

IMPORTANT NOTES:

DESIGN ASSUMPTIONS:

THE SPECIMEN BUILDING ALLOWS FOR THE FOLLOWING:

- HIGH WIND ZONE

- SEISMIC ZONE "A"
- 0.5 kPa SNOW LOADING

- 3 kPa FLOOR LOADING

AS DEFINED IN NZS 3604:1999

THE SPECIMEN DESIGN ALLOWS FOR THE FOLLOWING EQUIPMENT:

- Kayo PRIMUS 1058 TM/5 DENTAL

- PLANMECA INTRA X-RAY MACHINE.

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REV A: 16 April 2010
ISSUED FOR CONSENT

BOARD OF VOLUNTARY

MITCHELL V.

CONSULTING ENGINEERS

Question : Ground Floor, 2 Korl Street, 1

Telephone: 09 - 307 2141 Facsimile:

■ **Papadouras** : 2nd Floor, 37 Elliott Street, Papadouras, Telephone: 09 - 298 8600 Facsimile:

Job Title: **HEAD/DEPT. INTERN**

HENDERSON INIERN
70 LINCOLN BO

HENDERSON, AUCI

MAITEMATA DISTR

Sheet Title:

PROPOSED DENTAL

SUB-FLOOR PLAN/

Scale: 1:50 (A1)

Job No: 10-

Date: APRIL 2010

Design:	1VA07060
Dwg. No:	

Drawn by: S. V. N. C. 1000

M. IERUA	
Statue:	

PRELIMINARY

[illegible]

Design Information.

All generally used loadings are given below, refer to calculations for any specific cases.

No geotechnical assessment has been carried out on this site to support the assumed soil properties used in these calculations.

Liability will not be accepted should soils properties differ from those used in design.

Ref.

10/59

Sh No.

Sig.

[Signature]

Date.

19/4/10

Job Name.

Henderson
Intermediate

Soil Data.

<input type="checkbox"/>	$q_{working} = CN_c / F = 50^*6/3$	100	kPa
<input type="checkbox"/>	$q_{ultimate} = \phi CN_c = 0.5^*50^*6$	150	kPa
<input type="checkbox"/>	Shaft Adhesion (NZBC)	25	kPa

Refer Geotech Report by
Coffee dated 17/8/09

Dead Loads

Roofing.

<input type="checkbox"/>	Concrete Tile	0.9	kPa
<input type="checkbox"/>	Light Roof	0.4	kPa
<input type="checkbox"/>	Factory Roof with Purlins	0.14	kPa

N/A

Walls

<input type="checkbox"/>	Timber Walls	0.4	kPa
<input type="checkbox"/>	Timber & Brick Walls	2.3	kPa
<input type="checkbox"/>	200 Series Block Walls (Solid Filled)	4.4	kPa

N/A

Floors

<input checked="" type="checkbox"/>	Timber Floors	0.4	kPa
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Enter Ramps $Q = 4.0 \text{ kPa}$

Live Loads

<input type="checkbox"/>	Roofs	0.3	kPa
<input type="checkbox"/>	Residential Floors	1.5	kPa
<input type="checkbox"/>	Residential Decks	2.0	kPa

Seismic Loading.

$$C(T_1) = (C(T_1)S_p)/k_u$$

	ULS	SLS
<input type="checkbox"/> Int. Soils / Auck / Braced Frame $\mu=3$	0.09	0.04
<input type="checkbox"/> Int. Soils / Auck / Rnf. Msry $\mu=1.25$	0.23	0.04

Seismic zone A } as per
NZS 3104
High Wind zone

Wind Loading

$$q(z) = 0.6(V_R M_d (M_{z, cat} M_s M_t))^2$$

	ULS	SLS	
<input type="checkbox"/> Terrain #2 / Auck / <5m	1.00	0.7	kPa
<input type="checkbox"/> Terrain #3 / Auck / <5m	0.80	0.6	kPa

Design Standards

<input checked="" type="checkbox"/>	NZS1170 : 2002	LOADINGS
<input type="checkbox"/>	NZS3101 : 2006	CONCRETE
<input type="checkbox"/>	NZS3404 : 1997	STEEL
<input type="checkbox"/>	NZS3603 : 1993	TIMBER
<input checked="" type="checkbox"/>	NZS4230 : 2004	MASONRY

NZS3604:1999

Units Weights

Water	10	kN/m ³
Clay Unsaturated	18	kN/m ³
Clay Saturated	21	kN/m ³
Steel	78	kN/m ³
Concrete	24	kN/m ³
Timber	6	kN/m ³
Aluminium	27	kN/m ³
Glass	30	kN/m ³

MITCHELL VRANJES
CONSULTING ENGINEERS LTD

- Ground Floor 2 Kari Street Grafton Auckland
Box 65248 Mairangi Bay Ph.307-2141 Fax.307-2143
- First Floor 37 Elliott Street Papakura Auckland
Box 72799 Papakura Ph.298-8800 Fax.298-9920

Kevin M. Vranjes
Kevin R. Mitchell
Nick C. Covich
Naresh M. Panchia
Phil Huse-White

- Director
- Director
- Associate
- Associate
- Associate

B.E. (Hons), NZ.C.E., M.I.P.E.N.Z., CP Eng.
B.E. (Hons), NZ.C.E., M.I.P.E.N.Z., CP Eng.
B.E. (Hons), NZ.C.E., M.I.P.E.N.Z., CP Eng.
M.E. M.I.P.E.N.Z. CP Eng
N.Z.C.E. (Civil), R.E.A.

Job Name: Henderson Intermediate

To whom it may concern,

ORAL HEALTH FIXED FACILITIES

The standard design is for high wind zone, snow load and seismic zone A.

The structural loadings for this site are within the standard design parameters for all gravity, seismic and wind loads.



J. Vaotogo

■ GRAFTON:

Ground Floor, 2 Kari Street, Grafton, Auckland 1010.
Ph: 09-307 2141 Fax: 09-307 2143 email: grafton@mvengineers.com

■ PAPAURA:

2nd Floor, 37 Elliott Street, PO Box 72-799, Papakura, Auckland 2244.
Ph: 09-298 8800 Fax: 09-298 9920 email: papakura@mvengineers.com

Designed to NZ1170/3603/3403

- Calculations are based on **5WL⁴/384EI** deflection formula.
- Type allows for Timber (T), Glulam (GL) or Steel (S).
- **k_{factor}** allows for duration of loading in **TIMBER** members.
- Steel strengths based on **f_y = 300 Mpa E=200 Gpa**
- Timber strengths based on **f_b = 14.0 Mpa / f_s = 3.8 Mpa E=6.7MPa**
- Glulam timber strength based on **f_b = 18.0 Mpa / f_s = 3.8 Mpa E=8MPa**
- Ultimate conditions are checked for **(1.2G + 1.5Q)* / (1.35G)***
- Serviceability conditions are checked with appropriate creep factors.
- Nominal Beam Strength doesnot include K reduction factors
- Assumptions include: **k₄,k₅,k₈ = 1.0**

Pg	0.2	(kN)	Dead point load onto support
Pq	1.6	(kN)	Live point load onto support

Max Span Trans. Vibration

U.D.L. ImPLY Supported Beam Design.

Designed to NZ1170/3603/3403

Notes:

- Calculations are based on $5WL^4/384EI$ deflection formula.
- Type allows for Timber (T), Glulam (GL) or Steel (S).
- k_{factor} allows for duration of loading in TIMBER members.
- Steel strengths based on $f_y = 300 \text{ Mpa}$ $E=200 \text{ Gpa}$
- Timber strengths based on $f_b = 14.0 \text{ Mpa}$ / $f_s = 3.8 \text{ Mpa}$ $E=6.7 \text{ MPa}$
- Glulam timber strength based on $f_b = 18.0 \text{ Mpa}$ / $f_s = 3.8 \text{ Mpa}$ $E=8 \text{ MPa}$
- Ultimate conditions are checked for $(1.2G + 1.5Q)^* / (1.35G)^*$
- Serviceability conditions are checked with appropriate creep factors.
- Nominal Beam Strength doesnot include K reduction factors
- Assumptions include: $k_4, k_5, k_8 = 1.0$

INPUT LOADINGS

Loading	Trib	G Kpa	Q Kpa	w_g (kN/m)	w_q (kN/m)
Wall					
Floor	2.10	0.40	4.00	0.8	8.4
Roof					
Other					
				0.8	8.4

Beam Name: Bearer

INPUT

SPAN 1.400 (m)
 w_g 0.84 (kN/m)
 w_q 8.40 (kN/m)
 Beam 200 x 75
 Material t
 k_{factor} 0.8

w^* 13.608

Beam Material (S,T,GL)

"Duration of Load Factor NZS 3603:1993 Table 2.4"

OUTPUT

M^* 3.33 (kNm) Design Bending Moment
 ΦM_n 3.6 (kNm) *O.K for Flexural Strength*
 V^* 9.5 (kN) Design Shear Force
 ΦV_n 25.8 (kN) *O.K for Shear Strength*
 Δg 0.2 (mm) Dead Load deflection
 Δq 1.7 (mm) Live Load Deflection
 Δst 1.3 (mm) " $G+\psi_s Q$ Short term load factors NZS 4203:1992 Table 2.4.1 & k_2
 Duartion Load Factor NZS 3603:1993 Table 2.5 for Timber "
 $\Delta / \text{span}_{st}$ 1116 *O.K*
 Δlt 1.7 (mm) " $k_2(G+\psi_{lt}Q)$ Long term load factors NZS 4203:1992 Table 2.4.1 & k_2
 Duartion Load Factor NZS 3603:1993 Table 2.5 for Timber "
 $\Delta / \text{span}_{lt}$ 841 *O.K*
 $\Delta lt(\text{roof})$ 0.3 (mm) Longterm Deflection for Roof Only
 $\Delta / \text{span}(\text{roof})$ 4207 *O.K for Deflection for roof*
 1kN / 1mm 2.44 (m) *OK for Transient Vibration* Max Span Trans. Vibration
 P_g 0.6 (kN) Dead point load onto support
 P_q 5.9 (kN) Live point load onto support

specific check Henderson High T.

BROMS METHOD FOR SHORT PILES

INPUT

Ultimate load	$H_u = 8$	kN
Eccentricity	$e = 1.2$	m
Pile Diameter	$d = 0.4$	m
Undrained Cohesion	$C_u = 100$	kPa

OUTPUT

Effective eccentricity	$(e+1.5d)$	$e' = 1.8$	m
Factored Cohesion	(ϕC_u)	$\phi C_u = 50$	kPa
Beta	$(H_u/9C_u d)$	$\beta = 0.04444$	
Effective length		$L' = 0.61$	m
		$L'+1.5d$	1.21 m
Ult. Pile moment	$(H_u * (e+ \beta/2))$	$M^* = 14.6$	kNm

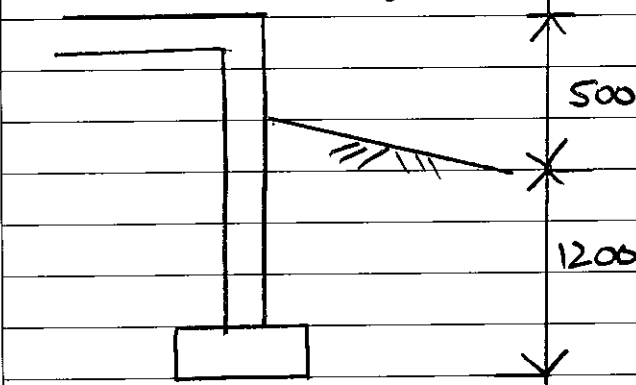
check 225mm ϕ steel

$\phi 145 = 16.36$ mm OK.

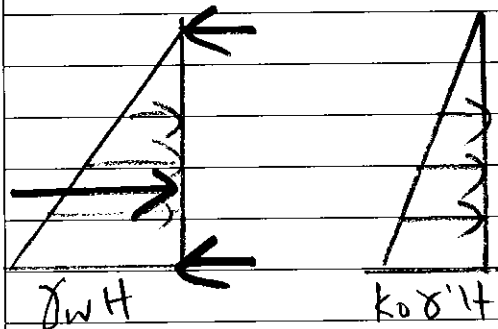
Use 225mm ϕ steel
to min 3.0m deep

Check Retaining - Henderson Int.

No Novacoil drainage behind wall, design for water pressure



- Propped at top by slab
 - Footing to be min 1200
 below FGL as per Geotek.



$$\gamma' = 18 - 10 = 8 \text{ kN/m}^3$$

$$H = 1.7 \text{ m}$$

$$k_0 = 1 - \sin 30^\circ = 0.5$$

$$P_w = \frac{1}{2} \times 10 \times 1.7^2 = 14.5 \text{ kN}$$

$$P_a = \frac{1}{2} \times 0.5 \times 8 \times 1.7^2 = 6 \text{ kN}$$

$$P^* = 1.5 (14.5 + 6) = 31 \text{ kN}$$

For propped top & bottom

$$M_k = 31 \times 0.128 \times 1.7 = 6.7 \text{ kNm}$$

For 200 series D12 @ 400 c/c 60 cur

$$\phi M_{res} = 6.5 \text{ with } 5\% \text{ ok}$$

Check shear $V^* = \frac{2}{3} \times 31 \text{ kN} = 21 \text{ kN}$

For 1m = 0.24 mPa

$$V_u = 0.75 \times 1.0 \times (0.19 - 0.6) \times 0.24 \times 10^3 = 23.4 \text{ kN}$$

> 21 kN ... OK

note have some passive resistance
 from fill in front of Feb ... OK

Henderson Intermediate

Extra over schedule for subfloor

Item	Description	Unit	Qty	Rate	Amount
1.0	Ordinary piles (125x125 x 1.3m Deep)	each	117		
2.0	Anchor piles	each	nil		
3.0	Braced piles (225 SED x 2.5m Deep)	each	20		
4.0	400 x 200 RC foundation	m	13		
5.0	200 series reinforced masonry wall	sm	13		
6.0	Hardfill backfill (solid measure)	cm	11		
7.0	100mm RC slab with DPC, sand blinding	sm	11		
8.0	All hardware as per NZS3604	LS	1		
9.0	Suction pit	LS	1		
10.0	400 x 400 verandah post foundations	each	3		

Total (excl. GST)