings. Moisture content of external finishing timbers shall be 18% and internal finishing timbers 12%.

All timber shall be treated in accordance with the Timber Preservation Council specification. The degree and type of treatment shall be appropriate to the end use of the timber as recommended by the T.P.C.

Finger jointed timbers used externally shall be primed before delivery to site.

CA 04 SCHEDULE OF TIMBERS

BUILDING ELEMENT	TREATMENT LEVELS
Posts	*Pinus radiata* H5 treated.
Exterior wall framing, Parapet Framing	Gauged *Pinus radiata* H1.2 treated.
Roof Framing, Trusses & ceiling joists, Interior wall framing including bottom plates	Planer gauged *Pinus radiata* H1.1 treated.
Plywood for Membrane decks	Cp-D Grade Construction Ply H3 treated.
Cavity battens, Enclosed deck and Balcony framing, Framing within enclosed balustrades, framing supporting decks & balconies.	Gauged *Pinus radiata* H3.1 treated
Interior finishing timbers	Select grade dry finger jointed *Pinus radiata*
Unroofed decking, handrails, balustrades, posts not in-ground	H3.2 treated Pinus radiata

Use dry timber with the following moisture content:

Category	M.C.Spec	90% of pieces	Extreme M.C.
Framing	16%	14% - 18%	13% - 19%
Exterior joinery and finishings	17%	14% - 18%	13% - 19%
Interior joinery and Finishings, fittings, Furniture, corestock and plywood	10%	8% - 12%	7% - 13%

The Contractor shall replace, at his own expense, any timber which shrinks or is damaged in finished work, caused through the use of imperfectly seasoned timber.

CA 05 WORKMANSHIP

The works shall be carried out in accordance with best trade practice by competent tradesmen using equipment, materials and processes that are best suited for the purpose.

Wait on all other trades, cut and bore as they may require and fix all blocks and supports.

CA 06 FIXINGS

Fix, frame, truss, brace, nail, screw, bolt and fit all timber together in a tradesmanlike manner and in accordance with the best trade practice.

Accurately set out, neatly execute and finish all work; make good, or replace to the Architect's satisfaction, all work developing defects.

Use galvanised mild steel and aluminium nails, brads, screws, bolts and metalwork where there is any likelihood of corrosion. Punch galvanised nails. Fix all framing with annular threaded flat head nails. Use brass or stainless steel fixings in all exterior joinery.

Use brass screws compatible in style, material and finish to fix hardware supplied. Check that screws supplied with hardware conform to this specification before fixing.

Penetrate second or holding framing timber with nails to half their length. Increase nail lengths by 25% where second timber is Pinus Radiata.

Fix interior finishing timbers, linings, trim, etc. with brads of length three times the thickness of attached material with minimum length 19mm.

Neatly punch all exposed nails below surfaces.

Attachments to concrete and blockwork shall be made by means of screws in approved proprietary plugs, or bolts, either built in or engaging in expanding sockets.

Interior wall plates to be fixed to concrete slab using Trubolts unless special fixing is required for bracing.

Cartridge fire fixing may only be used where directed and must not be used for fixing to steel. Fixings securing timber shall have aluminium discs under the head of the pin and shall not be located near the edge of the member. The charge must be adjusted so that the concrete surface around the fixing does not shatter.

CA 07 POLYSTYRENE INSULATION

Provide 25mm thick polystyrene under slab insulation and allow to fit under floor slab of entire house.

CA 08 FINISH

All timber surfaces exposed to view except where elsewhere specified, shall be hand dressed to a smooth even surface. In addition, all doors, windows, interior finishing timbers, interior joinery and fittings shall be hand dressed to a smooth even surface.

Remove all arises, all rough and uneven patches, hammer marks and other surface defects before painting is begun. No stains shall be shown on any timbers that are to have a natural or varnish finish.

Floor surfaces which are to receive a covering of sheet materials shall be brought to an even surface satisfactory for contact of such material.

CA 09 FRAMING

(a) General

Framing shall have all faces gauged to ensure accurate assembly. Where not shown otherwise, cross sections, spacing, lintels and bracing shall comply with NZS 3604.

Fixings to concrete shall be by 12mm bolt with 50x50mm washers built into concrete at 900mm maximum centres for exterior wall plates, or by proprietary metal strap fixings built in.

Intermediate wall plates shall be fixed with 12mm Trubolts fixings at 900mm centres. All wall lengths shall have at least 2 fixings.

Fixings to steelwork shall be with bolts, studs or approved proprietary fastenings at not more than 600mm centres. All members shall have at least 2 fixings.

(b) Cavity Construction

All battens are ex 50 x 20 ***Airflow Battens*** provided and installed by the **ROCKCOTE EPS 40 Plus Cladding System.**

(c) Wall Framing

Frame for all timber walls with 100 x 50mm (or size as detailed) framing at 400mm centres. Framing shall be set out to suit linings and fittings. Plates shall be in long lengths, halved over supports at joints and at corners. All external angles and intersections shall be blocked and spiked together.

Brace wall panels with Pryde bracing where detailed. Refer Schedule. Fix Braceline Gibraltar board bracing panels where shown in bracing schedule and indicated on plans.

(d) Roof Framing

Construct roof as detailed on plans.

Fix trusses at 900mm maximum centres, plumb and fixed to framing with framing anchors. Stiffen with runners and brace as required.

Strap ceilings with 75 x 40mm Dressing grade strapping or proprietary metal strapping at 600 max centres set out to suit sheets and in accordance with the specific requirements of Winstones Ltd directions for fixing Gibraltar Board for paint finish.

Care shall be taken to ensure that the Battens have a moisture content of less than 20% at time of fixing linings.

Alternatively Dimond or other approved ceiling battens may be used, fixed as per Manufacturer's instructions.

(e) Floor Framing

Frame for first floor areas with joists gauged over plates and between beams.

Securely fix to plates, and solid block as drawn and as required by NZS 3604, Clause 5.1.2.3.

CA 10 DAMP PROOFING

Fit Malthoid bitumen d.p.c. between timber and any concrete surfaces.

CA 11 BUILDING PAPER

Allow to supply and install Gib Frameguard 11 synthetic house wrap to all exterior wall framing only, in strict accordance with the Manufacturer's instructions.

Replace any damaged or worn paper where required.

CA 12 INSULATION

To all ceiling areas supply and install R 2.2, 100mm thick fibreglass batts.

To all external walls supply and install R1.8, 75mm thick fibreglass batts.

Ensure all cavities in external walls and ceiling spaces are filled.

CA 13 EXTERIOR WALL LININGS

(a) ROCKCOTE EPS 40 Plus Cladding System.

The exterior cladding, cavity battens plus all accessories and fixings will be supplied and installed by the licensed installers of the system.

(b) Hardies Soffit Linings

Provide 7.5mm thick Hardies Hardigroove soffit linings and fix on ex 50x50 bearers to all soffits and underside of decks and balconies. Refer to details 1 and 4 on the drawings.

(c) Hardiflex Sheets

Supply and fix 7.5mm thick sheets of Hardiflex to balcony walls where shown on the drawings and to the Manufacturer's installation instructions.

Hardiflex sheets shall have tapered edges and shall be fixed with 40 x 2.5mm galvanised flat head nails as specified by the Manufacturer spaced at 150mm centres to edges of sheets and at 150mm centres on intermediate studs.

Fixings shall be driven flush with surface of board. Finish sheets with 1mm and 2mm gap maximum as detailed with an Inseal 5375 adhesive foam strip 2.5mm thick x 80mm wide.

CA 14 INTERIOR WALL LININGS

(a) Schedule of Linings

Line walls of shower cubicles and all other tiled walls including bath cradle with Villaboard.

Line ceilings of Kitchen, bathroom, En suite and laundry with 13mm Gib Aqualine.

Line walls of Kitchen, bathroom, En suite and laundry with 10mm Gib Aqualine.

Line all remaining ceilings with 13mm Standard Grade Gibraltar Board.

Line all remaining walls with 10mm Standard Grade Gibraltar Board.

See bracing plan for extent of 10mm Braceline Gibraltar Board.

(b) Gibraltar Board

Fix all Gibraltar Board according to the Manufacturer's instructions using screw fixing to walls and screw and adhesive combination to ceilings.

Fix maximum sheet sizes as small patching of sheets will not be permitted.

Allow to fix perforated metal angle to all external corners.

All Braceline Gibraltar Board shall be fixed as required for sheet bracing by NZS 3604

All stopping shall be carried out by Sub Contractors skilled in this work and in strict accordance with the Manufacturer's instructions to suit Finish type '4'.

(c) Villaboard

Supply selected Villaboard wall lining and fit to shower walls and all other tiled areas in strict accordance with the Manufacturer's instructions.

Fix sheets to the framing using a good quality solvent based adhesive.

CA 15 PLYWOOD DECKING

Plywood shall be 18mm thick construction plywood, H3 treated, Cp-D grade complying with NZS 3614 : Construction Plywoods; AS2269 : Structural Plywood and AS 2271 : Exterior Plywood. Sheets shall be branded on back with Manufacturer's logo detailing grade, NZ standard, glueline treatment, glueline type and grade.

Store, handle and fix plywood in accordance with Manufacturer's instructions taking care not to damage edges or corners.

Liaise with Membrane decking trade and lay sheets in areas that can be covered the same day by decking membrane. Plywood shall not be left exposed to weather after fixing. Provide temporary covers as necessary.

Where there is likelihood of plywood getting wet before roofing is laid tape all joints with approved tape and prime top surface of sheets with Nuraflux.

Any plywood that has been exposed to weather shall be dried by approved methods to a moisture content of 15% at time of fixing of membrane decking. Provide moisture meter permanently on site to check moisture content.

Lay in maximum sized sheets with face grain at right angles to framing. Sheets shall be continuous over two or more spans. Lay in brick bond pattern with tight butt joints. All joints shall be made over framing. Remove all sharp edges and splinters from original and cut edges of sheets.

Fix sheets with 65mm stainless steel screws at 150mm centres, around edges of sheets and at 200mm centres at intermediate supports. Stagger screws between sheets ie; nails at joints shall bot be opposite each other. Fixings shall be 10mm in from edge of sheet. All screws shall be countersunk flush with plywood surface. Power driven nails may be used provided acceptable design data is obtained from the Manufacturer and that fixing is in accordance with their instructions. Staples are not permitted.

Fit ex 50 x 50 coving fillets at all upstands and junctions.

Fit over plywood where shaped timber battens are shown. Screw fix with hot dipped galvanised countersunk screws at 300mm centres with two screws 50mm apart.

CA 16 FLOORING

Flooring to the first floor ares shall be 20mm thick Kopine Ultralock flooring. Allow to fix in large sheets in stretcher bond pattern with close butted joints in accordance with the Manufacturer's instructions. Fit sheets with 70x2.8mm flathead hot dipped galvanised twisted shank nails at 150mm centres, around edges of sheets and at 200mm centres at intermediate supports. Stagger nailing between sheets ie; nails at joints shall not be opposite each other. Fixings shall be 10mm in from edge of sheet. All nails shall be punched flush with surface. Power driven nails may be used provided acceptable design data is obtained from the Manufacturer and that fixing is in accordance with their instructions. Staples are not permitted. In addition to the above nailing, the Carpenter shall allow to supply and apply Sturdibond glue to edges of all sheets plus all top edges of floor joists.

On completion allow to sand with 40 - 80 grit paper and leave in a suitable finish for flooring trade.

CA 17 INTERIOR FINISHES

Take delivery of, protect and fit plumb and square with all joinery fittings. Fit all necessary finishing timbers. Finishing timbers shall, whenever possible, be in unjointed lengths between angles and ends of runs.

Where running joints are inevitable, splay cut timbers. Mitre external angles and scribe internal angles. Nails and brads shall be punched below the surface in all finishing work. Fit 12mm bead at all junctions of corners of fittings and walls.

(a) Skirtings
To all areas supply and fix finger jointed *Pinus Radiata* H1.1 bevelled skirtings. Confirm profile before ordering. Mitre at all joins and angles.

(b) Cornices
Cornices shall be Gib Goldline outside corner angles

(c) Jambs
All jambs are slimline and therefore require no architraves.

(d) Beads
Provide the various beads as drawn or otherwise required.

CA 18 METAL JOINERY

Fix all window and door joinery, etc in strict accordance with Manufacturer's instructions, plumb and square and in proper alignment. Liaise with the Metal Window Manufacturer as necessary.

CA 19 FLASHINGS

See under Plumber for supply of all except roof flashings. The Carpenter shall liaise with the Plumber and allow to fix all necessary dwangs and backing timber to accommodate flashings.

CA 20 HARDWARE & DOOR GEAR

Refer to Monetary Allowances for the provisional sum of **$12,000.00** for the supply only of all door hardware as selected by the Principal. Allow to install all hardware including door locks and latches plus furniture, toilet roll and towel rail holders, cupboard Handles, Handrail Brackets and all other items not mentioned but covered by the Provisional Sums and as necessary to complete the contract.

The Carpenter shall supply the various door gear units including tracks, hinges etc as necessary and fix in their respective locations in strict accordance with the Manufacturer's instructions.

CA 21 SHELVING

(a) Wardrobes
Allow the p.c. sum of **TWO THOUSAND DOLLARS ($2,000.00)** for the supply and installation of an approved wardrobe system for the Master Bedroom as selected by the Principal. Do NOT place orders until all units are approved by the Principal.

To all remaining wardrobes and entry cupboard (D6) allow to supply and install Pryda aluminium profile rails with attached Melteca finish customwood shelf.

b) Linen Cupboards

Supply and fix six rows of ex 25mm thick slatted shelving in treated pine to linen cupboard on ground and first floor as shown.

CA 22 INTERNAL DUCTED VACUUM SYSTEM

Allow to provide and install a ducted vacuum system within the wall framing with outlets located in Lounge, ground floor hall, family room, stairwell, and first floor hall, as directed on site by the Principal.

The vacuum motor and collection bins are to be located where directed on site by the in the Principal.

Fix all strictly according to Manufacturer's instructions.

CA 23 SWITCHBOARD

Trim for meter board and separate distribution board. Liaise with the Electrician for installation of both boards.

CA 24 WATER CYLINDER STAND

Provide stand for hot water cylinder constructed from 100x50mm framing. Fixing shall be strictly in accordance with the NZ Building Code to resist seismic loads.

CA 25 MIRRORS

The Principal will select mirrors for the bathroom and En suite for fixing by the Carpenter where directed on site.

CA 27 SHOWERS

Frame up shower boxes as drawn and line with Villaboard. Glue and fix wallboard to frame as per Manufacturer's instructions with joints stopped flush for fixing of tiles. Supply and install approved water proofing membrane prior to laying of tiles.

The Plumber will supply and install Iplex D101STILE Smartile into Smartwaste in base of both tiled showers.

CA 28 MISCELLANEOUS

Allow for all labour involved in the construction of miscellaneous items not specifically noted in this Specification but shown on drawings and vice versa.

CA 29 BRACING

See drawings for extent of roof and wall bracing. Supply and install galvanised steel wall and roof bracing. **NOTE:** Special fixing requirements for sheet bracing refer to NZS 3604:1999.

CA 30 BATH SURROUND

The Carpenter shall allow to construct a cradle for the spa bath and line exposed surfaces with Villaboard suitable for tiling by the Employer.

CA 31 VANITY UNITS

Refer to **PR 13 Monetary Allowances** for the Provisional Sum of **$2,200.00** for the supply only of two vanity units selected by the Principal. Install in the Bathroom and En suite where shown drawn.

CA 32 TOILETS

Liaise with the Plumber and allow to frame up for two wall hung toilet pans with cisterns concealed within the wall framing. Provide access panel for cisterns.

CA 33 JOINERY ITEMS

The Carpenter shall fix all vanity units as selected by the Principal and pre hung doors as supplied by the Joiner into their respective locations.

CA 34 CAVITY SLIDERS

Allow for framing for all glass and timber cavity sliders to the following areas.

Ensuite
Lounge
Dining
Laundry

The Joiner will supply all timber cavity sliders and the Glazier will supply all Glass cavity sliders including fixings.

CA 35 POLYSTYRENE MOULDINGS

Provide 120 x 40 thick window sills.

Provide 150 x 150 thick fascia frieze to all main roof areas.

Provide 300 x 150 thick facing as required. See exterior elevations.

Provide 250 x 40 thick facing around building at first floor level. Refer to exterior elevations for extent required.

Provide and pack polystyrene as necessary to laminated timber posts to give the finished size of 350x350 to the columns as detailed on Sheet 9.

Glue fix all polystyrene profiles to Rockote and timber substrates using adhesive recommended by the Supplier of polystyrene prior to plastering.

CA 36 STAIRS

Allow to construct stairs using ex 50mm stringers and 20mm particle board flooring for treads and risers.

CA 37 WROUGHT IRON WORK

The Principal will select all wrought iron styles for the Balustrades, stairwell handrails and site wall insets. Allow to liaise with the Principal in the selection of wrought iron. Allow to supply and fix where directed including all brackets and fixings necessary.

CA 38 FIRE BOX

Provide a fire box for two gas fires as selected by the Principal. Refer to Gasfitter for supply of selected fires. Construct chimney from ex 100 x 50 timber framing where shown drawn. Finish exterior of chimney as detailed using Rockote with polystyrene mouldings at the top as shown detailed on section b-b Sheet 9.

The Plumber will install the gas fire and provide and pay all necessary fees and obtain permits required for code compliance of the installation.

CA 39 FIRE SPRINKLER SYSTEM

IPLEX will provide the Fire Sprinkler System throughout the house. Refer to the Provisional Sum in the **PR 13 Monetary Allowances** which covers the supply and installation of the system. Liaise with this trade as necessary for the installation prior to fixing wall linings.

CA 40 SECURITY SYSTEM

Refer to the Provisional Sum in the **PR 13 Monetary Allowances** for a Security System as selected by the Principal.

CA 41 COMPLETION AND CLEARING

The Carpenter shall clear away all debris from his work.

JOINER

Refer to the Preliminaries section of this Specification, which is equally binding on all trades.

JO 01 SCOPE OF WORK

The work of this section comprises all joinery work and related items necessary to complete works, including the following:

(a) Interior and exterior timber doors and frames.

(b) Interior joinery and fittings.

(c) Other miscellaneous items as drawn and/or specified.

JO 02 SHOP MANUFACTURE

Joinery shall be made in the Joinery Shop and may not be delivered in knocked-down form for site assembly unless this is approved by the Employer.

The Principal shall have the right to inspect the joinery during its manufacture.

Provide temporary bracing as required to prevent distortion to units before they are fixed in position.

JO 03 SITE MEASUREMENT

Before manufacture of joinery, check measure on the site to verify all shown dimensions and so that all units WILL FIT their respective spaces.

JO 04 GLUES

Glues used for exterior joinery shall be phenolic or resorcinal synthetic resin, water-proof glues.

JO 05 STANDARDS

The following standards shall apply unless otherwise noted in this Specification.

NZS	3602 : 2003	Code of Practice for Timber Products.
NZS	3631 : 2003	Classification and Grading of NZ Timbers.
NZS	1158 : 1965	Doors
NZS	3610 : 1979	Profiles of Mouldings and Joinery.

JO 06 MATERIALS

Timber species, grades, quality and profiles shall comply with the requirements of the above standards where appropriate unless otherwise specified. Timber shall be treated to the Timber Preservation Council's Specification and kiln dried to a moisture content of 12% at the time of machining.

Nails, screws and bolts shall be steel. Where used in a corrosive situation, fittings shall be galvanised of noncorrosive metal. Fixings for MDF shall be in accordance with the Manufacturer's recommendations.

JO 07 TIMBER SCHEDULE

All timber shall be of the following kinds and grades. All timber shall be sound, straight and free from checks and similar defects. Any split timber must be replaced.

(a) Interior joinery except fitments to be finger jointed Pinus Radiata C8

(b) Fitments 18mm medium density, Customwood. All exposed edges shall be clashed with hardwood edging strips.

NOTE: Finger jointed timber must conform to NZS 3616 1978. Units to be painted are to be shop primed with zinc titanium primer and undercoated within four weeks of arriving on site.

JO 08 WORKMANSHIP

All joinery shall be shop made in accordance with good trade practice by competent tradesmen. Assemble doors, frames and fittings by joints appropriate to the job.

Mortice and tenon housing shall be used whenever practicable and in preference to nailing. Fix glue blocks whenever required. Joints shall be accurately cut and fitted and well glued to develop the full strength.

All joinery timbers shall be machine dressed on four faces and all exposed faces shall be sandpapered or hand finished to a fine finish. Hammer bruises and other dents shall be raised or filled by suitable methods, holes stopped and all lumps smoothed off.

Before fabrication of joinery, check measure rough openings on site to verify all shown dimensions.

JO 10 DOORS

(a) Exterior Doors

Allow to supply double timber entry doors (see D1 of the window and door schedule) complete with glazed side lights in timber frames for fixing into position by the Carpenter.

(b) Interior Timber Doors
Interior doors shall be paint quality panelled timber doors as scheduled on the drawings and complying with the relevant NZ Standard.

(c) Cavity Sliders
Supply and install two paint quality timber panelled cavity sliders.

(d) Interior Glass Doors
All interior glass doors (D2, D2a and D2b on the window and door schedule) shall be frameless, tinted, toughened glass doors supplied and installed by the Glazier.

(e) Pre-Hanging
The Joiner shall allow to pre hang all doors in their respective frames and deliver to site for fixing in position by the Carpenter.

JO 10 FITTINGS

Refer to **PR 13 Monetary Allowances** for the provisional sum of **FIFTEEN THOUSAND DOLLARS ($15,000.00)** for the supply and installation of kitchen joinery as selected by the Principal.

Any joinery showing shrinkage, warp, wind or other defects after manufacture or installation and before the end of the maintenance period, shall be made good to the Architect's satisfaction.

All units shall be delivered to the site of the works and installed where designated.

ROOFER

Refer to Preliminaries section of this Specification which is equally binding on all trades.

RO O1 SCOPE

This section of the Specification consists of the supply and fixing of the following:

Timber tile battens
Roofing underlay
Wire netting to support underlay
Monier Elebana Roofing tiles and accessories
Birdproofing wire mesh for valleys

RO O2 MATERIALS

Roofing underlay shall be a breather type self supporting underlay.

Timber tile battens shall be rough sawn Boric treated Radiata Pine as approved in NZS 3602:1975.

Ridge and hip cappings shall be to match the roof tiles.

All Monier barge tiles shall be used at verges and gable ends and match the Elabana product.

Mortar bedding and flexible pointing shall be provided for all ridge and hip cappings in accordance with the Manufacturer's recommendations for mortar mix and colouring.

Mortar bedding and pointing shall be provided for verge and gable finishing in accordance with the Manufacturer's recommendations.

RO 03 STANDARDS

All materials and workmanship shall conform to the following Standard Specifications:

NZS 4206:1992	Specification from Concrete Interlocking Roofing Tiles.
NZS 4200:1994	Materials suitable for use as a Pliable Building Membrane
NZS 3601:1973	Metric Dimensions for Timber
NZS 3602:1995	Code of Practice for Specifying Timber and Wood-Based Products for Use in Buildings.
NZS 4203:1992	Code of Practice for General Structural Design and Design Loadings for Buildings.
NZS 3604:1999	Code of Practice for Light Timber Framed Buildings not requiring Specific Design.

RO 04 WORKMANSHIP

All roof tiling work shall be carried out by experienced competent tradesmen familiar with the products being used, in accordance with the best trade practise to produce a high standard of work.

Tiles shall be set out with straight and parallel and with tiles in each course, or in alternate courses, kept in vertical alignment so that the roof presents a regular and even appearance. The tiles shall be laid to interlock with adjoining tiles fitted closely together. All joints within the main body of the roof shall be formed with tiles having full side lap. Where it is necessary to cut a tile to form the correct length of course, the cut edge shall be located at the verge. On completion of work, the roof area and gutters shall be cleaned of debris and the roof left sound and weathertight.

RO 05 INSPECTION OF ROOF STRUCTURE

The Roofing Contractor or his representative shall inspect the roof structure before roof tiles are delivered or roof tiling commences. He shall ensure that the roof structure is standing ready for tiling and that work needed to be carried out by the main contractor or other trades in preparation for tiling, has been completed. If any aspect of the roof structure or preparatory work by other trades is not to the satisfaction of the Roofing Contractor, he shall bring this to the notice of the Main Contractor.

RO 06 ROOF STRUCTURE

Monier concrete roof tiles shall be laid over Gangnail timber trusses at 900mm centres. Roof pitch at 30 degrees with 15 degrees pitch to verandah.

RO 07 ROOFING UNDERLAY

Roofing underlay shall be laid and lapped over the rafters so as to drain into the gutter of the roof. A minimum lap of 150mm shall be allowed for horizontal laps and all vertical laps shall be carried over rafters. Where the rise of the fascia above rafter top could cause ponding, an anti-ponding board or device giving similar results shall be provided.

The underlay shall be sufficiently stiff to span between rafters or trusses without undue sagging. Underlay shall be installed under the valley boards of sufficient width to extend at least 200mm on each side of the valley and shall be carried over the fascia.

RO 08 TILE BATTENS

Timber tile battens shall be set out and spaced along rafters to give the required tile end lap and fixed to every rafter or truss with at least one nail of 2.5mm minimum diameter and of sufficient length to penetrate approximately five eighths of the total nail length into the rafter or truss. Battens of more than 50mm nominal width shall be fixed with two nails of this type to each rafter.

Battens shall be nailed at every intersection with rafters or trusses. All batten joins shall be located at the centre of a rafter or a truss member. There shall not be more than two joins on any rafter or truss and there shall be no less than two continuous battens between such joins.

Where a roofing underlay is laid on sarking, or in any other case where ponding behind normally laid tile battens could occur, the roof shall be counter battened or other measures taken to ensure that any water retained by the underlay can escape into the gutter.

RO 09 SECURING OF TILES

All perimeter tiles shall be mechanically fixed, i.e. each tile at roof edge adjoining a ridge, verge, valley, or eave. Any perimeter part tile of half or more the area of a full tile is deemed to be a sufficient 'tile' for this purpose. Any perimeter tile of less than half the area of a full tile shall be secured, if reasonably practicable, and in addition the adjoining tile in the same course shall also be secured. The two end ridge/hip tiles shall be secured and all cut tiles at valleys are also to be secured.

In the body of the roof inside the perimeter riles, not less than 50 percent of the tiles shall be mechanically fixed, the pattern ensuring that unsecured tiles interlock with secured tiles. In the case of projecting unlined eaves or projecting unlined gable ends, every tile in the overhanging portion shall be secured.

Tiles shall be secured by one of the following methods:

Nailing or screwing, with the use of clouthead nails or screws not less than 2.5mm in diameter. They shall be hot dipped galvanised or of corrosion resisting material. Fixings shall penetrate not less than 18mm into the tile batten but the points shall not project beyond the underside of the batten.

Clipping. The clip and its attachment to the batten shall be of suitable corrosion resisting material and fixed in accordance with the Manufacturer's instructions.

RO 10 VALLEYS

All valley boards and metal valley trays of adequate width shall be installed to form a continuous straight line into the gutter. Tiles fixed on either side of the valley shall be neatly cut with a tile cutter. Cut tiles shall be secured.

Any gaps which occur through the cutting of tiles at valleys shall be made birdproof either by the use of wooden wedges or by other effective means such as the provision of galvanised mesh birdwire fixed to valley battens and in contact with the underside of the tiles.

RO 11 EAVES

Provision shall be made for tiling the eaves course of tiles, at least sufficiently to maintain the normal pitch of the roof, by using either the fascia or tiling batten by an amount sufficient to ensure that the water discharges into the gutter.

RO 12 VERGES

Monier concrete barge tiles shall be fixed to barge boards by means of 35mm x 5mm galvanised round head screws or suitable corrosion resistant nails. Barge tiles shall be bedded and pointed where they meet the roof tiles but not at the leading edges.

Z Flashings shall be used as per details in strict accordance with the Manufacturer's recommendations.

Alternatively, tiles shall be bedded and pointed with mortar at verges. For this finish, barge boards shall be installed to allow for the thickness of a strip of fibre cement on top of the barge to line up with the top of the tile batten.

RO 13 RIDGES AND HIPS

The ridges and hips shall be covered with Monier ridge tiles and shall be bedded and pointed with weep holes provided at the pan of each tile. The end ridge and hip tiles shall be secured.

RO 14 GUARANTEE

The Roofing Contractor shall provide a written five year guarantee to cover roof tiling workmanship.

MEMBRANE ROOFING

Refer to Preliminaries section of this Specification which is equally binding on all trades.

MR 01 EXTENT OF WORK

This trade covers the supply and fixing of Bitumat Synroof Hi Build acrylic membrane to all trafficable deck areas as shown drawn.

Tenderers shall satisfy themselves that the details shown on the drawings are appropriate for their particular roofing product or shall allow in their tender for the additional cost of any amendments that may be required to enable them to meet the required guarantee. Such amendments shall be submitted to the Architect for his approval before tender acceptance.

MR 02 ACRYLIC MEMBRANE DECKS

Deck membrane shall be Bitumat Synroof Hi Build acrylic membrane supplied in 29kg pails and reinforced as per the Manufacturers recommended system using Chopped Strand fibre approximately 160-300gsm. Pails shall bear the Bitumat mark and be stored in clean dry and cool location.

MR 03 LAYING MEMBRANE DECKING

(a) The membrane deck shall be fixed by experienced licensed applicators specially skilled in this work using adequate and proper equipment and methods in accordance with best trade practice, this Specification, and recommendations laid down and approved by the Manufacturer of the roofing system.

(b) The Membrane roofing contractor shall satisfy himself that the substrate is in a suitable condition for laying. The substrate shall be tongue and groove 18mm plywood glue and screw fixed and sheets laid in a staggered pattern. All nails punched home, edges chamfered, coving fillets fixed to all upstands, moisture content correct, and free from grit contamination or defects.

(c) Do not lay membrane in wet or misty conditions or where the threat of rain is imminent or below 7 degrees C. Check substrate is dry (has maximum moisture content of 15%) at time of laying deck/roof.

(d) Prime substrate and allow to fully dry. Install membrane system as per Manufacturer's recommendations ensuring each coat is fully dry before installing next coat. Reinforce membrane using chopped strand fibre as per Manufacturer's specifications.

MR 04 DOWNPIPES

Metal downpipes are specified under the Plumbing Section of this Specification. Co-operate with that trade in the application of these items and production of the required guarantee.

MR O5 COMPLETION

On completion of all roofing carefully and thoroughly clean off and remove all scraps and other rubbish from the finished surfaces and leave in tidy order with the whole roof waterproof and in first class condition.

An inspection of the finished roofing is to be carried out with the Main Contractor, who will confirm the condition of the roofing as free from all defects. Any damage that may occur after this inspection is to be made good at the Main Contractors expense.

MR 06 GUARANTEE

Provide guarantee on approved form covering both materials and fixing of decking for a period of (10) ten years from the end of the Maintenance Period.

GASFITTING

Refer to the Preliminaries section of this Specification which is equally binding on all trades.

GF 0 SCOPE

The work in this section includes supply and fitting a 2 Masport gas Fires and the installation of a new gas cooker in the Kitchen where shown drawn on the Floor Plan Sheet 4. Included in the work will be the provision of two new gas cylinders and all necessary accessories to supply gas from the cylinders to the Fire and Cooker.

GF 02 WORKMANSHIP

The whole of the work shall be carried out by or under the direct supervision of experienced heating engineers in accordance with the best trade practice.

The Gasfitter will provide any permits required by the local authority and pay all fees in relation to this contract.

All pipework shall be neatly and securely fixed.

GF 03 GAS CYLINDERS

Supply and install two gas cylinders where directed on site by the Principal together with all valves and pipework as required to comply with the NZSS 5261 "Code of Practice for the Installation of Gas Burning Appliances and Equipment".

From cylinders run gas supply to the Cooker in the Kitchen and two gas fires fitted within the same chimney framing where shown on the drawings.

All pipework to be run concealed within wall framing.

GF 04 GAS FIRE

Supply two (2) Masport Piccolo Zero Inbuilt Zero Clearance gas fires. Install both fires within the same fire box cavity. One gas fire will face into the Lounge and the other into the Family room . Supply and install the necessary flue kits (2 off) to take up the chimney and out through the roof.

Liaise with the Monier Concrete tile Roofer for flashing of all roof penetrations as necessary to ensure the whole installation is waterproof.

Liaise with the Electrician for the connection of all electrical points and switches.

GF 06 GAS COOKER

Connect up gas supply from the cylinder to the cooker as supplied by the Principal where directed in the Kitchen.

Liaise with the Electrician for the connection of all electrical points and switches.

GF 07 TESTING

Test the whole of the Gas heating and cooking system to ensure full operation of all appliances.

GF 08 COMPLETION

Provide all the required guarantees and any necessary compliance certificates for the installation of heaters and cooker.

DRAINLAYER

Refer to Preliminaries section of this Specification which is equally binding on all trades.

DR 01 EXTENT OF WORK

The work of this section comprises the supply and installation of all pipework customarily done by the drainlaying trade and as further shown on Service Plan and/or specified herein.

DR 02 STANDARDS

The following standards shall apply unless otherwise stated in this Specification:

NZS 7642 : 1971 uPVC soil and ventilation pipe and fittings and accessories.

NZS 7649 : 1988 uPVC underground drainpipe and accessories.

NZS 4643 Code of practice for installation of uPVC pipe system.

NZ Building Act 2004

DR 03 REGULATION

All drainlaying work must be in accordance with the Plumbing and Drainage Regulations and to the approval of the Local Authorities and Inspectors.

DR 04 MATERIALS

All materials and fittings shall be the best of their respective kind in accordance with the above standards.

Supply uPVC 'Terrain' 110mm diameter sewer and 90mm diameter stormwater systems including gully traps lubricant, etc.

DR 05 EXCAVATION

See under Excavator section of this Specification.

DR 06 JOINTING

All joints in PVC pipe in accordance with NZS 7643.

Sockets to W.C. soil pipes shall finish at the correct height above floor level. The joint between the pan and the drain shall be made by the Plumber as specified under Plumber.

DR 07 JUNCTIONS

All junctions other than manholes shall be made with 'Y' shaped inspection junctions and bends. Fit cleaning eyes, brought to the surface, at all junctions and bends where shown or directed.

DR 08 GULLY TRAPS

Exterior gully traps shall be standard PVC gully traps set in concrete surrounds, at level to suit surrounding surfaces.

DR 09 LAYING DRAINS

Excavate for drains with trenches, three times overall pipe diameter, straight and to even gradients. Gradients to be generally a minimum of 1:40.

Lay drains in even gradient in 75mm minimum depth of clean gravel, with pipes fully supported and with gravel haunched to side for half of pipe diameter.

Check invert levels of existing drains before commencing work on site.

The minimum cover for drains shall be 300mm.

Backfill all drains with filling as specified under "Excavator". Compact to suit later siteworks.

Drains under building shall be encased with a minimum of 100mm of compacted pea metal.

Complete installation as per Manufacturer's instructions as to jointing etc.

DR 10 TERMINAL VENT

Install PVC Terminal Vent and terminate with standard cowl.

DR 11 TESTING

Clear all drains of debris. Test all drains and arrange for inspection by Local Authority. Provide all necessary labour for the completion of drains and their satisfactory operation.

At completion leave all drains operating freely and entirely without leaks.

DR 12 SEPTIC TANK

Allow to provide as necessary any extra drains from the existing tank to the house.

DR 13 WATER STORAGE TANKS

Allow to supply two (2) 5,000 gallon capacity water storage tanks and place where excavation has been carried out and as directed by the Principal. Make all necessary inlet and outlet connections.

DR 14 COMPLETION

On completion, remove all the trade debris and distribute surplus soil on site as directed, and leave all work, for which this trade is responsible, in proper order.

PLUMBER

Refer to Preliminaries section of this Specification, which is equally binding on all trades.

PLU 01 EXTENT OF WORK

This trade comprises the supply and fixing of flashings, downpipes, sanitary fittings and wastes, water supply and reticulation. The following is a list of items which will be selected by the Principal and fixed by the Plumber:

(a) kitchen sink unit & waste disposal
(b) dishwasher
(c) Rangehood
(d) all taps including shower roses and mixing valves
(e) bath
(f) vanity units & handbasins
(g) laundry tub & washing machine
(h) clothes dryer
(i) hot water cylinder
(j) wall hung w.c. pans and cisterns

All other plumbing materials including piping, ducting, wastes, traps, vents, stopcocks, valves, etc shall be supplied and fitted by the Plumber.

PLU 02 MATERIALS AND WORKMANSHIP

All work shall be carried out in accordance with the Building Act, Local Authority and Public Health Regulations. All materials shall be the best of their respective kinds. Water pipes and tubes shall be set out in straight runs of even gradients, avoiding all places where air locks are likely to occur.

Use easy bends and unless unavoidable, elbow fittings are not to be used. Copper tubing is to be secured in position by copper straps. All piping including water waste and vents shall be concealed unless specifically shown otherwise. All piping to be copper.

PLU 03 ELECTROLYSIS

Ensure that no dissimilar metals are in electrolytic contact.

PLU 04 ATTENDANCE ON OTHER TRADES

The Plumber shall liaise with the Concretor for reticulation of pipework prior to pouring concrete.

The Plumber shall liaise with the Electrician and Power Board to keep trench open for mains reticulation.

Liaise with the Gasfitter for installation of gas fires and attend that trade as necessary.

PLU 05 WASTES AND TRAPS

All fittings are to be fitted with traps of regulation size of white PVC. Waste pipes shall be of unplasticised PVC. Where concealed in concrete, wrap in denso tape.

PLU 06 VENT PIPES

Vent pipes shall be provided by the Plumber and be Class S unplasticised PVC pipes. Vent pipe sizes shall be as required by the Plumbing and Drainage Regulations.

Provide terminal vent where drawn. Penetrate the eaves and ring flash, cone flash and fit grille.

PLU 07 FLASHINGS

Fabricate and neatly fit all except Roof flashings as shown and as necessary to render the whole of the building water proof. Flashings shall be long lengths, neatly folded to profile with all raw edges folded under and welded. Fit straight and true with running joints lapped 150mm and sealed with silicone before pop riveting together.

NOTE: All roof flashings shall be supplied and fixed by the Roofer. Flashings to Aluminium window heads, jambs and sills shall be provided by the Metal Window Contractor and installed by the Plumber.

PLU 08 COLD WATER SUPPLY

Make connection to new water storage tanks. Run 20mm unplasticised PVC supply from Toby valve. Pipe shall be bedded, jointed and backfilled to full compliance with the Manufacturer's instructions. A minimum of 300mm cover shall be maintained over all pipes and particular attention must be given to the bedding, side filling and backfilling of pipe trench.

Run 20mm copper piping to the following with final branches being 15mm to the following fittings.

Hot Water Cylinder
Vanities & hand basins
W.C. Cisterns
Laundry Tub
Kitchen Sink
Dishwasher
Bath

2 x Showers
3 x Hose Taps

Run individual water supply to each shower outlet.

PLU 09 PUMP

Supply a new pump sufficient to carry water from the water storage tanks to the house and provide high pressure supply to all fittings. Install the pump where directed on site by the Principal.

PLU 10 H.W.C.

Supply and install a Rheem 270 litre High Pressure Grade A insulated electric water heater, all strictly to the Manufacturer's instructions and specification where shown drawn on the floor plan. Provide fixings against seismic loadings as detailed.

Provide a plastic tray complete with waste and connect to waste under water heater.

Provide and install approved wheel valve to cold inlet to water cylinder and check valve to cold outlet. Provide and install approved wheel valve to drain line.

Provide a 'Nefta' 55 degree temperature limiting valve and install a minimum of 350mm from the hot outlet on the water cylinder all in strict accordance with the Manufacturer's instructions.

PLU 10 HOT WATER SUPPLY

Connect hot water cylinder to water supply via isolating valve. From heater run 18mm supply to bath and 12mm to all remaining fittings.

NOTE: Run individual water supply to each shower outlet.

From cylinder run hot water supply to:

Bath
Basins
Laundry Tub
Washing Machine
Showers
Kitchen Sink
Dishwasher

Insulate all hot water supplies with preformed foam insulation well secured to pipework.

PLU 11 W.C.S

Install two (2) earthenware wall hung pans and seats into position as shown. Connect to drain with Flex-O-Seal connecter.

PLU 12 CISTERNS

Install two (2) cisterns into wall framing as per the Manufacturer's instructions. Connect to pan with white PVC flush pipe and connect to supply with white PVC supply. Isolate with Ballofix valve. Take overflow to outside in white PVC.

Liaise with the Carpenter who will provide for the concealment of cisterns within the wall framing.

PLU 13 VANITIES & HAND BASINS

Connect to water supplies and waste.

PLU 14 BATH

Connect selected spa bath to water supplies and waste. Liaise with the Electrician for power supply to bath.

PLU 15 SHOWER

Connect water supplies to mixer and rose. Connect shower to waste.

Supply two (2) D101STILE Smartile into Smartwaste and install in base of tiled showers in strict accordance with the Manufacturer's instructions. Confirm Stainless Steel or Brass finish with Employer prior to ordering. Distributed by IPLEX Pipelines 0800 800 262.

PLU 16 LAUNDRY TUB

Connect selected tub to water supplies and waste.

PLU 17 KITCHEN UNIT

The Kitchen sink unit will be provided by the Joiner as part of the kitchen joinery.

The Plumber shall allow connection from sink and dishwasher to water supplies and waste.

PLU 18 WASHING MACHINE

Complete installation to suit selected machine.

Provide waste outlet and connect supply with pair Fynastyle white stops. NOTE: Pipework from stops to be concealed in wall recess.

PLU 19 RANGEHOOD

Liaise with the Principal and provide all necessary ducting for the installation of the Rangehood. Provide roof flashings etc as necessary for completing installation through the roof.

PLU 20 CLOTHES DRYER

Install clothes dyer as selected by the Principal. Connect vent and take to exterior in wall framing. Finish at outside wall surface with standard hood.

PLU 21 HOSE TAPS

Finish off three (3) outlets with HMC brass outlets. Taps will be located where directed on site.

PLU 22 DOWNPIPES

Provide and fix all 80mm dia Colorsteel downpipes for the house as shown drawn. Fix pipes with straps to wall sheathing as appropriate. Connect to stormwater drains.

Ensure that provision is made at foundation line where necessary to avoid offsets at that level.

PLU 23 COMPLETION

At completion leave the whole of the plumbing system in perfect operating condition with all valves and cocks operating smoothly and with no leaks or drips. Leave all flashings thoroughly watertight and neatly finished. Remedy any leaks after complete testing of all pipework wastes and vents.

ELECTRICIAN

Refer to Preliminaries section of this Specification, which is equally binding on all trades.

EL 01 SCOPE OF WORK

The work in this section comprises the connecting up of the power supply, fitting of main switchboard, and wiring up of all new fittings plus installation of Smoke Alarms.

EL 02 STANDARDS

Documents referred to in this section include:

- Regulations
- Relevant Statutes
- NZ Interference
- Regulations, the Radio Interference Notice 1985

Regulations and Standards shall include all the relevant local territorial authority regulations and legal requirement for the work and the standards stated therein.

UNZ Wiring Regulations	1976 and all subsequent amendments
NZS 3019	
AS/NZS 3000:2000	
AS/NZS 3012	Systems for Construction & Demolition Sites
NZS 6401:2003	
AS 1670.6	Smoke Alarms
The NZ Building Code 2005	

EL 03 MATERIALS

All materials shall be of the best quality and of approved manufacture complying with the relevant N.Z. Standards.

EL 04 WORKMANSHIP

The installation shall be carried out in accordance with sound trade practice by a registered Electrician who shall co-operate with other trades as required.

EL 05 PERMITS

Notify the Supply Authority of the installation and obtain permission in writing before proceeding with any work. Pay all necessary permit fees and arrange all inspections.

EL 06 MSB AND METER BOARD

Boards shall be metal clad and external meter board shall be fixed with a glazed door.

Locking and catching device for the door shall be integral with the board. Position board where directed on site, complete with main switch and meters.

EL 07 MAIN CABLE

From terminal box, supply and fit underground three phase and neutral screened 'Exelene' insulated cable an additional 15% above calculated loading.

Correctly terminate at main board. Provide meter to Power Board requirements.

The Electrician shall identify separately in the Tender, the cost of supply and installation of the main cable.

EL 08 MINIATURE CIRCUIT BREAKER

Miniature circuit breakers shall conform to the following standards;

NZS 1279
AS/NZS 3000:2000
AS 3190
IEC60898
IEC61009

Supply and install the appropriate circuit breaker as follows;

RCCB – residual current circuit breaker without overcurrent protection

- 2P & 4P, 40A & 63A, 30mA
- Used to feed multiple MCB's

RCBO – residual current circuit breaker with overcurrent protection

- 2P, 6A - 40A,6kA, 30mA
- RCD protection combined with a MCB, used in a residential or commercial switchboard
- 1P, 6A – 40A, 10kA, 30mA

EL 09 SMOKE ALARMS

Supply and install battery powered Smoke Alarms generally to within 3.0 m of every bedroom door and all escape routes on each floor level. Smoke Alarms shall be tested or approved by a recognised national authority as complying with at least one of:

- UL 217
- CAN/ULC S531
- AS 3786

- BS 5446 Part 1

They shall provide a hush facility having a minimum duration of 60 seconds. Alarms shall have a test facility readily accessible by the building occupants.

Smoke alarms shall be installed on or near the ceiling in accordance with AS 1670.6 and the Manufacturer's instructions.

EL 10 FIRE SPRINKLER SYSTEM

Refer to **PR 13 Monetary Allowances** for the provisional sum of **$5,000.00** for the supply and installation of a fire sprinkler system.

The nominated sub contractor **IPLEX** will provide all necessary specifications for the installation of the system. Liaise with that trade as necessary.

EL 11 FITTINGS

Switches and socket outlets shall be flush type, white plastic made by PDL Industries from 500 series. Light switches shall be from 'Rocker' type, 5 amp. Socket outlets shall be three pin 10 amp complete with switches.

Plugs shall be fitted direct to the outlet boxes. All socket outlets shall be double horizontal fittings except in hall where they shall be single horizontal fittings.

Sockets shall be mounted 300mm above floor generally, 1200mm above floor in laundry, and 200mm above bench tops.

For the purpose of tendering allow for the following schedule of outlets. Exact numbers and locations of outlets shall only be determined on site in consultation with the Employer, and cost adjustments made against the following schedule.

Laundry

Recessed fittings	2
Double power outlets	3

WC

Recessed fittings	1

Bathroom

Shaver outlets (FRCD)	1
Heated Towel Rails	1
Tastic combination light/fan/extract	1
Wall mounted light fitting	1

Entry/Hall

Incandescent pendant fittings	1
Recessed light fittings	8

Double power outlets	2

Bedrooms 2 & 3

Recessed light fittings	2
Double power outlets	2

Study

Recessed light fittings	2
Double power outlets	2
Telephone jack point	1

Kitchen

Recessed light fittings	6
Double power outlets	3
Pantry light	1
Telephone jack point	1
Single outlets for Dishwasher	1
Oven	1
Rangehood	1
Hobs	1

Dining

Recessed light fittings	6
Double power outlets	2

Family

Recessed light fittings	6
Wall mounted fittings	3
Double power outlets	4
TV outlets	1
Gas fire switch	1
Telephone jack point	1

Lounge

Recessed light fittings	8
Ceiling mounted fan	1
Wall mounted fittings	2
Double power outlets	4
TV outlets	1
Gas fire switch	

Linen Cupboard

Hot Water Cylinder	1

Stairs

Tread lights	8
Incandescent pendant fittings	1

Master Bedroom

Recessed light fittings	4
Double power outlets	3
TV Outlet	1
Telephone jack point	1

Wardrobe

Recessed light fittings	1

En suite

Shaver outlets (FRCD)	1
Heated Towel Rails	1
Tastic combination light/fan/extract	1
Wall mounted light fitting	1

Utility Room

Recessed light fittings	2
Double power outlets	2

Exterior light fittings

Electronic Door Bell (Entry)	1
Entry soffit light fitting	1
Entry wall mounted fittings	2
Security sensor lights	2
Batten fitting over Laundry door	1

EL 11 CIRCUITS

Wire outlets through 10 amp MCB's with maximum 10 lights per circuit.

Wire socket outlets through 15 amp MCB's with maximum 5 sockets per circuit.

EL 12 WATER HEATER

Refer to Plumbing section for supply and installation of water heater. Connect up water heater to electrical supply. Water heater shall be wired on economy 8 night rate circuit. Wire in folded entron loline water heating element to NZ Reg. Design 10476 3 KW adjustable thermostat.

EL 13 VACUUM SYSTEM

Liaise with the Carpenter for the supply and installation of a fully ducted vacuum system. Allow for power supply to the systems motor where directed on site by the Principal.

EL 14 LIGHT FITTINGS

All light fittings will be supplied by the Principal. The Electrician shall allow to install all light fittings.

EL 15 CUPBOARD DOOR SWITCH

Allow to supply and install an Electrex cupboard door switch to Pantry cupboard.

EL 16 SHAVER

Provide and install two PDL 591FRCD-30 single switched sockets located in Bathroom and Ensuite where directed on site by the Employer.

EL 17 WALL OVEN, HOBS & RANGEHOOD

Allow to permanently wire in Wall Oven, Hobs and Rangehood with individual switches where directed on site.

EL 18 GAS FIRES

Allow to provide electrical supply to gas fires to operate fans.

EL 19 DISHWASHER

Allow to wire in dishwasher complete with adjacent switch.

EL 20 HEATED TOWEL RAILS

Allow to permanently wire in Heated towel rails with individual switches where directed on site.

EL 21 SPA BATH

Liaise with the Plumber and provide electrical supply to the spa bath in the En suite.

EL 22 WATER PUMP

Liaise with the Plumber and provide electrical supply for the water pump where directed on site.

EL 23 COMBINATION HEAT/LIGHT EXTRACTS

Allow to install two Tastic combination heat/light/extract units in Bathroom and en suite.

EL 24 TELEPHONES

Arrange with Telecom for supply to be laid from road to house in same trench as power cable, etc. Allow for wiring to 4 jack points as directed on site by the Principal. All telephones will be provided by the Principal.

EL 25 SKY DIGITAL NETWORK CONNECTION

Provide and install SKY Digital connection including module and remote. Locate dish where directed on site by the Principal.

Provide three aerial outlets where directed on site.

EL 26 SECURITY SYSTEM

Allow the sum of **THREE THOUSAND DOLLARS ($3,000.00)** for the supply and installation of a selected security system.

Confirm all details of the system with the Employer prior to ordering.

EL 27 UNDER TILE HEATING

Liaise with the Hot Wire under tile heating installer and provide electrical supply for all under tile heating to the Family, Dining, Kitchen, Bathroom and En suite as required.

EL 28 COMPLETION

At completion thoroughly check all work and arrange for test. Transfer name or user from Contractor to Owner only after tests have been completed to the entire satisfaction of the Supply Authority's Inspector.

METAL WINDOW MANUFACTURER

Refer to the Preliminaries section of this Specification which is equally binding on all trades.

MW 01 SCOPE OF WORK

This section includes the fabrication of all new external powder coated aluminium windows complete with all necessary jamb liners, heads, Colorsteel flashings, hardware and fixings in compliance with NZS 3504

MW 02 STANDARDS

The following standards shall apply unless otherwise noted in this Specification:

NZS 3544 : 1979	Specification for Aluminium Windows
NZS 3503 : 1978	Anodic Oxide Coatings
NZS 4211 : 1985	Specification for Performance of Windows
NZS 4233 : 1985	Code of Practice for Glazing in Buildings
NZS 4233 : 1988	Part 1 – Selection and Installation of Glass in Buildings

MW 03 MATERIALS

Aluminium sections shall be heavy duty domestic sections of 6063 alloy T5 Temper with 25 micron thick powder coat finish in colour selected by the Employer. The frame section shall include a condensation channel on internal face. Sashes shall be of hollow box sections with clip in security glazing beads.

Jamb linings shall be finished 30mm thick finger jointed Pinus Radiata H1 treated.

MW 04 PERFORMANCE

Frames shall be designed to withstand a wind pressure of 750 Pa and the air leakage performance of level 8. The Manufacturer shall provide a test certificate stating compliance with the above standards. All frames shall have AAA labels stating DWP, Air Leakage Level and the brand name of the window.

MW 05 FABRICATION

Notify Employer of the proposed type of opening windows and associated Hardware to be used prior to fabrication.

Check measure all rough openings on site before assembling frames.

Assemble frames in accordance with good trade practice with tight mitred and screwed corners with silicone sealant behind joint.

Hang sashes on Interlock stays correctly sized for sash weight and the exposure conditions. Fit two double tongued fasteners to each sash.

MW 06 GLAZING

All window glazing to aluminium frames shall be installed by Window Manufacturer and shall comply with NZS 4223 Part 3 1999, refer to the Glazier section of this Specification.

All clear glass shall be ordinary quality with clean undamaged edges and surfaces. Obscure glazing shall be cast glass.

All glazing within 500mm of floor level must be 6mm thick Bondlite.

MW 07 FIXING

The Main Contractor shall be responsible for the fixing of windows in the structural openings. All openings shall be square and true to the agreed dimensions. All rebates shall be a true plane with clean unbroken faces to give sound bed for sealants.

Generally anchor bracket fixings and attachments shall be of stainless steel or other non ferrous metal of sufficient strength to perform the functions for which they are intended. All screws, nuts, bolts, rivets, and other miscellaneous fastening shall be stainless steel.

MW 08 HARDWARE

All door and window hardware to be supplied by the Metal Window Manufacturer.

Supply to the Employer all proposed aluminium extrusions for approval prior to manufacture.

Door furniture - to be lever action with locksets key and snib combination.

Windows - Sashes over 600mm to have two fasteners per sash.
Any window protecting a drop greater than a metre as well as windows below 800mm above floor level and protecting a drop of more than a metre are to have restrictor stays fitted.

Sliding Windows - Sliding windows to have steel wheels or wheels suitable for long term use. Nylon wheels are not acceptable.

Colour options or variations to be selected by the Employer.

MW 09 FLASHINGS

All Colorsteel flashings at heads, jambs and sills of units shall be supplied by the Metal Worker and installed by the Plumber.

MW 10 PROTECTION

Completed window frames, reveal and jamb linings shall be protected from damage until completion. Storage shall be under cover and in such a manner as to avoid strain.

MW 11 GUARANTEE

Provide guarantee for metal windows made out in the name of the Employer against non performance, faulty materials or workmanship, waterproofness and coating breakdown for a period of two years from the date of Practical Completion.

MW 12 COMPLETION

On completion each window unit shall be cleaned and left in perfect working order ready for occupation. All sealant marks, Manufacturers stickers and the like shall be removed and any damage to glazing, frames, liners or coatings shall be made good at the Contractor's expense.

PAINTER

Refer to Preliminaries section of this Specification which is equally binding on all trades.

PA 01 SCOPE OF WORK

Allow to finish all new surfaces as scheduled below:

a) Exterior
All new exterior timber including timber joinery.
All Soffits

b) Interior
Interior of all exterior timber joinery.
All interior doors and frames and skirtings.
All new walls & ceilings including inside wardrobes & cupboards.

NOTE: The exterior cladding will be finished by the ROCKOTE applicator. The roofing, decking and all metalwork including flashings, cappings, spouting and downpipes are prefinished materials and do not require painting.

PA 02 MATERIALS

All Resene paints shall be brought on to the job in their original sealed containers. All applications are to be in accordance with the Resene One Line Specification system for each relevant substrate.

All materials shall be applied in strict accordance with the Manufacturer's recommendations and shall only be thinned if necessary. All undercoats shall be those recommended by the Manufacturer of the paint products used.

PA 03 WORKMANSHIP

The work shall be carried out by competent tradesmen in accordance with good sound trade practice using tools and equipment which will ensure a first class job. All such workmanship shall comply with the requirements of NZS 2239 'Code of Practice for Painting'. The top and bottom edges of all sashes, facings, etc shall be painted and the same number of coats as the exposed surfaces. Paint on all putty and glazing beads shall impinge on the glass to provide a waterproof seal between the glass and putty or bead. Paint shall be applied by brush, except the finishing coat to Gibraltar board linings which shall be roller application.

PA 04 PREPARATORY WORK

Inspect and check that all work affecting this trade is satisfactory before proceeding.

PA 05 PROTECTION

Take adequate precaution during and after painting, both inside and out, to protect the works from dirt, dust and other disfigurements and leave windows clean at completion.

PA 06 REMOVALS

Allow to remove all hardware and electrical fittings prior to commencement of painting and replace at completion.

PA 07 RUB DOWN

Allow to rub down between coats of finishes with fine glass paper or steel wool to remove raised grain in order to provide a smooth finish for the following coats.

PA 08 COLOUR SCHEME

All Interior anad Exterior colours shall be given on the job.

PA 09 STOPPING

a) Timber - stop all nail holes, cracks and putty with linseed oil. Apply putty after application of priming coat of paint.

b) Gibraltar Board - See 'Carpenter' section of this Specification for work to be carried out by separate Contractor. Check surface prior to painting to ensure level 4 finish has been achieved. If there is any concern about the standard of finish such concerns are to be raised with the Main Contractor immediately and no paint applied until any problems are rectified. Application of any paint product constitutes acceptance of the finished surface and any subsequent problems which may arise will then become the responsibility of the Painting Contractor and any making good will be done at his own expense.

PA 10 SYSTEMS

Exterior

(i) Soffits – apply one sealer coat then two coats of acrylic semi-gloss.
(ii) All timber - prime with one coat of general purpose wood primer followed by one undercoat and two coats semi gloss finish enamel.

Interior

(i) Gibraltar Board Walls & Ceilings – apply one coat of sealer and two coats acrylic paint in selected gloss or matt finish.
(ii) Painted Timber - apply one primer/sealer coat followed by two coats of water based semi gloss enamel.

PA 11 CUPBOARDS

Paint the interior of all cupboards and wardrobes in three coat work as for walls and ceilings.

PA 12 MAKE GOOD

Make good all work done under this heading after all other trades. On completion of the job, remove all tins and rubbish, clean down all work, clean all glazing, fittings, etc, leave job free of all paint and stains.

GLAZIER

Refer to Preliminaries section of this Specification which is equally binding on all trades.

GL 01 SCOPE OF WORK

All glazing to metal windows and doors shall be provided and installed as part of the Metal Window Manufacturer's contract.

Glass Cavity Sliders will be green tint frosted toughened glass.

Glass shower panels will be 6mm thick toughened glass.

Glazing to toilet and bathroom shall be selected obscure glass.

Glass pivot hinged doors will be green tint frosted toughened glass.

Glass to Bi-fold doors will be 6mm thick toughened glass.

GL 02 WORKMANSHIP

All work shall be completed in accordance with sound trade practice.

GL 03 CLEANING

Thoroughly clean all glass on both sides and remove any debris as necessary at the completion of the work.

GL 04 GLASS CAVITY SLIDERS

Supply glass cavity sliders and En suite multi sliders including all stainless steel fixings from the DORMA Manet sliding door system accessories, hinges and other fixings necessary to ensure solid and secure installation of all units. Install units into locations as shown on the Floor Plan and the window and door schedule.

All door hardware and fixings must have the approval of the Principal before installation or fixing.

GL 05 GLASS PIVOT HINGED DOORS

Supply glass pivot hinged doors between the Lounge and Family rooms including all DORMA Manet Pivoting Door system accessories, hinges and other fixings necessary to ensure solid and secure installation of all units.

All door hardware and fixings must have the approval of the Principal before installation or fixing.

SPECIALIST FINISHER

Refer to Preliminaries section of this Specification which is equally binding on all trades.

SF 01 SCOPE

This section comprises the supply, fixing and finishing of **ROCKCOTE EPS 40 Plus System** manufactured and supplied by Rockcote Architectural Coatings NZ Ltd. Refer to the details at the rear of the specification for installation.

Consult and cooperate with the Main Contractor and Metal Window Sub-contractor to establish suitable details at junctions between Rockcote and joinery, and sequence of installation. Cooperate with Carpenter in the location and fixing of timber blocking as required for fixing downpipe brackets, taps, etc.

SF 02 PROTECTION

Protect other surfaces. On completion of the work, made good any damage or marring caused by operations of this trade, at no extra cost and to the Architect's satisfaction.

SF 03 WORKMANSHIP

The supply, fixing and finishing of this system is a specialised application and shall be carried out only by an experienced **Rockcote Licensed Contractor** who will ensure that the system provides a durable coating of uniform thickness and texture, completely adhering to the substrate.

SF 04 ACCEPTANCE OF SURFACES

The Sub-contractor shall inspect the wall framing and satisfy himself that it is in a satisfactory condition for the application of the system.

SF 05 SUBSTRATE

Supply and fix Rockcote ***Airflo Battens*** to the building wrap with either nails or glue. 40mm FR, H Grade Polystyrene sheeting is mechanically fixed over the battens creating a vented, drained cavity behind the plaster cladding.

SF 06 PREPARATION

Rockcote ***Airflo*** flashings, window jamb and sill flashings to be mechanically fixed in place prior to installation of ***Airflo*** Battens and Polystyrene sheeting. Polystyrene sheet surface must be free of contaminants which could effect the adhesion of the acrylic Rockcote coatings, ie dust, oils, enamel paint etc.

All uPVC Rockote flashings to be installed as per Rockcote Technical manual by Licensed Rockote Contractors. Control joints must be identified on plans. Aluminium joinery must be clear of the timber framing by 5mm minimum, this is to allow for flashing flange to return under the joinery.

SF 07 BASE RENDER APPLICATION

Rockcote 'Q' Render hand or pump applied to a thickness of 4mm average, walls are to be screeded flat and level, Rockcote fibreglass reinforcing is to be embedded into the wet surface, a light skim to fully bed the reinforcing in place can be applied.

SF 08 ROCKCOTE LEVELLING RENDER APPLICATION

To be applied once the base Render has cured. A 1-2mm skimcote of Rockcote 'Q' Render is applied and floated to a level finish ready for sealing.

SF 09 SEALER APPLICATION

Usin a medium nap lambs wool or similar roller, apply a uniform thickness of pre coloured Rockcote HB Sealer not less than 3.5m2 per litre.

SF 10 ROCKCOTE INTERGRATED COLOUR PLASTER APPLICATION

Provide samples of texture finish to Employer for confirmation before work commences. Selected Rockcote 100% acrylic pre coloured plaster finish to be applied by Licensed Rockote Contractor in such a manner to achieve the desired texture effect, ie Trowel, Sponge, Float, Brush or Roller.

SF 11 ROCKCOTE ARMOUR APPLICATION

Apply one (1) coat of Rockcote 100% acrylic Siliconised Armour in selected colour using a medium nap lambs wool roller or similar, ensuring a wet edge is maintained at all times to avoid layering of the paint.

SF 12 CLEAN UP

All Rockcote products are water soluble. Please check with the local council regarding plaster paint/paint waste to ensure no contamination of waterways occurs.

SF 08 GUARANTEE

Provide a written 15 year Company Product Warranty and 10 year Workmanship Warranty covering the integrity of the cladding plus workmanship.

SOLID PLASTERER

Refer to Preliminaries section of this Specification which is equally binding on all trades.

SP 01 EXTENT OF WORK

The work consists of plastering the Hardiflex substrate on the inside walls of the Balcony shown drawn and both sides of the new concrete block site walls.

SP 02 PROTECTION

Care shall be taken to cover up and protect all other work throughout areas to be plastered during the progress of this work. The Contractor shall be held responsible for any damage which may occur from this clause.

SP 03 GENERAL

This work shall be carried out in accordance with best trade practice by competent craftsmen with equipment, materials and processes that are adequate for the purpose. Proportions of materials shall not be taken as arbitrary and the Architect reserves the right to vary the proportions to suit the characteristics of the available materials if tests disclose such variation to be necessary to produce the best results.

The source of the supply of the materials for plastering shall not be changed during the course of the contract without the Architect's approval.

SP 04 WATER

Water shall be drawn from approved supply.

SP 05 SAND

Where not otherwise specified, sand shall conform to NZS 2199, Sands for Mortars and Plasters. Sands shall be completely free of salt or other deleterious matter, obtained from one source and shall be of average colour obtainable in the vicinity of the Contract site.

SP 06 CEMENT

Where not otherwise specified, all cement shall be Portland Cement of New Zealand manufacture and shall conform to NZSS 1844.

SP 07 PLASTICISING AGENT

Plasticising agent shall be Febmix or equal approved mortar plasticiser and shall be used in accordance with Manufacturer's instructions.

SP 08 MIXING

All plaster shall be properly mixed in an approved mechanical mixer and shall be used at once, and no more than can be used before initial set shall be mixed at any time. Re-tempering or re-mixing after plaster has set or gone off will not be permitted.

SP 09 WORKMANSHIP

All work to be in accordance with 4251 "Code of Practice for Solid Plastering ".

All plastered surfaces shall be made perfectly level and plumb, well straightened to grounds, floated, trowelled and finished to a fine face free from cracks, blisters, water marks or other imperfections. Make good any damage caused by other trades. All work shall be in the finishes and profiles as shown on the drawings and specified below.

SP 10 SURFACE PREPARATION

All surfaces to be plastered shall be properly prepared.

SP 11 CONTROL JOINTS

Provide horizontal and vertical control joints at 4m centres in each direction as detailed below.

SP 12 PLASTERING WORK

All surfaces are to be given a slurry of four parts sand to one part of cement thrown on to give a good key to subsequent coats. A second coat of one part cement, four parts sand and Febmix to Manufacturer's specification straightened and well combed for key. First and second coats shall average 12mm thickness.

Finishing coat shall be five parts of fine grey sand, one part cement and Febmix to Manufacturer's specification. This coat shall be approximately 4mm thick and be brought to a true and even surface with a wood float giving an approved finish free from blemishes, and of a consistent texture to take paint finish by others.

SP 13 COMPLETION

At completion leave all surfaces in first class condition for painting.

TILER

Refer to Preliminaries section of this Specification, which is equally binding on all trades.

TL 01 SCOPE OF WORK

Refer to the flooring finishes plan at the rear of the specification. The Tiler shall install all wall and floor tiles selected by the Employer to areas as shown drawn on the floor finishes plan at the rear of the specification and the Floor Plan Sheet 4 and as further specified and supply and install mesh under tile heating.

TL 02 STANDARDS

All work in this section to be undertaken by competent and experienced Tilers using the materials and the techniques recommended by the Tile Manufacturer. All surface preparations and tiling work to be in accordance with AS 3958 part 1 as modified by BRANZ "Good Tiling Practice".

Documents and standards to be observed in this section are:

AS 3958:	Ceramic Tiles Part 1; Guide to installation of ceramic tiles
BS 5385:	Wall & Floor Tiling
BS 5385.4:	Tiling in specific conditions
BS 5980:	Adhesives for use with ceramic tiles
BS 5980:	Ceramic Floor & Wall tiles
BRANZ Publication:	Good Tiling Practice

TL 03 GUARANTEES

Provide the Employer with a written two year guarantee for work under normal environmental and use conditions against failure of materials and execution at completion of the contract.

TL 04 UNDER TILE HEATING

Allow to supply and install a Hot Wire mesh under tile heating system in the Family, Dining, Kitchen, Bathroom and En suite including individual switches and thermostats.

Liaise with the Electrician to wire in all necessary switches and thermostats.

TL 05 WALL TILES

Allow to fit all wall tiles in Bathroom and En suite to a height of 2.0m in the shower and 1200mm around walls.

Refer to **PR 13 Monetary Allowances** for the provisional sums for supply only of all floor tiles as selected by the Principal.

TL 06 FLOOR TILES

Refer to **PR 13 Monetary Allowances** for the provisional sums for supply only of all floor tiles as selected by the Principal.

TL 07 ADHESIVES

All tiles in wet areas to be laid using Mapei ULTRAMASTIC premixed, flexible, waterproof ceramic tile adhesive to BS 5980.

All remaining tiles to be laid using Mapei cement based ceramic tile adhesive to AS 2358 and BS 5385, part 4.

TL 08 GROUTING

Use Mapei Ultracolour grout for tiles. Confirm grout colour with Employer prior to ordering and installing tiles. Remove tile 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 all 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 cloth and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

TL 09 SURFACE PREPARATION

Completely remove from the surface all contaminates such as paints, oils, release and curing compounds. Remove all projections, unevenness and loose material to leave a clean, dust and dirt free surface.

TL 10 LAYING TECHNIQUE

Before commencing work obtain approval from the Principal for the proposed layout of tiles, expansion joints and any other visual considerations of the finished work.

Ensure that all services and accessories are in place and located to suit the tile layout with the substrate required for tiling work. Commencement of the work will be construed as meaning the substrate and environment are accepted by the Tiler Layer as satisfactory.

Do not carry out tiling where the ambient temperature is below 5 degrees C or onto a substrate with a temperature higher than 40 degrees C.

TL 11 TILE FIXING

Apply adhesive, prepare and fix tiles by the method recommended by the adhesive manufacturer and tap them firmly into place.

TL 12 PROTECTION

Protect tiles from damage. Liaise with the Main Contractor to ensure no tiles are disturbed by foot traffic for at least 24 hours after laying and after grouting. Provide protection to tiles by laying sheet material such as insulating board for the period between completion of laying and completion of the remainder of the contract works. All tiles damaged during the currency of the contract are to be replaced at the Contractor's own expense.

TL 13 COMPLETION

Upon completion of settling and grouting, thoroughly sponge and was the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

Remove all debris and unused materials and elements from the site.

FLOOR LAYER

Refer to Preliminaries section of this Specification which is equally binding on all trades.

FL 01 SCOPE

The scope of this Sub-trade comprises the supply, laying and fixing of new carpet and underlay as further specified and shown on the Floor Plan Sheet 4 and floor finishes plan at the rear of the specification.

FL 02 WORKMANSHIP

All work shall be carried out in strict accordance with the best trade practice by competent craftsmen, using equipment, materials and processes that are recognised and adequate for the purpose.

FL 03 MATERIALS

Refer to **PR 13 Monetary Allowances** for the provisional sum for supply only of all carpet as selected by the Principal.

Supply and install Dunlop Ultralay Two Ultrafresh treated double bond Commercial underlay fixed by the double stick method.

FL 04 INSPECTION

The Floor Layer shall inspect all surfaces to ensure they are in a suitable condition to receive the floor covering specified.

Should the Floor Layer consider that the surface is in an unacceptable condition to enable him to carry out the work specified, such inadequacies shall be referred to the Main Contractor who shall be responsible for making good.

FL 05 PREPARATION

Thoroughly remove all dust from floors to received new coverings and vacuum clean surfaces prior to commencement of flooring.

FL 06 LAYING

Where shown on the drawings, lay specified underlay under carpet at right angles to the carpet with tight butt joints and paper surface to the floor.

Fix using pressure sensitive adhesive.

Cut carpet with 4 - 6mm fullness to place all seams in compression. Tightly butt seams together and finish with hot melt tape. Evenly stretch carpet and fix to underlay or directly to flooring with latex contact adhesive. Extend carpet up stair risers.

Fit Naplock pinless trims and binder bars at all junctions with other flooring.

Finish junctions of carpet and tiles with smoothedge.

FL 07 MAINTENANCE INSTRUCTION

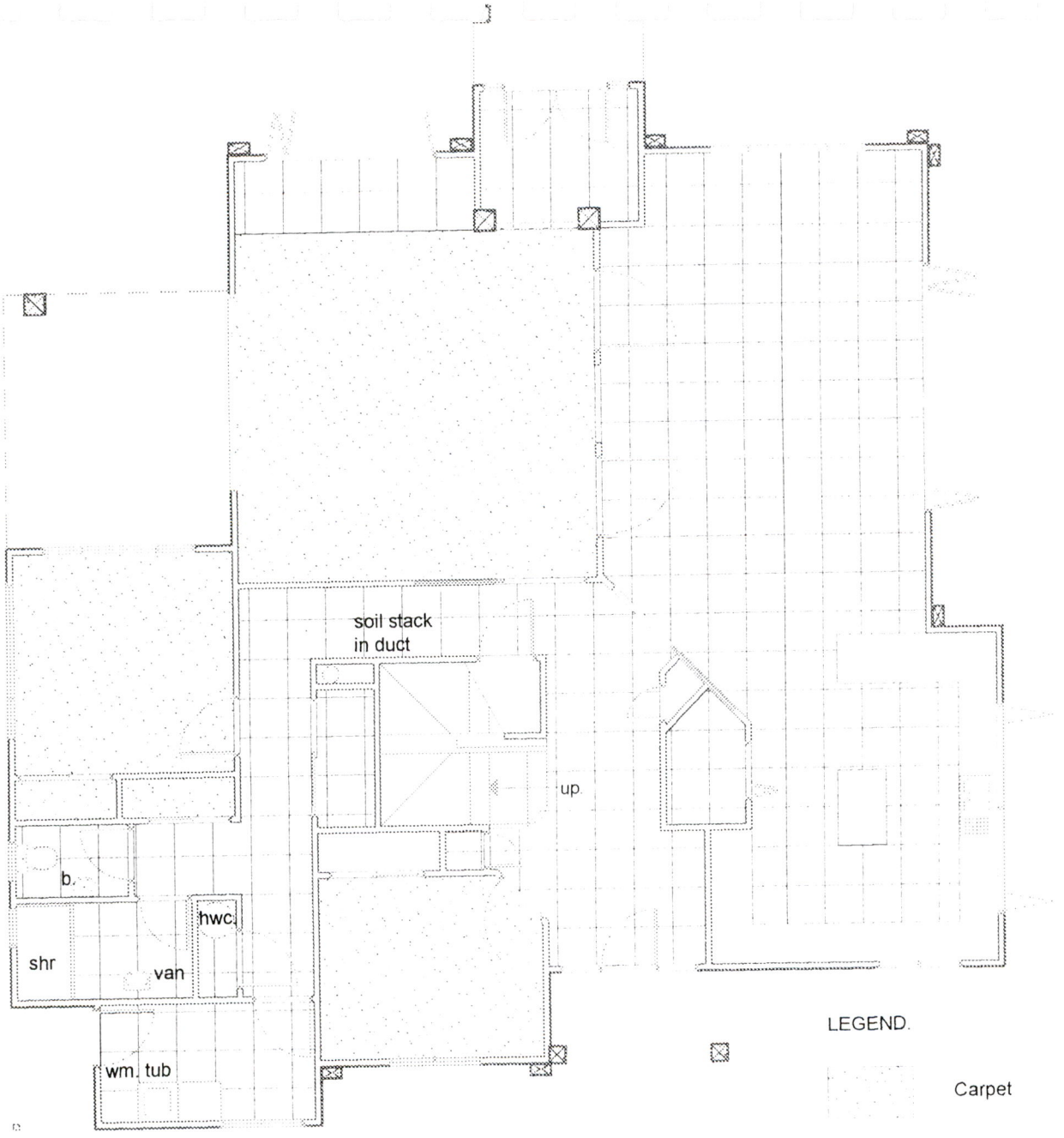
Provide cleaning and maintenance instructions from the various flooring Manufacturers for their products. Laminate instructions in clear plastic and bind into a folder for the Employer.

FL 08 GUARANTEES

Provide written guarantees in the name of the Employer stating that all floor coverings will remain free of defects for a period of two years from the date of Practical Completion.

FL 09 CLEANING

Thoroughly vacuum all surfaces after laying flooring.

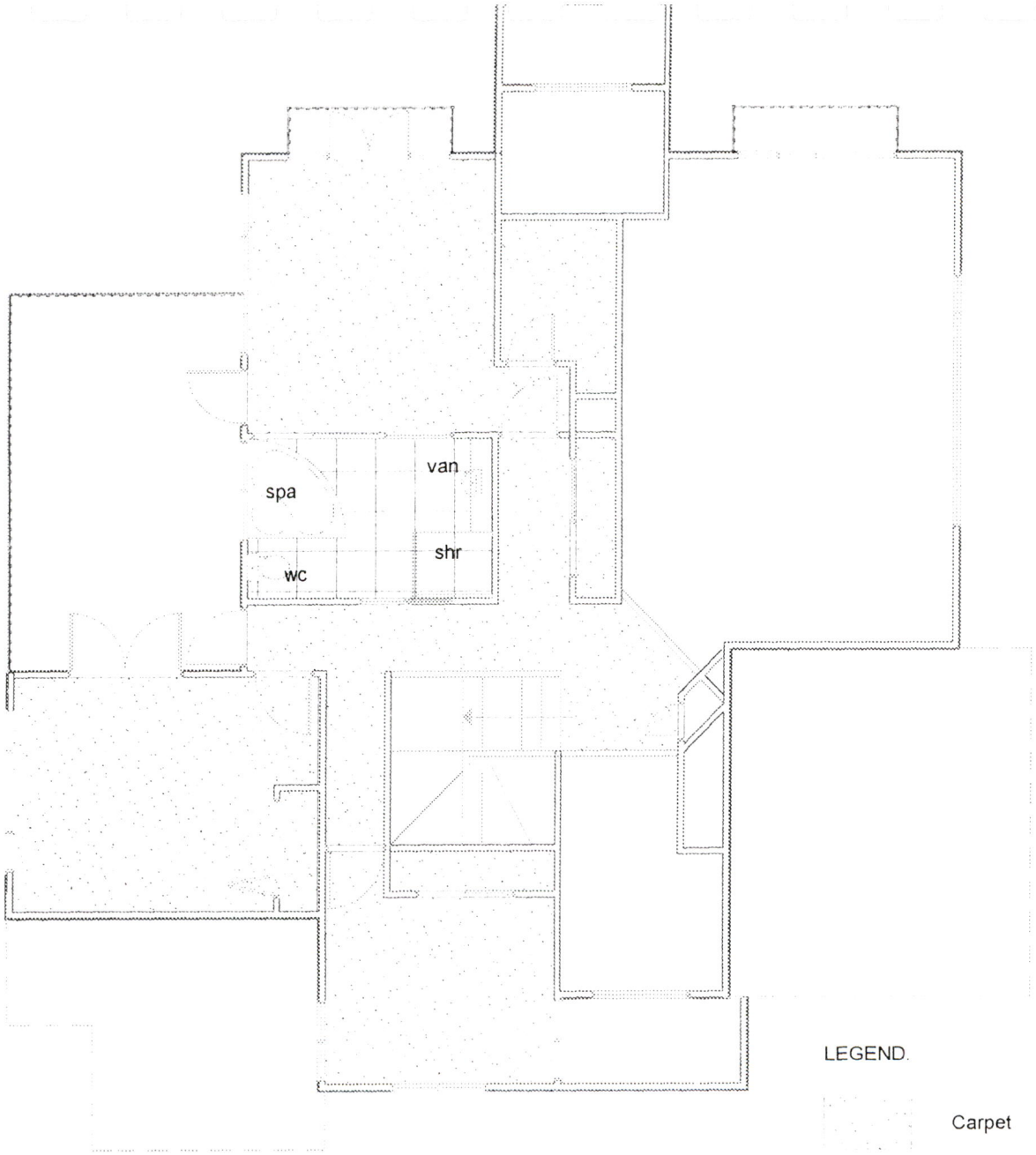


ground floor flooring plan.

SCALE 1:100.

NOTE:
Stair treads ex 50 varnished timber

Image quality due to condition of original



LEGEND.

Carpet

Tiles

first floor flooring plan.

SCALE 1:100.

NOTE:
Stair treads ex 50 varnished timber

Image quality due to condition of original