Graham N. RUNDLE BE M.IPENZ
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38 Woods Ave TAURANGA

21 April 1997

PRODUCER STATEMENT - DESIGN No. 2937

Issued by: **Graham N. RUNDLE**

to: **GARRY RANKIN**

To be supplied to: **TAURANGA DISTRICT COUNCIL**

in respect of: **ALTERATIONS TO GARAGE**
at: **10 ANCHORAGE GROVE, TAURANGA**

Graham N. RUNDLE Professional Engineer Ltd has been engaged by TREVOR JONES DESIGN LTD
to provide engineering design services in respect of the requirements of Clause B1
of the Building Regulations 1992 for those parts of the building work specified in the accompanying calculations. The design has been prepared in accordance with B1/VM1 & AS1
of the approved documents issued by the Building Industry Authority and the work is described on TREVOR JONES DESIGN LTD
drawings titled ALTERATIONS TO GARAGE
and the specification and other documents according to which the building is proposed to be constructed.

As an independent design professional covered by current policy of Professional Indemnity Insurance to a minimum value of $200,000, I believe on reasonable grounds that subject to the safe ground bearing pressure being no less than 70 kPa and all proprietary products meeting the performance requirements, the drawings, specifications and other documents to which the building is proposed to be constructed comply with the relevant provisions of the building code.

Graham N. RUNDLE BE M.IPENZ ERB Registration No.7733

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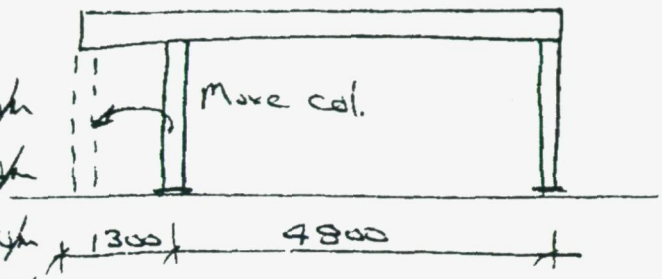
Client: **TREVOR JONES DESIGN LTD**	**20 Apr '97**
Project: **ALTERATIONS TO GARAGE** Project No.	**2937**

At existing frame at spiral staircase



Loading

Dead. Roof $0.25 \times 3.05 = 0.76$ KN/m
Walls ~~0.25×2.4~~ $0.18 \times 3.05 = 0.55$ KN/m
Floor $0.40 \times 3.05 = 1.22$ KN/m
2.53 KN/m

Live Roof $0.25 \times 3.05 = 0.76$ KN/m
Floor $1.5 \times 3.05 = 4.58$ KN/m
5.34 KN/m

1.2G+1.6Q $M^* = (1.2 \times 2.53 + 1.6 \times 5.34) \times 6.1^2/8 = 11.6$ KN-m

12"×4"×16# RSJ $\delta_{G+\psi_s Q} = \frac{5}{384} \times \frac{(2.53 + 0.7 \times 5.34) \times 6100^4}{200 \times 10^3 \times 4290 \times 10^4} = 13.2$ mm $\frac{6m}{453}$

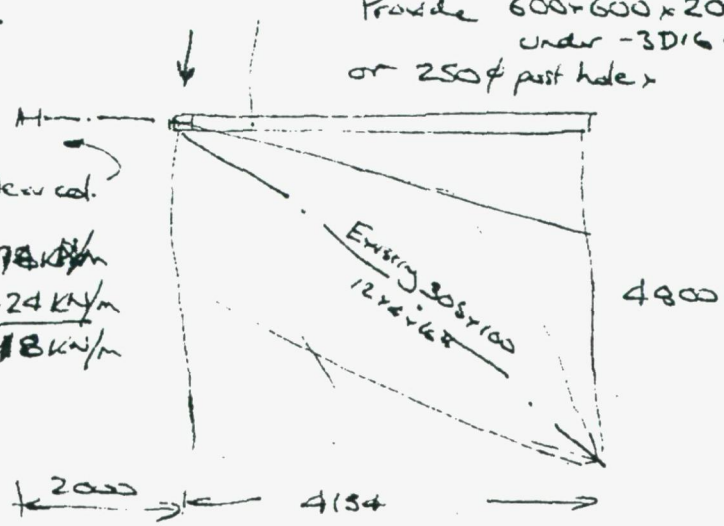
$f_s = \frac{11.6 \times 10^6}{0.9 \times 280 \times 10^3} = 46$ MPa. ∴ Quite OK.

Reaction at new post $= (2.53 + 5.34) \times 6.1/2 = 24$ KN

Required bearing area for 70KPa $= \frac{24}{70} = 0.34 m^2$ 600×600

∴ Move existing column over to end of beam. Fully weld into position

At existing corner of garage



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Floor from angled beam under deck

Dead Decking 0.40 KPa $\times 4.7/2 = 0.94$ KN/m
Sk. 0.24 KN/m
1.18 KN/m

Live $2.0 \times 4.7/2 = 4.7$ KN/m.

1.2G+1.6Q $P^* = (1.2 \times 1.18 + 1.6 \times 4.7) \times 6.3/2$
$= 28.45$ KN.

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w^* Dead $(0.25 + 0.19 + 0.40) \times 4.5/2 = 1.86$ kN/m

Slab $= 0.24$

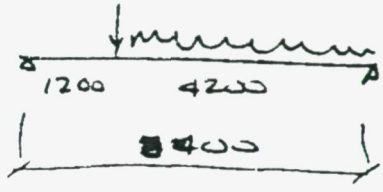
2.10 kN/m

Live $(0.25 + 1.5) \times 4.5/2 = 3.93$ kN/m.

$1.2G + 1.6Q$ $\quad w^* = 1.2 \times 2.10 + 1.6 \times 3.93 = 8.81$ kN/m

$R_A^* = 28.15 \times \frac{4.2}{5.4} + 8.93 \times \frac{4.2 \times 2.1}{5.4}$

$= 36.32$ kN. $\quad R_B = 24.3$ kN.



Max BM @ 2.13 from A.

$M^* = 36.32 \times 2.13 - 28.15 \times 0.93 - 8.93 \times 0.93^2/2$

$= 47.87$ kN-m.

Deflection $\delta_{G+\psi_s Q} \approx \frac{5}{384} \times \frac{(2.11 + 0.7 \times 3.94) \times 5400^4}{200 \times 10^3 \times 42.9 \times 10^6} + \frac{(1.19 + 0.7 \times 4.7) \times \frac{63}{2}}{3 \times 200 \times 10^3 \times 42.9 \times 10^6 \times 1200^2 \times 4200^2}$

$= 6.28 + 2.57 = 8.9$ — $\frac{S_r}{G_0}$ ∴ OK. $= 540$

Support on 250ϕ post hole piles.

Capacity of 250ϕ pile $= \pi \times 0.25^2/4 \times 1.5 \times 70 + \pi \times 0.25 \times 8.33 \times h.$

$= 6.54 + 5.15h$ ∴ NG.

For 400ϕ $\quad Q_u = 13.2 + 10.5h.$ ∴ Use 400ϕ × 1.200 deep post hole under each new post.

∴ Extend frame by welding on extra length of 12" × 4" × 16# RSJ & relocating post – extend if necessary.

Found on 400ϕ × 1.200 deep post hole pile.

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CALCULATIONS

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Project: **ALTERATIONS TO GARAGE** Project No. **2937**

Rafters: **12' X 4" X 16# RSJ** Grade: 250

Bending:

	ϕM_{sx} =	63.00 kN-M	
	ϕM_{sy} =	5.20 kN-M	
Load Case: 1.2G & 1.6Q	M_x^* =	47.87 kN-M	
	M_y^* =	0 kN-M	
For L_x = 2.100	k_t = 1.0		
	k_l = 1.0		
	k_r = 1.0		
L_{ex} = 2.100		α_s = 0.571	
		For α_m = 1.35	
	ϕM_b =	48.59 kN-M	**OK**

Section Properties:

d =	305 mm
b_f =	102 mm
t_f =	6.73 mm
t_w =	5.59 mm
d_1 =	3 mm
A_g =	3039 mm^2
I_x =	42.9 x $10^6 mm^4$
Z_x =	280 x $10^3 mm^3$
S_x =	280 x $10^3 mm^3$
r_x =	119 mm
I_y =	1.17 x $10^6 mm^4$
Z_y =	23.1 x $10^3 mm^3$
S_y =	23.1 x $10^3 mm^3$
r_y =	19.6 mm
J =	38.6 x $10^3 mm^4$
I_w =	10.4 x $10^9 mm^6$
f_{fy} =	250 MPa
k_f =	1
Compact:	N
Z_{ex} =	280 x $10^3 mm^3$
Z_{ey} =	23.1 x $10^3 mm^3$