

## PRODUCER STATEMENT – PS1 – DESIGN

(Guidance on use of Producer Statements (formerly page 2) is available at [www.engineeringnz.org](http://www.engineeringnz.org))

**ISSUED BY:** Design Station Limited  
(Design Firm)

**TO:** KiwiSpan South Taranaki  
(Owner/Developer)

**TO BE SUPPLIED TO:** South Taranaki District Council  
(Building Consent Authority)

**IN RESPECT OF:** KiwiSpan Shed (DSL Reference: KS19823)  
(Description of Building Work)

**AT:** 27 County Drive  
(Address)

Town/City: Hawera **LOT** 42 **DP** 412125 **SO**  
(Address)

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

Structural design of the steel structure, foundations and floor slab

(Extent of Engagement)

services in respect of the requirements of Clause(s) **B1/VM1 & VM4, B2/AS1** of the Building Code for:

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

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

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment **B1/VM1 & VM4, B2/AS1** or  
(verification method/acceptable solution)

☐ Alternative solution as per the attached schedule.....

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

KiwiSpanNZ Arthur Brown Construction .....and numbered **1,5-9,F1,2,A20,21,41,91,B2,30,C10**  
together with the specification, and other documents set out in the schedule attached to this statement.

**On behalf of the Design Firm**, and subject to:

- (i) Site verification of the following design assumptions **See attached Schedule to PS1**  
(ii) All proprietary products meeting their performance specification requirements;

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

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

I, **Kerry McCollum** ..... am: ☒ CPEng **184622** # ☐ Reg Arch ..... #  
(Name of Design Professional)

I am a member of: ☒ Engineering New Zealand ☐ NZIA and hold the following qualifications: **BE(Hons)**

The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000\*.

The Design Firm is a member of ACENZ: ☐

**SIGNED BY:** **Kerry McCollum** .....(Signature) **Kerry McCollum**  
(Name of Design Professional) Digitally signed by Kerry McCollum  
Date: 2021.09.24 12:50:50 +12'00'

**ON BEHALF OF** Design Station Limited .....Date **23/09/2021**  
(Design Firm)

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

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.  
**THIS FORM AND ITS CONDITIONS ARE COPYRIGHT TO ACENZ, ENGINEERING NEW ZEALAND AND NZIA**





23 September 2021  
JOB NUMBER: KS19823  
JOB NAME: ARTHUR BROWN CONSTRUCTION  
27 COUNTY DRIVE  
HAWERA  
LOT: 42 DP: 412125

### **SCHEDULE to PS1**

1. **Foundation Notes:**

- Foundation ground improvements for Ribraft: RED JACKET, Ref: CAL-4104-01, Date: 25 November 2020.

The following specification is recommended:

- 1. Use 300mm thick hardfill raft.
- 2. Proof roll subgrade before laying AP65. Compacted AP65 Hardfill. Compact in 150mm layers. Top with crusher fines to produce smooth surface for damp proof membrane. Extend hardfill 1000mm beyond building footprint.
- 3. Suitably qualified engineer to inspect cleared subgrade and final compaction.
- Following from recommendations in above Geotech Report the foundations have been designed for an ultimate foundation bearing capacity of 135kPa at subgrade.
- Earthworks and Inspections as per above Document.
- The PS1 does not cover the suitability of the site, stability, sub-soil conditions, or any other Geotechnical information that may affect the foundation design.

2. **Design has been based on the following site specific and/or building specific items:**

- Building Importance Level = "1"
- Design Life for structural elements = 50 years
- Design Wind Speed = 37.3m/s (for design of the Building)(Wind Zone = "High") - in accordance with AS/NZS1170.2:2011
- Earthquake Zone = "1" in accordance with NZS3604:2011
- Corrosion Zone = "C" in accordance with NZS3604:2011

3. **Weathertightness:**

- The PS1 does not cover weathertightness.

4. **Construction Monitoring:**

- All building inspections to be carried out by the Territorial Authority – unless agreed with the owner/developer otherwise.
- Note: Design Station Ltd are not undertaking any construction monitoring – so are unable to provide a PS4 – Construction Review.

### **B2 COMPLIANCE**

Compliance is shown on a material-by-material basis see below for compliance paths.

#### **Structural Steel (B2/AS1 cl 3.6.1)**

Life to first maintenance for Z450 Galvanized coating.

Surface-specific atmospheric corrosivity categories Appendix A. (Table 2 SNZ TS 3404:2018)

Building

External Exposed:C2, Expected Life to first maintenance = 36+ years

External Sheltered:C3, Expected Life to first maintenance = 12-36 years

Internal:C3, Expected Life to first maintenance = 12-36 years





**Concrete (B2/AS1 cl 3.1.1)**

Concrete covers have been selected in accordance with NZS 3101, Part 1, Section 3

**Painting of Steel to Concrete Interfaces for Long-Term Durability**

**Additional Coating for Embedded Column / Concrete Interface (External).**

(Refer to Altex Coatings Limited Specification)

Apply a band of Chem-Bar 3500 at 75um DFT (a good brushed or rolled coat) direct on to the galvanized coating after a degrease and light sand (refer to specification). The band of Chem-Bar 3500 shall extend a minimum of 50mm above and 100mm below the concrete interface for any exposed Embedded Column surface. Seal around the exposed Embedded Column / concrete interface with mastic sealant. Slope Concrete surface away from steelwork, wherever possible.

NOTE: Any damage to the galvanized coating shall be spot primed with Carbozinc 858 prior to coating with Chem-Bar 3500 (refer to specification for surface preparation).

**Additional Coating for Column / Concrete Interface (External).**

(Refer to Altex Coatings Limited Specification)

Apply to the underside and edges of steel plate with Chem-Bar 3500 at 75um DFT (a good brushed or rolled coat) direct on to the galvanized coating after a degrease and light sand (refer to specification). The Chem-Bar 3500 shall extend a minimum of 100mm in from the edges to the top face of the plate. Chamfer and place mastic bead when interface between steel and concrete is clearly visible.

NOTE: Any damage to the galvanized coating shall be spot primed with Carbozinc 858 prior to coating with Chem-Bar 3500 (refer to specification for surface preparation).

**Limitation**

This letter has been prepared solely for the benefit of KiwiSpan Ltd for building consent application. No liability is accepted by Design Station Ltd in respect of its use by any other person. Any other person who relies upon any matter contained in this letter does so entirely at their own risk.

**Kerry McCollum (CPEng)**

**Design Station Ltd**

(Part of the Donovan Group of Companies)



## APPENDIX A - Extracts from SNZ TS 3404:2018

Table 2 – Surface-specific atmospheric corrosivity categories

Macroclimate corrosion category (from AS/NZS 2312.1:2014)	Typically	Location	Characterised by	Surface-specific atmospheric corrosivity				
				External			Internal	
				Exposed	Sheltered	Wet	Dry	Damp
C5-M	Within 200 metres of breaking surf on the west and south coasts of the South Island  Within 100 metres of breaking surf on west and south coasts of the North Island  Within 50 metres of breaking surf on all other coasts  This environment may be extended inland by prevailing winds and local conditions	All coasts	Heavy salt deposits  Almost constant smell of salt sea spray in the air	C5-M				C4
C4	Within 500 metres inland of breaking surf  Within 50 metres of calm salt water such as harbour foreshores  This environment may be extended inland by prevailing winds and local conditions	All coasts	Medium salt deposits  Frequent smell of salt sea spray in the air	C4	C5-M		C1	C3
C3	Within 20 km of breaking surf  Within 5 km of salt water	West and south coasts of South Island  East coast of both islands, west and south coasts of North Island, and all harbours	Minor salt deposits  Occasional smell of salt in the air	C3	C5-M  C4      C5-M			

Table 2 – Surface-specific atmospheric corrosivity categories (continued)

Macroclimate corrosion category (from AS/NZS 2312.1:2014)	Typically	Location	Characterised by	Surface-specific atmospheric corrosivity				
				External			Internal	
				Exposed	Sheltered	Wet	Dry	Damp
	More than 20 km to 50 km from salt water	West and south coasts of South Island		C2	C3	C4		
C2	More than 5 km to 50 km from salt water	East coast of both islands, west and south coasts of North Island, and all harbours	No marine influence	C2	C3	C4		C3
C2	Inland, more than 50 km from salt water	North and South Islands		C2		C3	C1	
See note 3	Close to geothermal source < 500 metres	Geothermal zone	Constant smell of hydrogen sulphide	See note 3				C4
-	Beyond 500 metres to geothermal source		Mild geothermal influence					C3

**NOTE –**

- (1) The atmospheric corrosivity categories given provide an indication of the environment corrosivity to assist in the selection of a suitable corrosion protection system, taking into account the macroclimate and where required microclimate effects.
- (2) For confirmation of a site-specific atmospheric corrosivity category (for example, for sites that are sheltered from marine influence by the local topography), then site-specific testing is required as described in HERA Report R4-133.
- (3) For areas in the geothermal zones, both the macroclimate and the surface-specific corrosivity categories are dependent on the level of geothermal activities and distance from the geothermal source. The corrosivity category could range up to C5 with considerable variation; thus in those areas site-specific corrosivity assessment is recommended. For areas that are more than 500 metres beyond the geothermal source or boundary (such as Sulphur Bay, Rotorua), and that have been assessed using the smell test as having minimal or non-existent geothermal influence, the other corrosion zones or categories apply based on distance from the sea.





# CERTIFICATE OF DESIGN WORK MEMORANDUM FROM LICENSED BUILDING PRACTITIONER



## Section 300 and Section 45, Building Act 2004

### The Building

Street address 27 County Drive  
Suburb  
Postcode  
Town/City HAWERA  
Building consent no.

### The Owner

Name(s) Arthur Brown Construction  
Email hawera@arthurbrown.co.nz  
Address 108 Wilson Street - Hawera  
Phone 06-2785199

## Basis for providing this memorandum

I am providing this memorandum in my role as the specialist designer who carried out or supervised specific Primary structure elements of restricted work (RBW) design work as described in this memorandum. Other designers will provide memoranda covering the remaining RBW design work. Refer to the attached PSI.

## Identification of restricted building work (RBW) design work

I, Andrew Fraser carried out or supervised the following RBW design work:

### Primary structure: B1

Design work that is RBW	Description (as required) and reference to plans and specifications	Carried out or supervised
Foundations and subfloor framing	Foundation ground improvements for rib raft floor as designed by others	Supervised
Retaining walls		
Beams		
Portal		
Bracing		
Other (primary)		

Note: SED = Elements subject to Specific Engineering Design outside of the scope of NZS 3604:2011, unless otherwise noted

Initial: \_\_\_\_\_

Date: 25 November 2020

## Waivers and modifications

Are waivers or modifications of the Building Code required? No

If yes, please provide details of the waivers or modifications:

Building Code Clause NA  
Waiver/modification required NA

## Issued by

Name Andrew Fraser  
Chartered status CPEng  
Email info@redjacket.nz  
Phone (daytime) 06 759 0999  
Mobile 027 257 9970  
Postal address PO Box 904, New Plymouth, 4340  
Physical address 3 Davidson Street, New Plymouth  
Design entity/company Red Jacket  
Chartered no. 96197  
Website www.redjacket.nz  
Phone (after hours)

## Declaration

I, Andrew Fraser, LBP state that I have applied the skills and care reasonably required of a competent professional in carrying out or supervising the RBW described in this memorandum and that based on this, I certify that the RBW described in this memorandum:

- Complies with the Building Code; or
- Complies with the Building Code subject to any waiver or modification or the Building Code described in this memorandum.

Signature:

Date: 25 November 2020





**RESIDENTIAL BUILDING  
27 COUNTY DRIVE  
HAWERA**

**STRUCTURAL CALCULATIONS**

**File Ref.** CAL-4104-01

REV.	DATE	ISSUED FOR
A	25/11/2020	Issued for Building Consent



**Job Name:****27 COUNTY DRIVE HAWERA****File Ref.**

CAL-4104-01

## Scope of Work

Structural design for ground improvements to support the residential garage on ribraft floor foundation

## Basis of Design

- ☒ AS/NZS 1170 Loading Standard
- ☐ ~~NZS 3404 Steel Structures~~
- ☐ ~~NZS 3603 Timber Structures~~
- ☐ ~~NZS 3101 Concrete Structures~~
- ☐ ~~NZS 4320 Reinforced Concrete Masonry Structures~~
- ☒ NZS 3604 Timber-Framed Buildings
- ☒ B1/VM4
- ☐

## References

- Arch Drawings by Mannor Build 27 October 2020
-



Job Title 27 COUNTY DRIVE - HAWERA.

- RESIDENTIAL GARAGE IS TO BE LOCATED ON GROUND WHICH DOESN'T MEET NZS3604 'GOOD GROUND' REQUIREMENTS
- IT IS PROPOSED TO INSTALL 200mm THICK HANUFILL RAFT UNDER THE SLAB TO SUPPORT RIBRAFT SLAB AND REDUCE BEARING PRESSURE ON SUBGRADE.

### LOADS.

GARAGE FLOOR  $G = 2.5 \text{ kPa}$   
 $G_{SOL} = 0.5 \text{ kPa}$   
 $Q = 2.5 \text{ kPa} \text{ \& } 13 \text{ kN}$

- 13 kN point load will govern.
- ASSUME POINT LOAD WILL BEAR ON  $2 \times 1.0 \text{m}$  OF RIBS  $A_k = 2 \times 0.1 = 0.2 \text{ m}^2$ .
- LOAD COMBINATIONS.

$$\begin{aligned} \text{ULS} &= 1.2G + 1.5Q = 1.2 \times 3 \text{ kPa} + 1.5 \times 13 \text{ kN} \\ &= 3.6 \text{ kPa} + 19.5 \text{ kN} \\ &= 23.1 \text{ kN} \end{aligned}$$

$$\therefore \frac{23.1}{0.2 \text{ m}^2} = q_{\text{ULS}}^* = 116 \text{ kPa} \cdot \text{ULS.}$$

$$\begin{aligned} \text{SLS} &= G + 0.4Q = 3.6 + 0.4 \times 13 \\ &= 8.8 \text{ kN} \\ &\quad \underline{0.2} \end{aligned}$$

$$q_{\text{SLS}}^* = 44 \text{ kPa}.$$



Job Title 27 COUNTY DRIVE, HAWERA.

### CURRENT SUBGRADE BEARING CAPACITY

FROM TST-4101-1 SCALA AVERAGE 75mm/BLOW.

REFER ALLOWABLE BEARING PRESSURE STOCKWELL NEXT PAGE.

$$\phi q_{ult} = \frac{3 \times 45 \text{ kPa}}{2} = 68 \text{ kPa}.$$

TRY 300 THICK LAP65 RAFT WITH 100 THK RIB  $B = 0.1$

$$\frac{q}{q_0} = 0.15 \quad \therefore q_{ult} \text{ AT SUBGRADE} = 116 \times 0.15 = 17.4 \text{ kPa} < \phi q_{ult}.$$

$\therefore \text{OK}.$

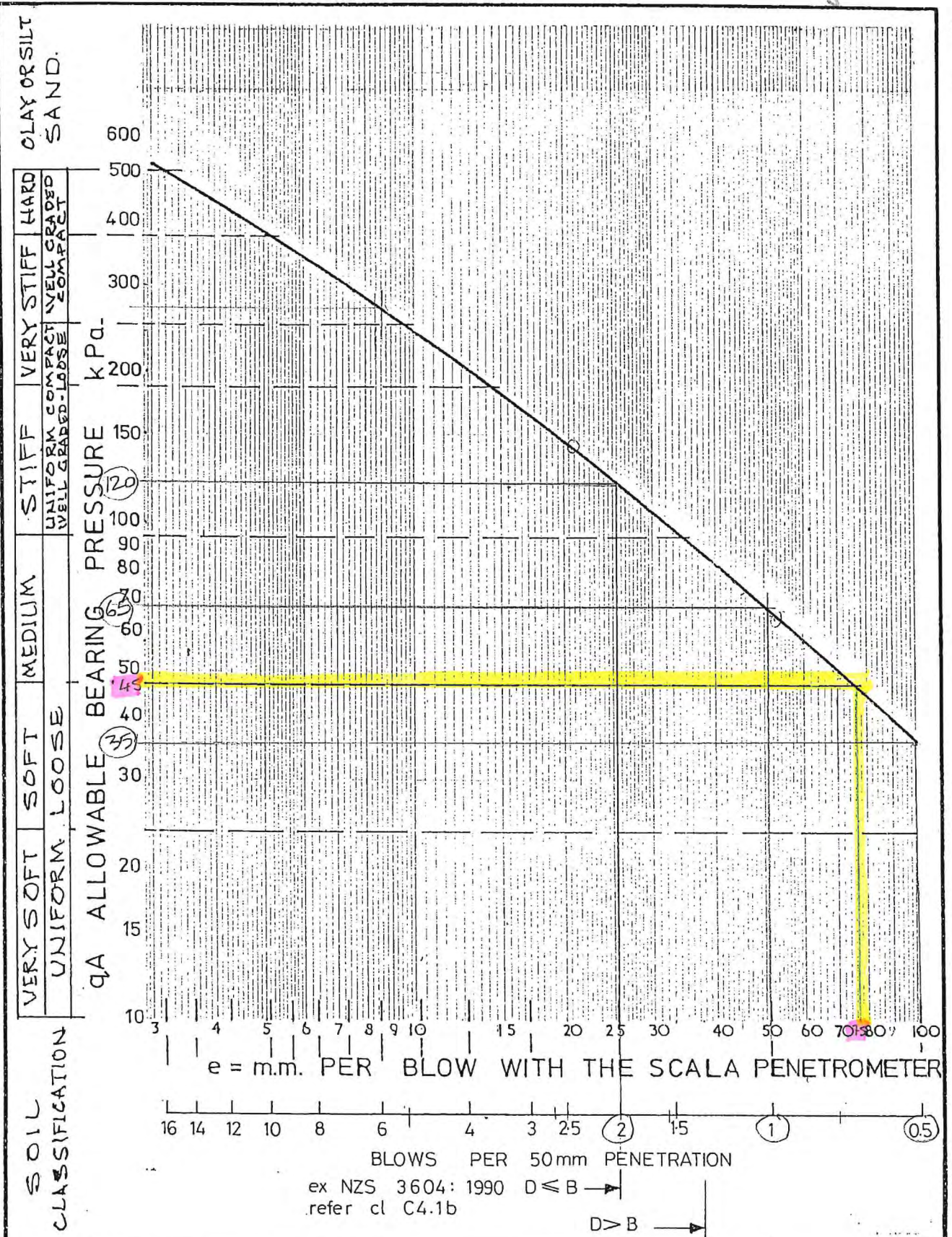
$$q_{ult} \text{ AT SUBGRADE} = 44 \times 0.15 = 6.6 \text{ kPa}.$$

$\therefore \text{OK}.$

USE 300THK THRU-FILL RAFT.

- REFER MARKED UP PLANS ATTACHED.
- SUITABLY QUALIFIED ENGINEER TO INSPECT CLEARED SUBGRADE AND FINAL COMPACTION.





**redjacket**  
Consulting Engineers

Determination of allowable  
bearing pressure under  
small structures

ref. N.Z. Engineering 15 June 1977  
M.J. Stockwell



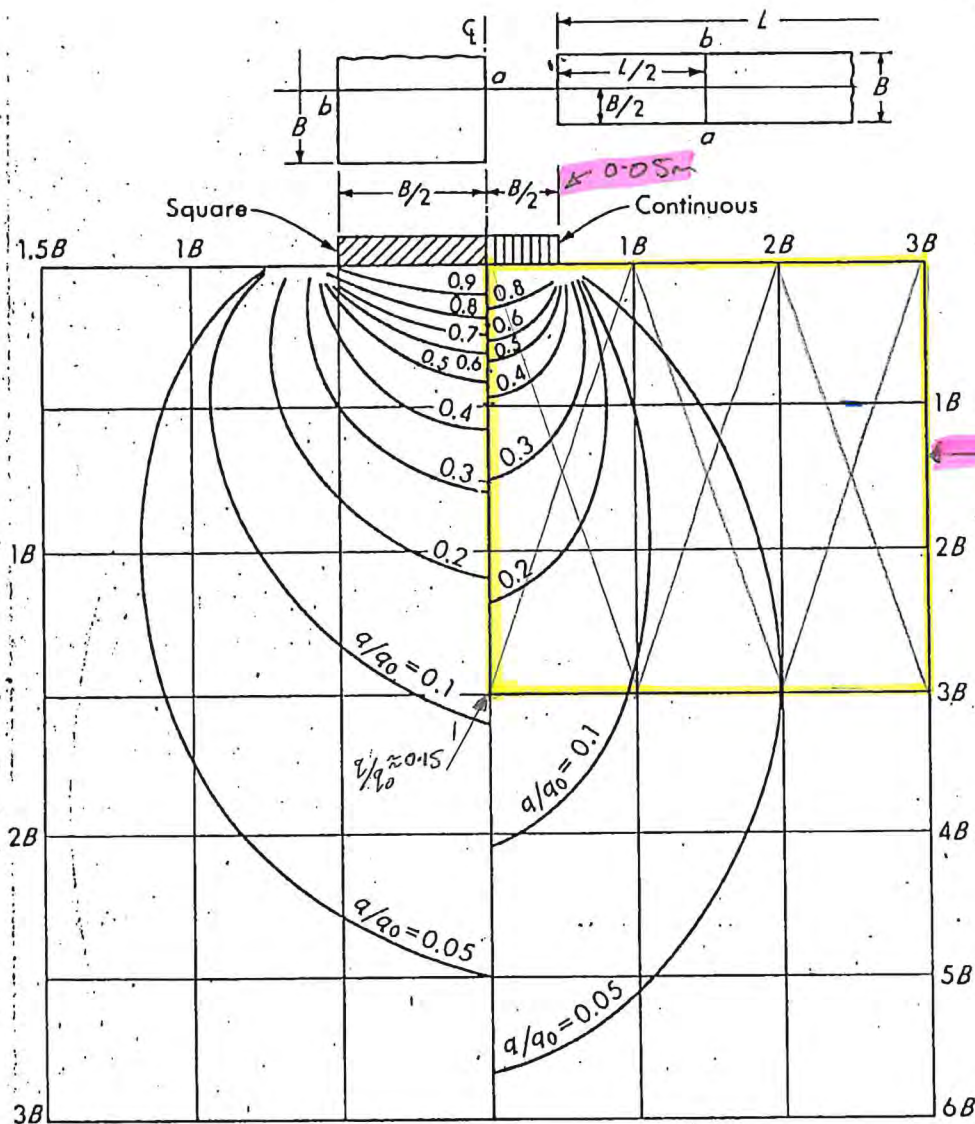


Figure 5-6. Pressure isobars based on the Westergaard equation for square and long continuous footings of dimension  $B \times B$  or  $B \times L$ . Values for the continuous footings are at the point  $L/2$  from the end. Chart constructed from Fig. 5-5 ( $\mu = 0$ ). Applicable along line  $ab$  as shown.

$AB$  scale shown on the chart, and thus the chart includes only 160 of the 200 units used to establish the influence value.

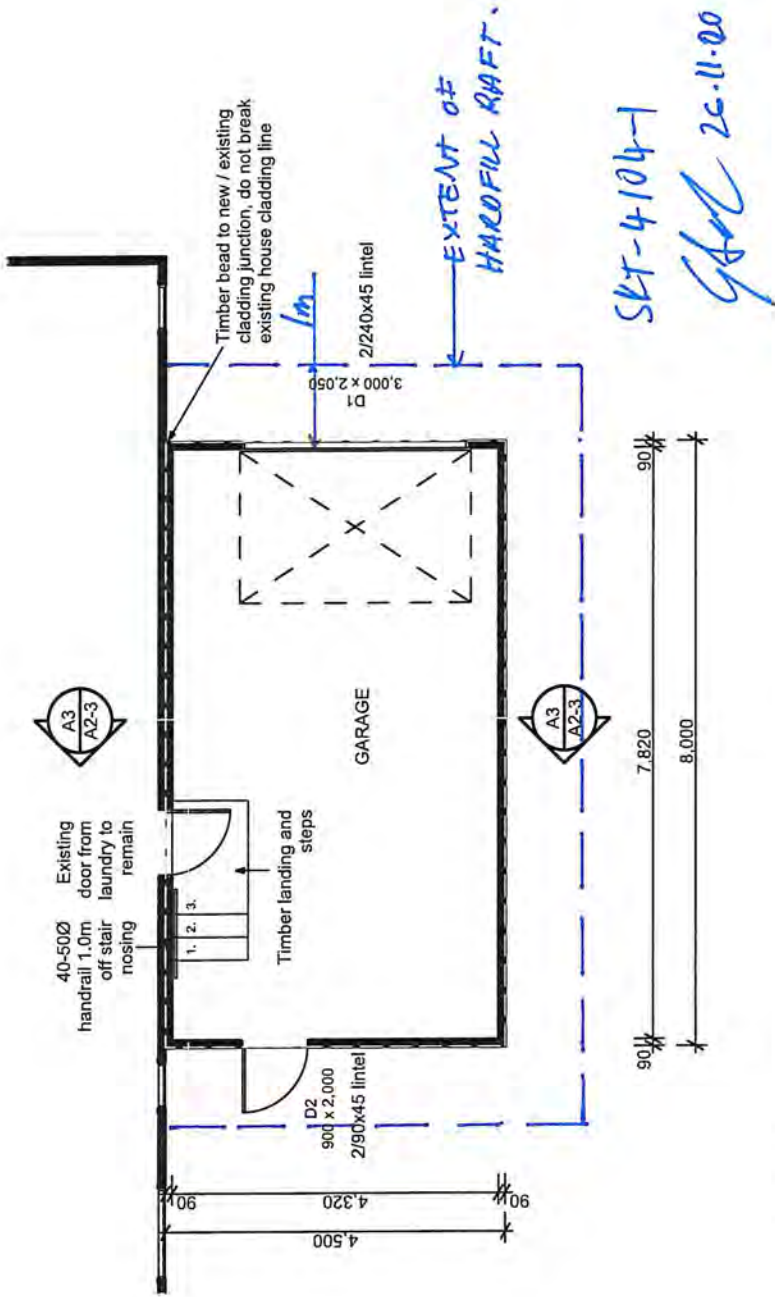
Figure 5-6 is a set of isobars prepared from Fig. 5-5 to obtain stresses at a point beneath continuous and square foundations. Figure 5-5 may be used for round contact areas.

A numerical procedure may be used to solve Eq. (5-8) on the computer in a similar manner to the Boussinesq equation.

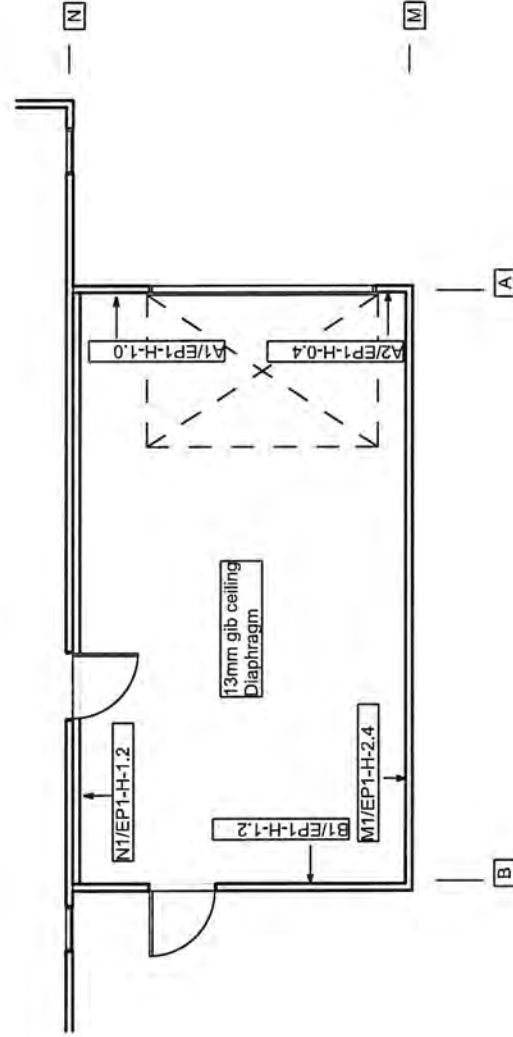
In comparing the Boussinesq and Westergaard methods for vertical stresses, one finds that

1. At small  $r/z$  (close to footing) the Boussinesq equation gives larger stress intensity.
2. At  $r/z$  about 1.8 both values are approximately equal.
3. At  $r/z$  greater than 1.8 the Westergaard equation gives larger stresses.

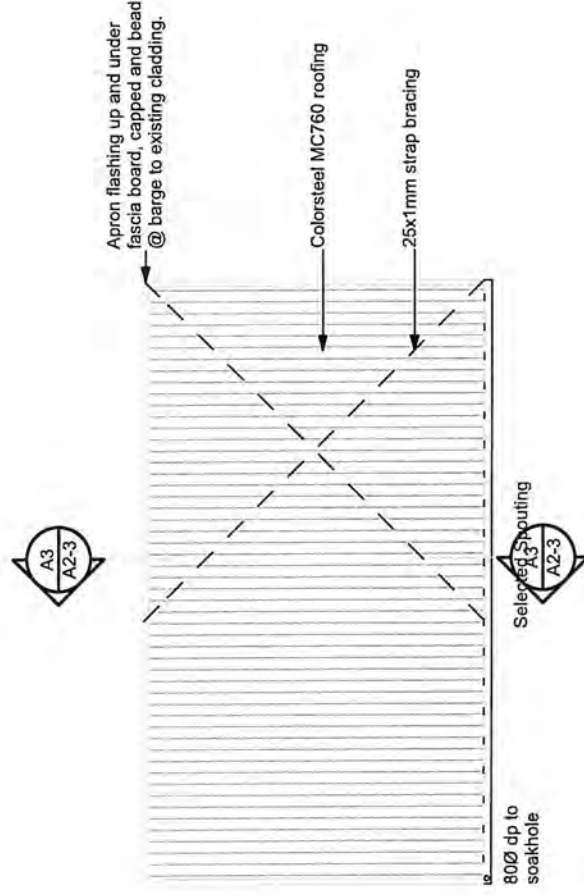




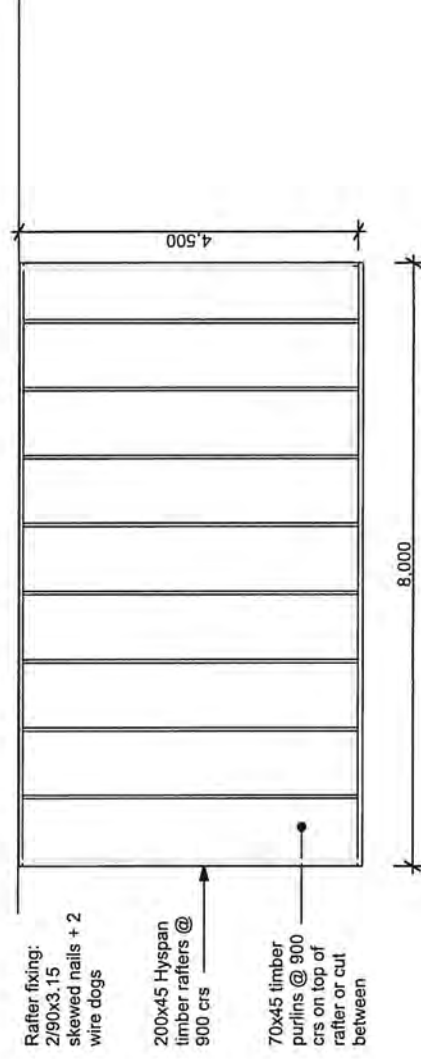
FLOOR PLAN  
Scale 1:100



BRACING PLAN  
Scale 1:100



ROOF PLAN  
Scale 1:100



ROOF FRAMING PLAN  
Scale 1:100



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These drawings are protected by copyright and remain the property of Manor Build. They may not be reproduced or copied without permission of Manor Build. All site dimensions are to be verified and confirmed by the client prior to the commencement of works.

#Notes

client:  
**LOWE**

project:  
**RELOCATE PERMIT**

design by: Manor Build

scale: As Noted

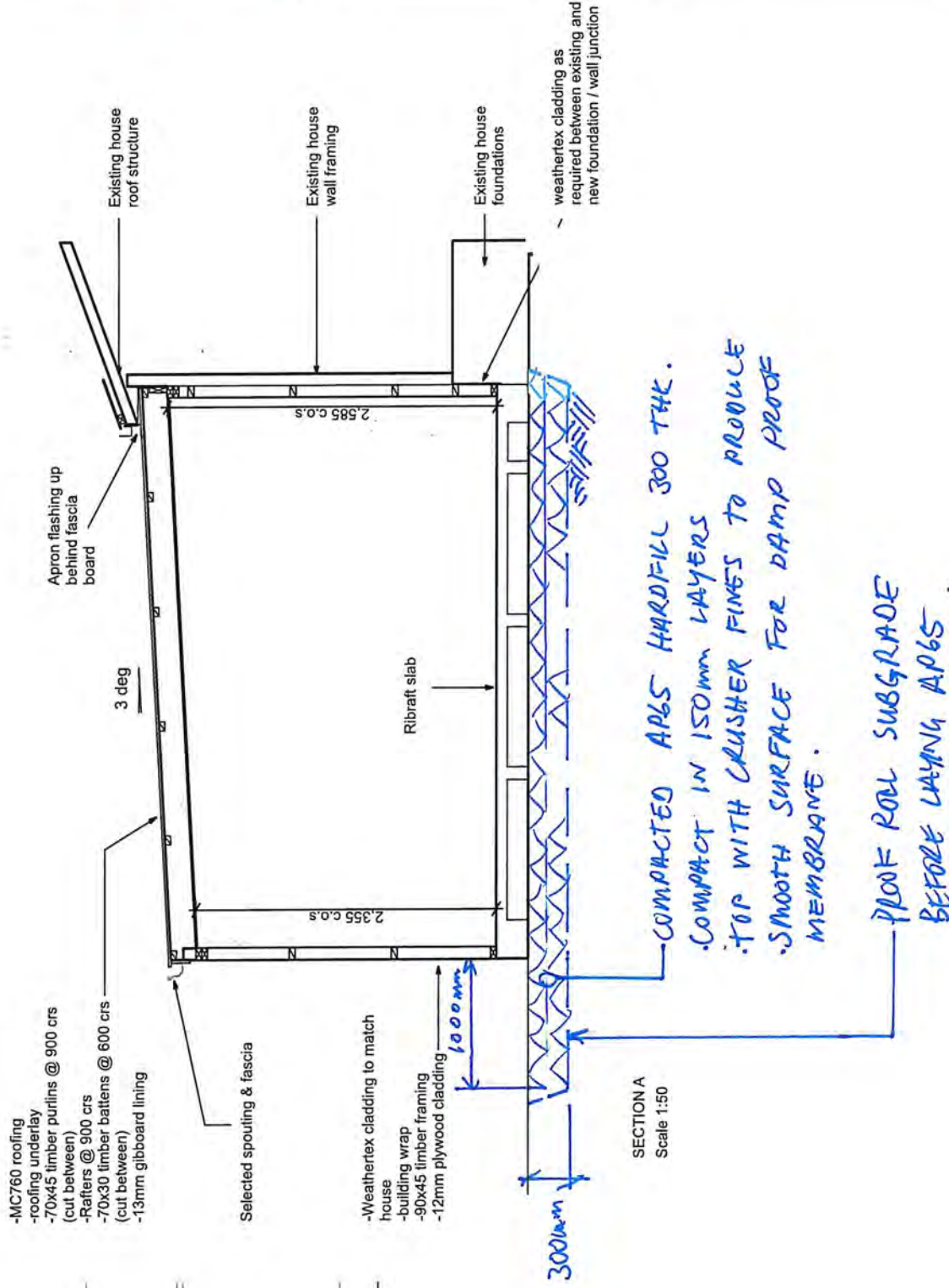
date: 27/10/2020

**PLANS**

job no:  
**MG181**

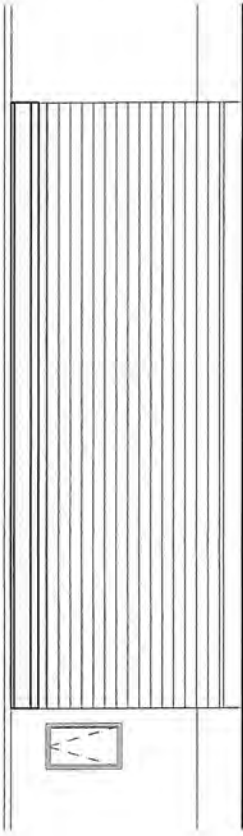
sheet no:  
**A2-2**





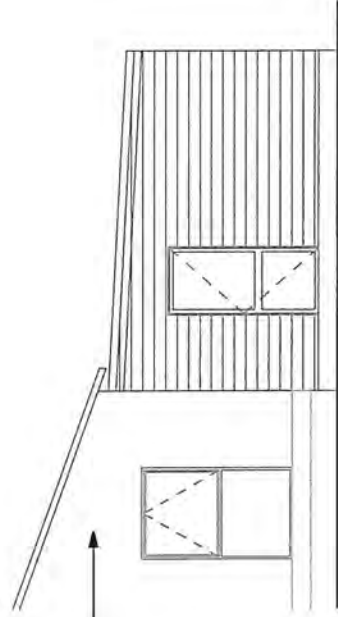
26.11.20 SKT-4104-1  
GRL

Existing house



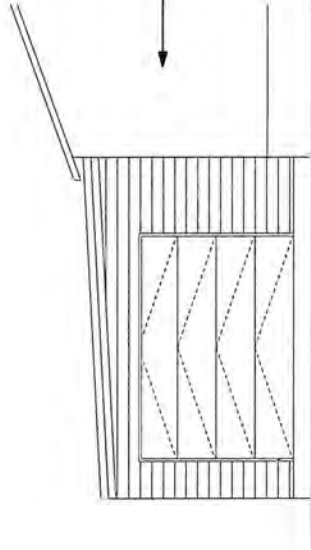
ELEVATION E1  
Scale 1:100

Existing house



ELEVATION E2  
Scale 1:100

Existing house



ELEVATION E3  
Scale 1:100

HOUSE NOT PART OF PERMIT





## SOUTH TARANAKI DISTRICT COUNCIL

Consent No: 200394.02

Building Category: R1

Site Address: 27 County Drive, Hawera 4610

Owner/Agent: Central Housemovers

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### Inspections

The following inspections are required:

- 1 Footing/Foundation/Slab
- 1 Final-Non-Habitable
- 2 Total Inspections

### Documentation

The following documentation is required:

- 1 Application form for CCC
- 1 As-built drainage plan
- 1 Engineer's ground bearing report      For construction monitoring by Engineer
- 1 PS4 (Specify)      For construction monitoring by Engineer (X2)



## GoGet Consent Time Report

Consent No: 200394.02

Date	Processing/Inspection Type	Status	Processor/Inspector	Time
Processing BLDG				
28 Jul 2021	Processing		Wilson Collin	60
28 Jul 2021	Processing	On	Wilson Collin	
28 Jul 2021	Processing	On	Wilson Collin	
29 Jul 2021	Processing	On	Wilson Collin	
27 Sep 2021	Processing	Off	Wilson Collin	
27 Sep 2021	Processing		Wilson Collin	30
Time Subtotal:				1:30
Processing PLNG				
24 Jun 2021	Processing		Maria Hokopaura	15
Time Subtotal:				0:15
Time Totals:				1:45



# GoGet Processing Summary Report

Consent No: 200394.02

Site Address: 27 County Drive, Hawera 4610

Description: AMENDMENT: Addition to Dwelling of a Kiwispan Garage

Checklist/Elements	Status	Notes	Processed By
<u>Pre-Processing Vetting</u>			Wilson Collin
<u>Project review summary</u>	Yes		Wilson Collin
General	Pass		WC
Notes	Yes	The following is a short summary of the proposed project. It is intended to outline the scope of work and the compliance pathway used for the decision process. AMENDMENT: Addition to Dwelling of a Kiwispan Garage This is the second amendment received for the addition of garage to house. first ammedment was with drawn 200394.01. Proposed garage is a lean to kiwi span shed, attached to existing house. with PS1 provided to show compliance.	WC
<u>Quick Consent</u>	Pass		Wilson Collin
Consent Type	Pass		WC
Minor work	Pass	Unlined garage.	WC
Certificate for Public Use	N/A		WC
Other	N/A		WC
Solid Fuel Heaters (B2, C2, E2, F7, G12)	N/A		WC
Wetback Installation Checklist (G12)	N/A		WC
Swimming Pool and Fencing Checklist (B1, B2, F2, F4, G12)	N/A		WC
Demolition Checklist (F5, E1, G9, G12, G15)	N/A		WC
Retaining Wall Checklist (B1, B2, F4, E1)	N/A		WC
Marquee (B1, C1-C6, D1, F6, F7)	N/A		WC
Boundary fence (B1)	N/A		WC
Pole shed (B1 and E2)	N/A		WC
Unlined Garage (B1 and E2)	Pass		WC
Engineer	Pass	The engineer is working within their scope. The PS1 identifies the engineer, their CPEng number is: 184622 - Kerry McCollum Checked on register.	WC
Wall bracing	Pass	Correct parameters have been used for calculating wall bracing demand. This includes considerations around wind, earthquakes, cladding types, and building characteristics. The wall bracing design shows adequate strength to resist lateral loads expected given the above parameters. The layout of the bracing meets the provisions to avoid torsion due to asymmetric design.	WC
Posts	Pass	Steel framed shed. C - columns connected to Concrete slab foundation with HD100 Bracket fixed with M12x30 bolts. with PS1 to show compliance.	WC
Footings	Pass	The post has a sufficiently sized concrete footing to resist expected uplift loads. Concrete MPA meets design requirements. Steel framed shed. C - columns connected to Concrete slab foundation with HD100 Bracket fixed with M12x30 bolts. with PS1 to show compliance.	WC



Checklist/Elements	Status	Notes	Processed By
Fixings	Pass	The connections between the footing, post, and the roof structure are detailed appropriately, with fixings meeting the required capacity.	WC
Framed roof	Pass	Rafters, including valley and hip rafters, are adequately sized with appropriate fixings given the wind zone, their span, and spacing.	WC
Truss roof	N/A		WC
Purlins and tile battens	Pass	The purlins or tile battens are adequately sized given the wind zone, their span and spacing. Correct fixings are specified given the uplift loads expected.	WC
Roof bracing	Pass	Adequate bracing is provided for the roof given the roof pitch and area. Bracing is provided by bracing straps. Strap bracing shown	WC
Alternative Solution Decision	N/A		WC
Profiled metal	Pass	The pitch of the profiled metal roof is appropriate given the type of the metal profile.	WC
Profile metal wall cladding	Pass	The vertical profile metal wall cladding is direct fixed.	WC
Roof claddings	Pass	The manufactured cladding proposed has been sighted against a BRANZ appraisal or similar. It is used within the scope outlined, and details shown on the consent drawings match those provided by the manufacturer and covered by the appraisal. The pitch of the roof cladding is appropriate.	WC
Wall cladding	Pass	Please detail wall cladding to Existing house connection. show apron flashing if required. --- Customer Response --- Correct, side wall cladding will butt up into soffit and be sealed against soffit --- Council Response - WC 27 Sep 2021 1:53pm --- Elevation shows garage to butt against the existing house.	WC
<u>Request for Further Information:</u>			
Request:		Please detail wall cladding to Existing house connection. show apron flashing detail if required.	WC
Response:		wall cladding to existing house is james hardie board, this shed structure is a stand alone building connected to house only with an apron flashing onto existing fascia board	WC
<u>Request for Further Information:</u>			
Request:		Please detail wall cladding to Existing house connection. show apron flashing detail if required.	WC
		Please detail Apron flashing. In keeping with James Hardie Manufacturers specifications or E2/AS1.	
Response:		please find attached apron flashing detail	WC
<u>Request for Further Information:</u>			
Request:		Please clarify Clad wall corner flashing (Detail 05). Consider Existing Soffit overhang. The apex of the shed is shown to be flashed into fascia board. And the wall corner of the shed is shown to be butted against the side of the house. please clarify	WC
Response:		Correct, side wall cladding will butt up into soffit and be sealed against soffit	WC
Relocated building (B1 and B2)	N/A		WC
<u>CodeMark</u>	N/A		Wilson Collin
<u>Producer Statements</u>	Pass		Wilson Collin
General	Pass		WC
Statement Type	Pass	DG % '8Yg][ b'? YffmA W c`i a % ( * &&"	WC
Category	Pass	Structural	WC
Supporting information provided	Pass	Calculations/Specifications	WC



Checklist/Elements	Status	Notes	Processed By
Engineering calculations reference plans and specifications	Pass	Engineering calculations reference: Plans Specifications	WC
Statement issued by	Pass	The statement provides the name of the statement author and/or company issuing the statement	WC
Name of party/parties on statement	Pass	The statement provides the name of party/parties that the statement is issued to	WC
Statement supplied to BCA	Pass	The statement specifically nominates that the statement is to be supplied to the BCA	WC
Statement provides address/legal description of site	Pass	The statement provides the address and legal description of the site where the building work is to be undertaken	WC
Statement provides description of work covered	Pass	Part only, eg foundations only, or building structure excluding roof structure, or all work The statement provides the description of the work or part(s) of work that is to be covered by the statement Steel structure of shed and Slab foundation	WC
Statement nominates method of compliance	Pass	The statement nominates the method of compliance with the Building Code, B1/VM1 & VM4, B2 AS1	WC
GHUHYa Ybh\Ug\Ui h\cf g'XYHJ]g	Pass	The statement has the author's signature, address, qualifications/professional affiliation, registration number, date completed	WC
Building Code clauses specifically referenced	Pass	B1 B2	WC
Producer statement subject to conditions	Pass	The producer statement is subject to conditions Schedule to PS1 provided  PS1 is conditional to good ground being present at site. however, Geo-technical carried out on 14/08/2020 indicates that the soil at site does not meet the NZS3604 definition of good ground. --- Customer Response --- Please see attached updated PS1 and foundation design --- Council Response - WC 27 Sep 2021 1:55pm --- PS1 provided by Kerry McCollum for foundation and floor slab. with CM as specified in Schedule to PS1.	WC
<u>Request for Further Information:</u>			
Request:		PS1 is conditional to good ground being present at site. however, Geo-technical carried out on 14/08/2020 indicates that the soil does not meet the NZS3604 definition of good ground. PS1 for Kiwispan shed is not suitable to show compliance due to soil conditions at site	WC
Response:		Please see attached updated PS1 and foundation design	WC
Site assumptions confirmed before start	Pass	Site assumptions confirmed prior to construction commencement Good ground assumption	WC
Compliance demonstrated	Pass	Compliance has been demonstrated	WC
Durability provisions	Pass	Durability provisions have been met	WC
Producer statement affects a compliance schedule	N/A		WC
Testing/inspection procedures for compliance schedule	N/A		WC
Special maintenance requirements	N/A		WC
Conditions placed on building consent	Pass	PS4 required for issue of CCC On-site observations	WC
<u>Peer Review (Option)</u>	N/A		Wilson Collin
<u>S71 - Natural Hazard Assessment</u>	N/A		Wilson Collin
<u>S75 - Construction Over Two Or More</u>	N/A		Wilson Collin



Checklist/Elements	Status	Notes	Processed By
<u>Allotments</u>			
<u>S84 - Restricted Building Work</u>	N/A		Wilson Collin
<u>S100 - Requirements for Compliance Schedule</u>	N/A		Wilson Collin
<u>S112 - Alterations To Existing Buildings</u>	N/A		Wilson Collin
<u>S133AT Alterations to buildings Subject to EPB notice</u>	N/A		Wilson Collin
<u>S113 - Buildings with specified intended lives</u>	N/A		Wilson Collin
<u>S115 - Change Of Use</u>	N/A		Wilson Collin
<u>S116A - Subdivision Code Compliance Requirements</u>	N/A		Wilson Collin
<u>S363 - Certificate For Public Use</u>	N/A		Wilson Collin
<u>S26 Warnings and Bans</u>	N/A		Wilson Collin
<u>A1 - Classified Uses</u>	Pass		Wilson Collin
A1 prompts	Pass		WC
Classified use(s) applicable to this building	Pass	7.0 Outbuildings	WC
<u>B1 - Structure</u>	N/A	Covered under PS1,	Wilson Collin
<u>B2 - Durability</u>	N/A		Wilson Collin
<u>C1-6 - Protection From Fire</u>	N/A		Wilson Collin
<u>Fire and Emergency New Zealand review</u>	N/A		Wilson Collin
<u>D1 - Access Routes</u>	N/A		Wilson Collin
<u>D2 - Mechanical Installations For Access</u>	N/A		Wilson Collin
<u>E1 - Surface Water</u>	Pass		Wilson Collin
Specific Engineer Design	N/A		WC
Soak pits	N/A		WC
Site location	N/A		WC
Floor level	N/A		WC
Stormwater drainage	Pass		WC
Drainage connections	Pass	Please show how storm water will be dealt with. --- Customer Response --- stormwater will connect into existing drainage which is connected to STDC storm water system --- Council Response - WC 27 Sep 2021 1:55pm --- To connect to Council reticulation.	WC
<u>Request for Further Information:</u>			
Request:		Please show how storm water will be dealt with.	WC
Response:		stormwater will connect into existing drainage which is connected to STDC storm water system	WC
Network Utility Operator (NUO)	Pass	The drainage system is connected to the stormwater and is made in a manor that avoids damage to the storm water and is to the approval of the NUO i.e. silt trap	WC
Secondary flow path	N/A		WC
Size and gradient	N/A		WC
Sumps	N/A		WC
Roof catchment	N/A		WC
Other compliance paths	N/A		WC
<u>E2 - External moisture</u>	N/A		Wilson Collin
<u>E3 - Internal Moisture</u>	N/A		Wilson Collin
<u>F1 - Hazardous Agents On Site</u>	N/A		Wilson Collin
<u>F2 - Hazardous Building Materials</u>	N/A		Wilson Collin



Checklist/Elements	Status	Notes	Processed By
<u>F3 - Hazardous Substances And Processes</u>	N/A		Wilson Collin
<u>F4 - Safety From Falling</u>	N/A		Wilson Collin
<u>F5 - Construction and Demolition Hazards</u>	N/A		Wilson Collin
<u>F6 - Visibility In Escape Routes</u>	N/A		Wilson Collin
<u>F7 - Warning Systems</u>	N/A		Wilson Collin
<u>F8 - Signs</u>	N/A		Wilson Collin
<u>F9 - Means Of Restricting Access To Residential Pools</u>	N/A		Wilson Collin
<u>G1 - Personal Hygiene</u>	N/A		Wilson Collin
<u>G2 - Laundering</u>	N/A		Wilson Collin
<u>G3 - Food Preparation And Prevention Of Contamination</u>	N/A		Wilson Collin
<u>G4 - Ventilation</u>	N/A		Wilson Collin
<u>G5 - Interior Environment</u>	N/A		Wilson Collin
<u>G6 - Airborne And Impact Sound</u>	N/A		Wilson Collin
<u>G7 - Natural Light</u>	N/A		Wilson Collin
<u>G8 - Artificial Light</u>	N/A		Wilson Collin
<u>G9 - Electricity</u>	N/A		Wilson Collin
<u>G10 - Piped Services</u>	N/A		Wilson Collin
<u>G11 - Gas As An Energy Source</u>	N/A		Wilson Collin
<u>G12 - Water Supplies</u>	N/A		Wilson Collin
<u>G13 Foul Water</u>	N/A		Wilson Collin
<u>G14 - Industrial Liquid Waste</u>	N/A		Wilson Collin
<u>G15 - Solid Waste</u>	N/A		Wilson Collin
<u>H1 - Energy Efficiency</u>	N/A		Wilson Collin
<u>Planning</u>			Maria Hokopaura
District Plan	Pass		MH
Zoning	Yes		MH
Performance Standards	Pass		MH
Rural only	N/A		MH
Other	N/A		MH
Resource consent required	N/A		MH
Resource consent granted	N/A		MH
Property Information	Pass		MH
Heritage Building, Item or Site	Pass		MH
Title Check	N/A		MH
Suspect Section	N/A		MH
Council Infrastructure	N/A		MH
HAIL Activity	N/A		MH
Coastal Protection Area	N/A		MH
Structure Plan	N/A		MH
Flood Zone Area	N/A		MH
Significant Waterbody, ONF/L, SNA	N/A		MH
<u>Building Consent Granted</u>	Pass		Wilson Collin
Conflict of Interest	N/A		WC
Building Officer	Pass		WC
Plans and documents collated and stamped	Pass	All plans and documents have been collated correctly and stamped	WC
Amendments/variatio	Pass	Amendments/variatio	WC



Checklist/Elements	Status	Notes	Processed By
final documents		documents	
Documentation and required inspections	Pass	Documentation for CCC recorded Required inspections recorded	WC
Supervision Memos Signed Off	N/A		WC
Create Approved copies	Pass	Saved to Working Files folder Moved to Approved Consent Files folder	WC
Create Required Items report	Pass	Required Items report generated and filed to Required Items folder	WC
Create Time Report	Pass	Time Report generated and filed to Processing Summaries folder	WC
Create Processing Summary Report	Pass	Processing Summary Report generated and filed to Processing Summaries folder	WC
Compliance Schedule	N/A		WC
Grant Building Consent	Yes	I am satisfied on reasonable grounds that the provisions of the building code would be met if the building work were properly completed in accordance with the plans and specifications that accompanied the application.	WC
Refuse to Grant	N/A		WC
<u>Request for Further Information:</u>			
Request: Please provide details of rafter to house connection and or stringer connection.			WC
Response: There is no rafter to house connection, Kiwispan building is standalone beside house			WC

I am satisfied on reasonable grounds that the provisions of the Building Code will be met if the building work in relation to the attached application is properly completed in accordance with the attached plans and specifications.

Signed: \_\_\_\_\_ Date: 27 September 2021 2:32 pm  
Wilson Collin



# APPLICATION FOR BUILDING CONSENT (Form 2)

Section 33 or 45, Building Act 2004.



APP

## COUNCIL USE ONLY

BC Number

Receipt Number

Amount Paid



### 1. What are you applying for? *Tick all applicable*

<sup>1</sup> For PIM only applications complete Sections 1 to 7, and 13 only. Follow instructions as per section.

☒ Building Consent

☐ Project Information Memo (PIM)<sup>1</sup>

☐ Amendment to Building Consent<sup>2</sup>

☐ Building Consent using a National Multiple-Use Approval ('MultiProof')<sup>3</sup>

☐ Staged Consent<sup>2</sup>

<sup>2</sup> Stage Number  Expected number of stages

<sup>2</sup> Please enter existing building consent number(s):

<sup>3</sup> Please enter National Multiple-Use Approval number:

### 2. What building work are you doing? *Tick all applicable*

If your building work is not listed, tick **Other** and provide details (this includes amendments to building consents)

<input checked="" type="checkbox"/> <b>RESIDENTIAL</b>			
<input checked="" type="checkbox"/> New detached dwelling	<input type="checkbox"/> New multi-residential dwelling (more than 2 household units)	<input type="checkbox"/> Plumbing works	
<input type="checkbox"/> Major alterations/additions – any work that <b>includes</b> altering or attaching to the exterior of a building	<input type="checkbox"/> Minor alterations – any internal work that does <b>not include</b> altering the exterior of the building	<input type="checkbox"/> New solid fuel burner	
<input type="checkbox"/> Garage / detached carport	<input type="checkbox"/> Other, (please provide details below)		

Details

<input type="checkbox"/> <b>COMMERCIAL/INDUSTRIAL</b>			
<input type="checkbox"/> New commercial / industrial building	<input type="checkbox"/> Major alterations/additions – any work that <b>includes</b> altering or attaching to the exterior of a building	<input type="checkbox"/> Seismic strengthening	
<input type="checkbox"/> Minor alterations – any internal work that does <b>not include</b> altering the exterior of the building	<input type="checkbox"/> Internal fit-out only (including plumbing and ventilation)	<input type="checkbox"/> Other, (please provide details below)	

Details



### 3. Where is the building work? *Complete all fields, enter N/A where not applicable*

What is the street address? <i>(If No street address, State nearest street intersection &amp; distance/direction from that intersection)</i>	27 County Drive, Hawera		
Legal description:	LOT: 42	DP: 412125	
Building name:			
Location of building within site/block including near street access:	As per enclosed site plan	Level / Unit #:	
Does the building or site have any cultural or heritage significance, or is it a Marae?	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/> No
<i>If Yes, provide details</i>			
Is the subdivision of an existing site involved? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
<i>If a sub division is proposed and you have not yet received a s224 certificate, the application will also need to provide any relevant information stating legal description as at the date of application and, if subdivision is proposed, include details of the relevant resource consent number and any proposed lot numbers.</i>			
<i>If Yes, complete the following:</i>	Resource Consent No.		
	Proposed LOT No.		

### 4. Who owns the building or land? *Complete all fields*

Owner name:	Raewyn Stockman c/- Hamish Scott		Title:	
Owner email address:	hamish@seselectrical.co.nz			
Owner contact numbers:	Ph:		Cell:	
Owner mailing address:	27 County Drive, Hawera			
Indicate which of the following Proof of Ownership documents is attached to your application. Your document <b>must</b> be less than <b>3</b> months old.				
<input checked="" type="checkbox"/> Copy of Certificate of Title	<input type="checkbox"/> Copy of Lease Agreement	<input type="checkbox"/> Agreement for Sale & Purchase	<input type="checkbox"/> Other document showing full name of legal owner	
Are you using an Agent?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<i>If Yes, please also complete the following</i>	
Who is the first point of contact for further correspondence?		<input checked="" type="checkbox"/> Agent	<input type="checkbox"/> Owner	
Who is the first point of contact for invoicing?		<input type="checkbox"/> Agent	<input checked="" type="checkbox"/> Owner	
Payee name for invoice:	Raewyn Stockman C/- Hamish Scott			
Name of contact at Agent:	Central House Movers		Title:	
Agent email:	helena@centralhousemovers.co.nz			
Agent contact numbers:	Ph: 063221860	Cell:		
Agent mailing address:	86 Bridge Street, Bulls, 4818			
Relationship to owner:	Agent			



5. Who's involved in the build? *Complete all fields per line, or select N/A where not applicable. If you have additional roles to add, please use the table in Appendix A.*

	Role	N/A
<i>Trade</i>	<i>Designer</i>	
Name:	Martin Cockitt - ACE Consultants	
Address:		
Contact number:	027 555 5702	
Email:	martin@aurora.org.nz	
Licensing class:	Engineer	
Registration number:	LBP:	
<i>Trade</i>	<i>Architect</i>	
Name:		
Address:		
Contact number:		
Email:		
Licensing class:		
Registration number:	NZTAB:	

6. What are the specifics of the site? *Complete all fields*

What is the wind zone?													
<input type="checkbox"/>	Low	<input type="checkbox"/>	Medium	<input checked="" type="checkbox"/>	High	<input type="checkbox"/>	Very High	<input type="checkbox"/>	Extra High	<input type="checkbox"/>	Specific Design State value below		
What is the exposure zone?				<input type="checkbox"/>	Low (B)	<input checked="" type="checkbox"/>	Medium (C)	<input type="checkbox"/>	High / Sea spray (D)				
Does the proposed building work cover two or more allotments?										<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Are there public drains on the site?										<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Is the site subject to natural or created hazards such as erosion, subsidence, flooding, slips, cut and fill or contamination?										<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Is it a sub-division?										<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Are there any alterations to land contours (e.g. earthworks)?										<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Are there new or altered connections to public utilities?										<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
Are there new or altered locations and/or external dimensions of buildings?										<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
Is there new or altered access for vehicles?										<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Is the building work over or adjacent to any road or public place?										<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Does the building work involve the disposal of storm-water or wastewater?										<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
Is the building work over any existing drains or sewers or in close proximity to wells or water mains?										<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Are there any other matters known to the applicant that may require authorisation from the territorial authority?										<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
If Yes, please provide a summary here													



7. What are the details of the building work? *Complete all fields, or enter N/A if not applicable*

Provide a full description of the building work:  <i>E.g. 4 Bedroom dwelling with multiple cladding types and attached garage</i>	To relocate a brand new yard built home to site onto driven timber piles as per site plan		
Estimated value of the building work (including GST):		\$ 27000	
If the application is for an amendment to a building consent, please add the additional value if applicable (including GST):		\$	<input type="checkbox"/> N/A
What is the intended life of the building?		<input checked="" type="checkbox"/> 50+ years	<input type="checkbox"/> Limited Life
If Limited Life, please indicate the intended life of the building		years	
Have you discussed this project with Council prior to applying?		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does the project include Restricted Building Work?		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Are you applying for Owner/Builder exemption to complete the Restricted Building Work?		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<i>If Yes, please complete and attach the <b>Statutory Declaration as to Owner Builder form</b> (click here)</i> <i>If No, please complete and attach the <b>Memorandum from Licensed Building Practitioner: Certificate of Design Work form</b> (click here) for each type of building work being undertaken</i>			
Total number of floor levels:	1	Levels below ground:	
Current floor area:	0	Proposed new total floor area:	135
<i>If you are making alterations to an existing dwelling, please complete the following:</i>			
Is there any Recladding?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Is Recladding covered by a claim under the Financial Assistance Package scheme?
		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
If Yes, please provide Financial Assistance Package reference number			
Does the building work involve a swimming pool?		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Year first constructed:		2020	
Current lawful established use:		Dwelling	
Proposed use (A1 classified use):		Dwelling	
Will the building work result in a change of use of the building?		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<i>If you are unsure how to determine if a change of use will occur, please refer to the guidance provided by the Ministry of Business, Innovation and Employment: <a href="http://www.building.govt.nz/managing-buildings/change-of-use-and-alterations/">http://www.building.govt.nz/managing-buildings/change-of-use-and-alterations/</a></i> <i>If Yes, please provide details</i>			



## 8. What clauses of the building code does your building work comply with?

Please read the following carefully:

- You are required to indicate what code clause(s) your building work complies with
- Unless otherwise noted below, your application will be assessed under Acceptable Solutions
- If you are using another means of compliance, please provide details of the standard(s) that your building work complies with and the means of compliance in the space provided. Use a separate sheet of paper if necessary
- If you do not provide all the necessary information to show how your application complies with the Building Code, it will be returned unprocessed.

☒ I understand that this application is to be assessed against Acceptable Solutions, unless otherwise stated in the following section. Please tick to indicate your agreement.

<input checked="" type="checkbox"/>	B1 Structure	<input type="checkbox"/>	F1 Hazardous agents on site	<input type="checkbox"/>	G5 Interior environment
<input checked="" type="checkbox"/>	B2 Durability	<input type="checkbox"/>	F2 Hazardous building materials	<input type="checkbox"/>	G6 Airborne & impact sound
<input checked="" type="checkbox"/>	C1 Protection from fire	<input type="checkbox"/>	F3 Hazardous substances and processes	<input type="checkbox"/>	G7 Natural light
<input type="checkbox"/>	C2 Prevention of fire occurring	<input type="checkbox"/>	F4 Safety from falling	<input type="checkbox"/>	G8 Artificial light
<input type="checkbox"/>	C3 Fire affecting areas beyond fire source	<input checked="" type="checkbox"/>	F5 Site safety	<input type="checkbox"/>	G9 Electricity
<input type="checkbox"/>	C4 Movement to place of safety	<input type="checkbox"/>	F6 Visibility in escape routes	<input type="checkbox"/>	G10 Piped services
<input type="checkbox"/>	C5 Access & safety for fire-fighting operations	<input checked="" type="checkbox"/>	F7 Warning systems	<input type="checkbox"/>	G11 Gas as an energy source
<input type="checkbox"/>	C6 Structural stability	<input type="checkbox"/>	F8 Signs	<input checked="" type="checkbox"/>	G12 Water supplies
<input checked="" type="checkbox"/>	D1 Access routes	<input type="checkbox"/>	F9 Means of restricting access to residential pools	<input checked="" type="checkbox"/>	G13 Foul water
<input type="checkbox"/>	D2 Mechanical installations	<input type="checkbox"/>	G1 Personal hygiene	<input type="checkbox"/>	G14 Industrial liquid waste
<input checked="" type="checkbox"/>	E1 Surface water	<input type="checkbox"/>	G2 Laundering	<input type="checkbox"/>	G15 Solid waste
<input checked="" type="checkbox"/>	E2 External moisture	<input type="checkbox"/>	G3 Food preparation & prevention of contamination	<input type="checkbox"/>	H1 Energy efficiency
<input type="checkbox"/>	E3 Internal moisture	<input type="checkbox"/>	G4 Ventilation		

Provide details of all Verification Methods being used (include relevant code clause and means of compliance)

Provide details of all Alternative Solutions being used (include relevant code clause and means of compliance) or details of any waivers and modifications (including applicable code clauses)



9. What specified systems are in your building? *Complete all fields*

Does your building work involve any Specified Systems (SS)?	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
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<b>Residential</b> <i>please complete the following</i>					<input type="checkbox"/> N/A	
<i>If Yes, please complete Specified System 16 (Cable Car) below</i>						
SS16 Does your building work involve a cable car?		<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No	<i>If Yes, please provide detail below</i>
SS Cable cars	Existing	Removed	Altered	Added / New	Complete this section if the cable car is being altered or added	
					Performance Standards	Inspection & Maintenance Procedures
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Reporting Frequency
Provide any other details						

<b>Commercial</b> <i>please complete the following and Appendix B (Specified Systems)</i>		<input checked="" type="checkbox"/> N/A
If applicable, what is the existing compliance schedule number?		
Risk Group:		
Total occupancy numbers:		

10. Does your build require a fire design review?

Certain applications for building consent must be submitted to the Fire and Emergency New Zealand Fire Engineering Unit (FEU) for review. *For commercial / industrial applications please complete the following:*

Is your building of a type defined in the Gazette notice and section 46 of the Building Act, 2004?	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
--	--------------------------	-----	-------------------------------------	----



## 11. Have you attached all required documents?

You are required to provide all the necessary documents to support your application. This includes (but is not limited to) the following sections:

- Section 4: Proof of Ownership
- Section 6: Plans showing land and boundary features as required  
PIM, development of contribution notice or certificate attached to PIM
- Section 7: Statutory Declaration as to Owner Builder form OR Memorandum of Licensed Building Practitioners – Certificate of Design Work (for each type of building work being undertaken)
- Section 8: Plans, specifications and other supporting information in relation to the compliance method of the build, e.g. where the work deviates from an Acceptable Solution method.

Please check your application and ensure all the supporting information is attached otherwise your application will be returned **unprocessed**.

When you are satisfied your application is complete, please complete section 13 and send to your local Building Consent Authority.

If you are unsure about what information to include in your application, a guidance document is available ([click here](#))

### Privacy Information

The information you have provided on this form is required so that your building consent application can be processed under the Building Act 2004. The Council collates statistics relating to issued building consents and has a statutory obligation to forward these regularly to Statistics New Zealand. The Council stores the information on a public register, which must be supplied (as previously determined by the Ombudsman) to whoever requests the information. Under the Privacy Act 1993 you have the right to see and correct personal information the Council holds about you.

## 12. Your application fees

Your council will charge fees for your consent application. These will include statutory levies payable to BRANZ and the Ministry of Business, Innovation & Employment.

A full fee schedule can be found on the Council's website. Please consult this before submitting your application.

## 13. Have you signed the application?

I request that you issue a project information memorandum, project information memorandum and building consent, or building consent for the building work described in this application.

All of the information contained in this application is, to the best of my knowledge, true and correct. I understand that work must not commence until the building consent is issued and uplifted.

Name and signature of the owner / agent on behalf of and with the authority of the owner

☒ I understand that this application may only be made with the owner's approval. Please tick to indicate your agreement.

Owner / Agent Name:	Helena Hendra - Central House Movers
Owner / Agent Signature: (Enter your name and tick the acknowledgement box if you do not have a digital signature)	
Date:	11/9/2020

Your local council (or their website) will be able to help you with information specific to the site your application covers.



## Appendix A List of those involved in the build

	Role
<i>Trade</i>	
Name:	
Address:	
Contact number:	
Email:	
Class:	
Registration number:	
<i>Trade</i>	
Name:	
Address:	
Contact number:	
Email:	
Class:	
Registration number:	
<i>Trade</i>	
Name:	
Address:	
Contact number:	
Email:	
Class:	
Registration number:	
<i>Trade</i>	
Name:	
Address:	
Contact number:	
Email:	
Class:	
Registration number:	
<i>Trade</i>	
Name:	
Address:	
Contact number:	
Email:	
Class:	
Registration number:	



## Appendix B List of specified systems (Commercial / Industrial Building Consent Applications)

The specified systems for the building are as follows:

*Tick all applicable and outline the performance standards and reporting frequency*

The following specified systems are existing, being altered, added to, or removed in the course of the building work		Existing	Altered	Added/New	Removed	Complete this section if systems are new, altered or added only		
						Performance standards	Inspection & maintenance procedures	Reporting frequency
SS1	Automatic systems for fire suppression (e.g. sprinkler systems)(includes Gas/Flood Systems)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS2	Automatic or manual emergency warning systems for fire or other dangers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS3	Electromagnetic or automatic doors or windows							
	SS3.1 Automatic doors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS3.2 Access control doors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS3.3 Interfaced fire or smoke doors or windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS4	Emergency lighting systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS5	Escape route pressurisation systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS6	Riser mains for use by fire services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS7	Automatic backflow preventers connected to a potable water supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS8	Lifts, escalators, travellers or other systems for moving people or goods within buildings							
	SS8.1 Passenger-carrying lifts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS8.2 Service lifts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS8.3 Escalators and moving walkways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS9	Mechanical ventilation or air conditioning systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS10	Building maintenance units (for providing access to the exterior and interior walls of a building)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS11	Laboratory fume cupboards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS12	Audio Loops or other assistive listening system							
	SS12.1 Audio loops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS12.2 FM radio frequency systems and infrared beam transmission systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			



The following specified systems are existing, being altered, added to, or removed in the course of the building work		Existing	Altered	Added/New	Removed	Complete this section if systems are new, altered or added only		
						Performance standards	Inspection & maintenance procedures	Reporting frequency
SS13	Smoke control systems							
	SS13.1 Mechanical smoke control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS13.2 Natural smoke control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS13.3 Smoke curtains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS14	Emergency power systems for, or signs relating to, a specified system in 1-13 above							
	SS14.1 Emergency power systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS14.2 Signs for systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS15	Other fire safety systems or features							
	SS15.1 Systems for communicating spoken information intended to facilitate evacuation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS15.2 Final exits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS15.3 Fire separations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS15.4 Signs for communicating information intended to facilitate evacuation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	SS15.5 Smoke separations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
SS16	Cable cars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			





**RECORD OF TITLE  
UNDER LAND TRANSFER ACT 2017  
FREEHOLD  
Search Copy**



  
R.W. Muir  
Registrar-General  
of Land

**Identifier** 445017  
**Land Registration District** Taranaki  
**Date Issued** 24 December 2008

**Prior References**  
293173

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**Estate** Fee Simple  
**Area** 606 square metres more or less  
**Legal Description** Lot 42 Deposited Plan 412125  
**Registered Owners**  
Raewyn Pamela Stockman

---

**Interests**

Subject to Section 59 Land Act 1948  
8040085.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 24.12.2008 at 9:00 am  
Fencing Covenant in Easement Instrument 8040085.11 - 24.12.2008 at 9:00 am  
Land Covenant in Easement Instrument 8040085.11 - 24.12.2008 at 9:00 am

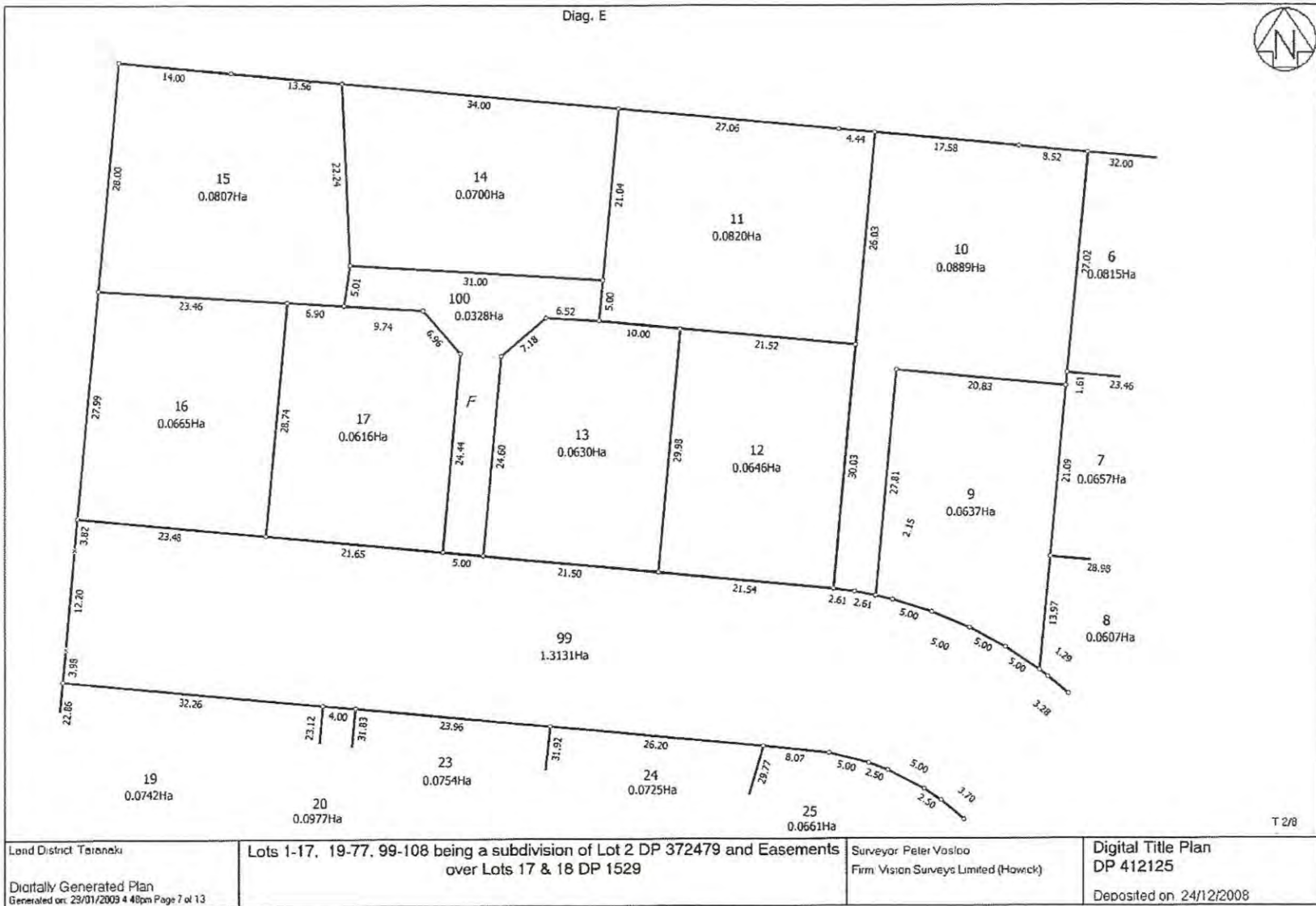




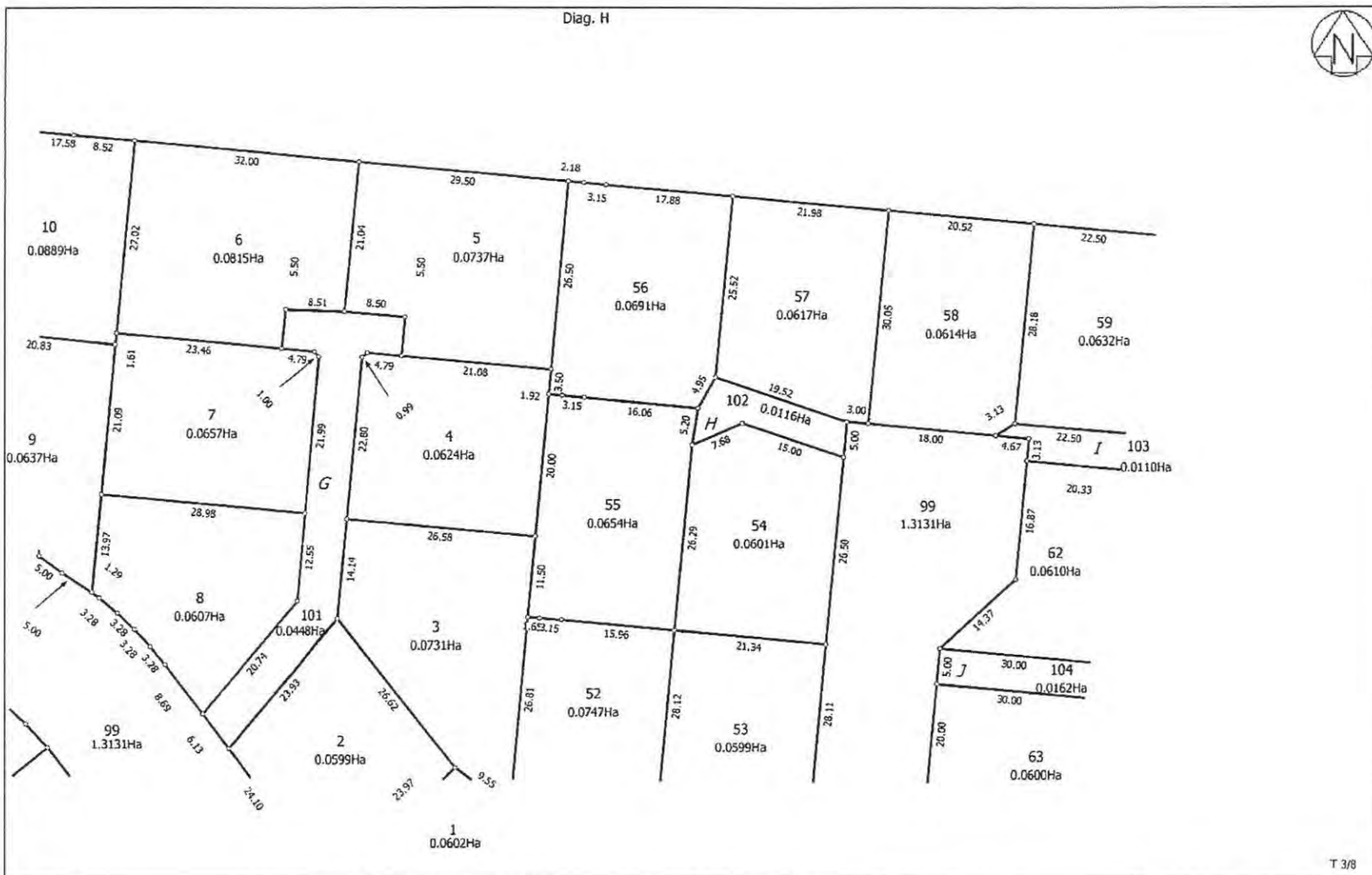
**NOTE:**  
*Lot 77 is a Recreation Reserve to Vest in South Taranaki District Council*  
*Lot 99 is Road to Vest in South Taranaki District Council*  
*Lot 108 is a Local Purposes Reserve to Vest in South Taranaki District Council*

Land District: Toronto Digitally Generated Plan Generated on: 29/11/2004 From Page 6 of 13	Lots 1-17, 19-77, 99-108 being a subdivision of Lot 2 DP 372479 and Easements over Lots 17 & 18 DP 1529	Surveyor: Peter Vasloo Firm: Vision Surveys Limited (Howick)	Digital Title Plan DP 412125 Deposited on: 24/12/2008
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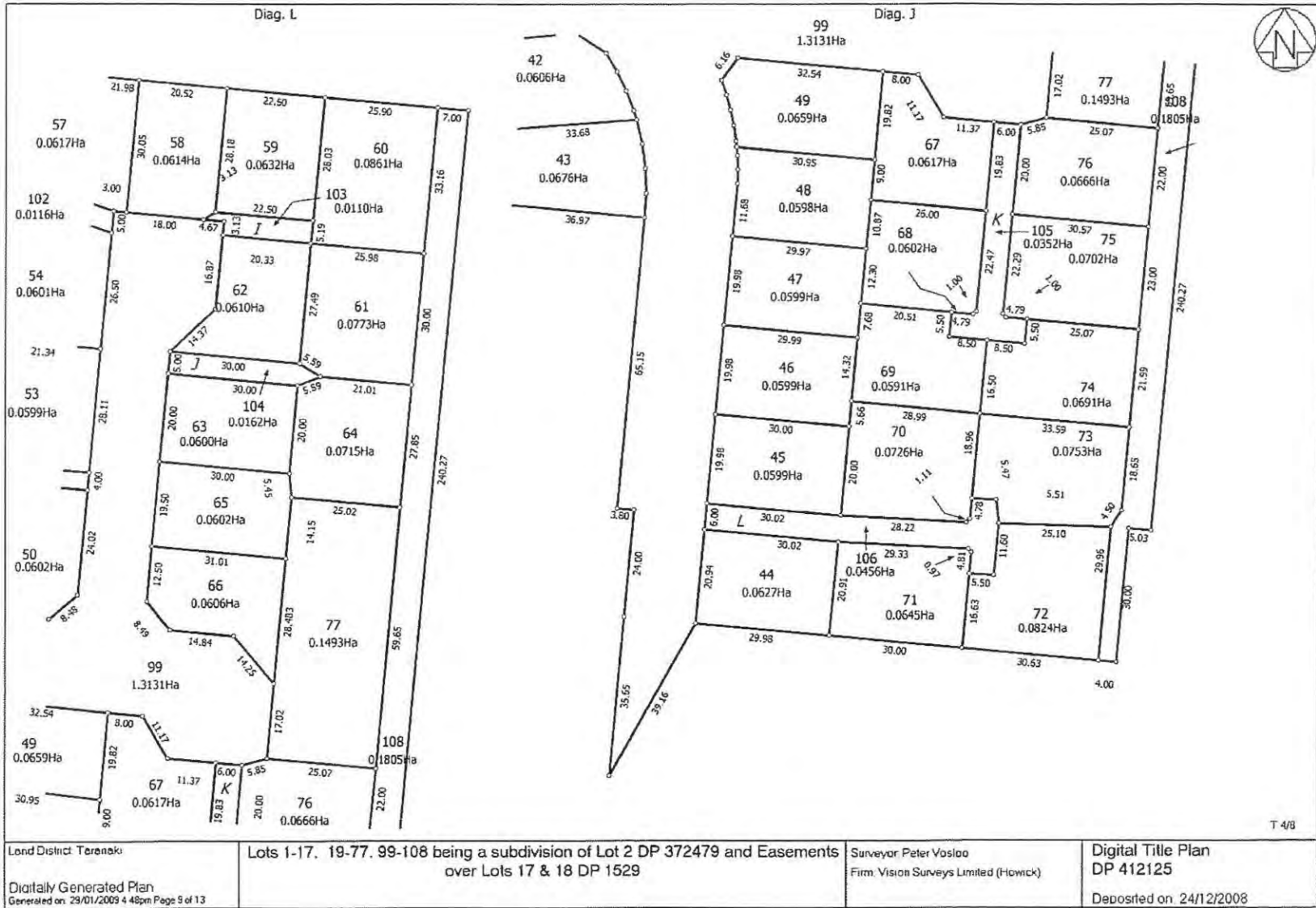






Land District Taranaki	Lots 1-17, 19-77, 99-108 being a subdivision of Lot 2 DP 372479 and Easements over Lots 17 & 18 DP 1529	Surveyor Peter Vosloo Firm Vision Surveys Limited (Howick)	Digital Title Plan DP 412125 Deposited on 24/12/2008
Digitally Generated Plan Generated on: 23/01/2009 4:48pm Page 8 of 13			









T 5/8

Lend District, Taranaki

Digitally Generated Plan  
Generated on: 25/01/2009 4:48pm Page 10 of 13

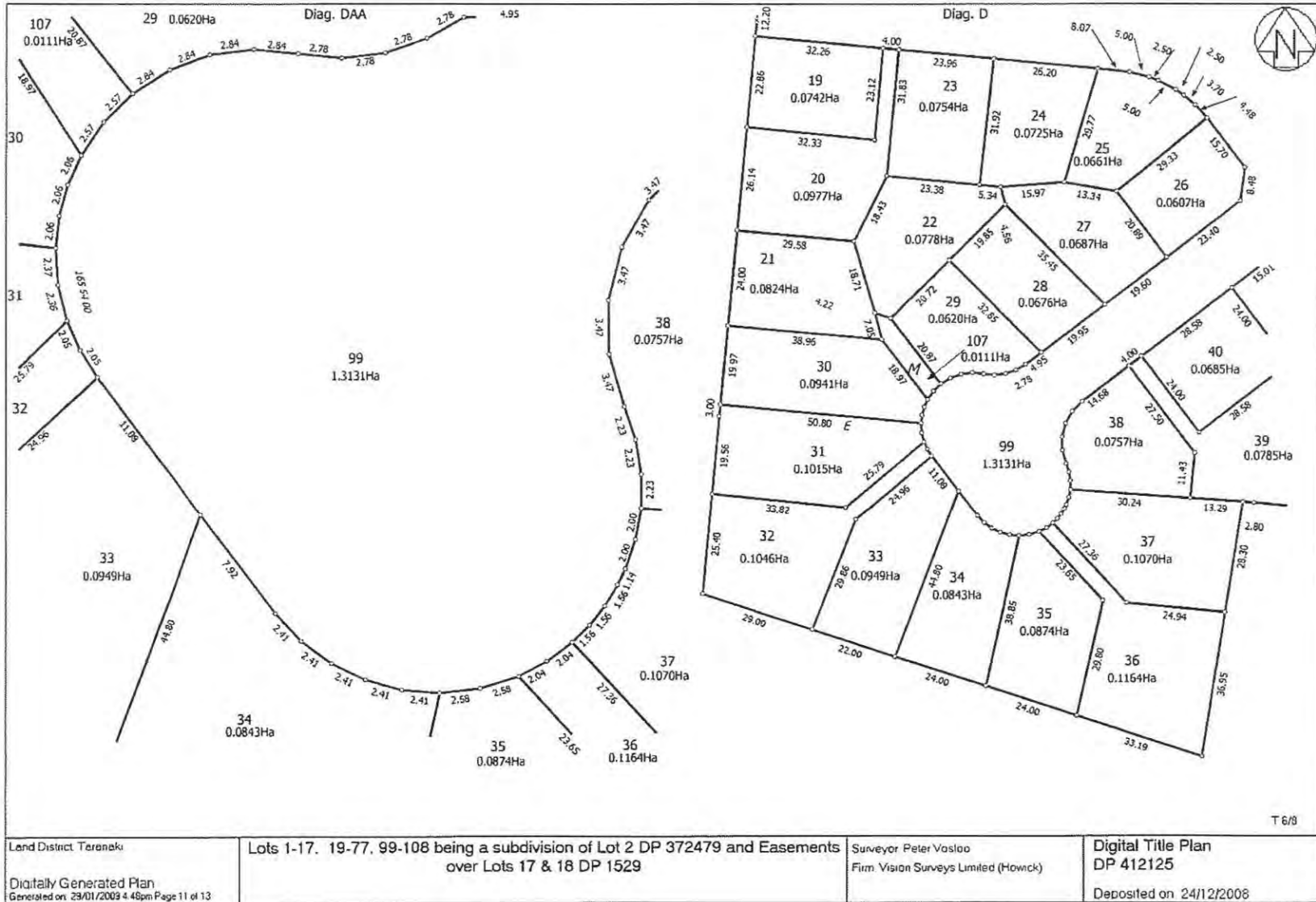
Lots 1-17, 19-77, 99-108 being a subdivision of Lot 2 DP 372479 and Easements  
over Lots 17 & 18 DP 1529

Surveyor: Peter Vosloo  
Firm: Vision Surveys Limited (Howick)

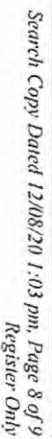
Digital Title Plan  
DP 412125

Deposited on: 24/12/2008















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# ENGINEERS REPORT

## 27 County Drive Hawera

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14<sup>th</sup> September 2020

Authored by: Martin Cockitt CMEngNZ CPEng IntPE APEC MICE CEng (UK)

ACE Consultants Ltd

Geotechnical Testing by

Jabe Radich

GEOTEST Ltd

South Taranaki District  
Council  
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ACE Consultants



## INTRODUCTION

ACE Consultants Ltd in association with, Geotest, has been engaged to undertake a geotechnical investigation and engineering report to determine the suitability of a proposed building platform located at Lot 42 DP 412125.

This report comments on the following:

The subsoil suitability, in accordance with the New Zealand Building Code - NZBC Acceptable Solutions B1.

The zoning of the lot in terms of building loadings

The relationship of the building platform its surrounding structures.



Figure 1: Location 27 County Drive Hawera

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Figure 2: Lot 42 DP 412125 at 27 County Drive, Hawera

## SITE DESCRIPTION

County Drive is located off Glover Road on the north entrance into the Hawera Township.

The site is located on the eastern road frontage of the encompassing lot and has rights to and area of 606 m<sup>2</sup>. The site has a surface grade of approx. 2% and falls west away from County Drive towards the old fenceline. The house site is situated fairly central to the lot, as shown in Fig 1. above. There is an existing house to the north and a new build house to the south.

## BRANZ ZONING

### Earthquake

The site is located in Zone 1 in Fig 5.4 of NZS 3604:2011, which is aligned with NZS 1170.5:2004 Structural design actions - Part 5: Earthquake actions - New Zealand.

### Corrosion Zone

The site is located in Zone C in Figure 4.2 of NZS 3604:2011 for New Zealand. The zones relate to the severity of exposure to wind-driven salt, with B being low risk, C medium risk and D high risk.

### Climate Zone

The site is located in Zone 2 in Figure B1 in NZS 4218:2004 Energy efficiency.



### Wind Region

The site is located in Region A in accordance with NZS 3604:2011 and AS/NZS 1170.2:2011.

### Rainfall Intensity

The site has a high rainfall intensity of 60-70mm/hr obtained from the NIWA HIRDS (High-Intensity Rainfall Design System) data. It corresponds to a 10-minute rainfall intensity with an annual probability of exceedance of 10%. These values are used in conjunction with clause E1 of the Building Code if required.

### Under Ground Services

As illustrated in the South Taranaki GIS image below, the regular services run around this site with no services crossing the intended footprint of the building. This information, should of course also be checked with the dial before you dig services on-site before any excavation takes place.



Figure 3: Image services utilities at the site



## GEOTECHNICAL INVESTIGATION

A geotechnical investigation was carried out on the 14<sup>th</sup> August 2020 and consisted of four scala penetrometer tests and four hand-bored augers with shear-vane tests. These tests were performed in logical locations to understand the suspected subsoil conditions. Geotechnical testing was done below the current ground level as of the test date (EGL). The testing is attached as Appendix A.

The tests were undertaken to the maximum depth of 3000 mm (this being the maximum possible with the hand equipment). The test results are attached in Appendix A.

Topsoil was present to a depth of 300mm in all holes.

All boreholes identified the subsoil to be clayey, silty ash with some sand and organic material layers; it has been identified as typical Taranaki Brown Ash. Borehole 3 found black peat at 4500mm. Images of typical soil samples extracted during testing are shown below.



*Figure 4: Typical soil samples from boreholes (note discolouration from the typical Taranaki Ash)*

The water table was encountered in all boreholes (1000 mm in borehole 1 and 4 plus 1500 mm in borehole 2 and 3). The apparent difference in depth to the water table is due to the difference in EGL – rather than subsoil conditions altering the water table depth (which was fully encountered at 2000mm in all holes).

Scala penetrometer testing gave variable penetrations per blow (ranging from 55 mm to 125mm per blow). These Scala penetrometer tests illustrated that apart from BH1 (the south-east corner) the encountered material is generally weak with the Black Peat encountered in BH3 (north-west corner) being particularly weak.



### **Taranaki Brown Ash**

The volcanic ring-plain which surrounds Mt. Egmont in the Taranaki district is comprised of volcanically derived debris known as volcanoclastic deposits. Taranaki Brown Ash is the general term used by the engineering profession to describe the finer-textured soil fractions of these deposits which, in contrast to sedimentary deposits, exhibit characteristics of considerable significance to the engineer involved with its use in foundations. This material can be of pyroclastic or detrital nature, and were laid some 10,000 years ago.

Pyroclastic material is defined as having been produced by explosive or aerial ejection from a volcanic vent. In contrast, detrital volcanic material consists of reworked and redeposited pyroclastic material, commonly in the form of lahar deposits. Lahars (or volcanic mudflows) generally occurred when ash, lapilli and blocks of all sizes became intermixed with water (either from a crater lake or melted snow) and flowed down the mountainside, often travelling large distances. The resultant landform from this is characterised by swarms of mounds and hillocks set on an otherwise flat plain; this is most common in South Taranaki.

The strength of Taranaki Brown Ash is measured as a Californian Bearing Ratio or CBR. Undisturbed volcanic ash CBRs can vary 0 to 13 with the range 3 to 7 being more typical.

The insitu or natural moisture water content

This can vary from 60 to 120% however, 80 to 100% is the typical range. The moisture content varies with the allophane content, and this increase with depth. A moisture content of 100% at 2m depth is not uncommon.

Taranaki Brown Ash frequently occurs in thick weak to strongly weathered beds. This weathering process produces a succession of 'clay minerals' with initial allophane being formed, which in time (say 20,000 years) changes to halloysites and finally kaolin, both of which are quite weak.

This dominant allophane clay mineral in the Taranaki volcanoclastics contributes a greasy feel to the soil and imparts many of the undesirable characteristics associated with this material. The allophane mineral exists as a gel-like structure which, on drying below the natural water content, will undergo irreversible changes in physical properties as the gel structure collapses and aggregates into much coarser grain sizes. This makes the material very unsuitable as an engineering fill material.

### **Testing Summary**

The testing has concluded that the subsoil does not consistently meet the strength requirement from NZS3604 definition for 'Good Ground' that being *'any soil or rock capable of permanently withstanding an ultimate bearing capacity of 300kPa, (i.e. an allowable bearing pressure of 100kPa using a factor of safety of 3.0)'*.

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## **BUILDING PLATFORM SUITABILITY**

Geotechnical testing has identified that the subsoil is an unsuitable fill material with variable bearing capacities through the test locations.

The above indicates that the soil does not meet the NZS3604 definition of 'Good Ground', or that of New Zealand Building Code – Acceptable Solutions B1/AS4 of approved documents B1/4: Structural Foundations. Therefore, specific engineered design of future dwellings foundations will be required.

Two likely options to create suitable foundations for a dwelling are summarized below.

### **Engineered Raft Foundation**

A raft foundation (e.g. the Firth RibRaft system, most commonly used in New Zealand) is a continuous slab in two directions resting on the soil that extends over the entire footprint of the building. This style of foundation equally distributes the surcharge from the foundation and dwelling onto the soil – reducing the stress on the soil and aiding in removing the potential of differential sedimentation. This raft is a common solution in New Zealand's soft soils.

### **Piled Foundation**

A piled foundation typically consists of thrust timber piles (with a specified small end diameter, depth of embedment and pile set) embedded into the soil. These piles are located strategically under the foundations to support them in weak or organic soils. These piles are either driven to a set onto "Good Ground" (end bearing) or rely on skin friction to maintain a solid placement in weaker ground.

## **BUILDING PLATFORM DESIGN**

A suitable piled foundation combining the two options above (rib raft design with minimal piling) is attached as Appendix B.

## **BUILDING PLATFORM CALCULATIONS**

These are attached as Appendix C.

## **DESIGN STATEMENT**

An Engineering NZ Design Statement (PS1) for the foundations and platform design is attached as Appendix D.

## **STORMWATER MANAGEMENT**

South Taranaki District Council will provide a kerbside connection to their stormwater infrastructure system.

## **FLOOD FREE PLATFORM**

Provided any future dwelling is not built near the low points within the lot and provided the finished-floor-level requirements outlined within NZS3604 and NZS4229 are met, then a flood-free platform can be achieved.

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## **LIMITATIONS OF THIS REPORT**

This report has been prepared for the South Taranaki District Council as our Client, in accordance with the agreed scope of services. The reliance by other parties on this document shall without our prior agreement in writing be at such parties' sole risk.


The observations noted in the supplied site investigation have been extrapolated between the various test locations to infer probable site conditions. It is noted that these inferences in no way guarantee the validity of these assumptions due to the potential variability of the site soils.

Recommendations and opinions in this report are based on data obtained from the investigations and site observations as detailed in this report. The nature and continuity of subsoil conditions at locations other than the investigation bore and tests are inferred, and it should be appreciated that actual conditions could vary from the assumed model. If ground conditions are found to vary from that described or assumed, the matter should in the first instance be referred to Geotest for comment.

Please contact any of the signatories for further information. If there are any questions arising from the above or during construction, please call this office.



Authored by:


Martin Cockitt
Date: 14/09/20

## **APPENDICES**

**APPENDIX A - GEOTECHNICAL RESULTS**

**APPENDIX B - LAYOUT OF BUILDING AND FOUNDATIONS**

**APPENDIX C - STRUCTURAL CALCULATIONS FOR RAFT AND FOUNDATIONS**

**APPENDIX D - DESIGN STATEMENT PS1**

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## APPENDIX A - GEOTECHNICAL RESULTS

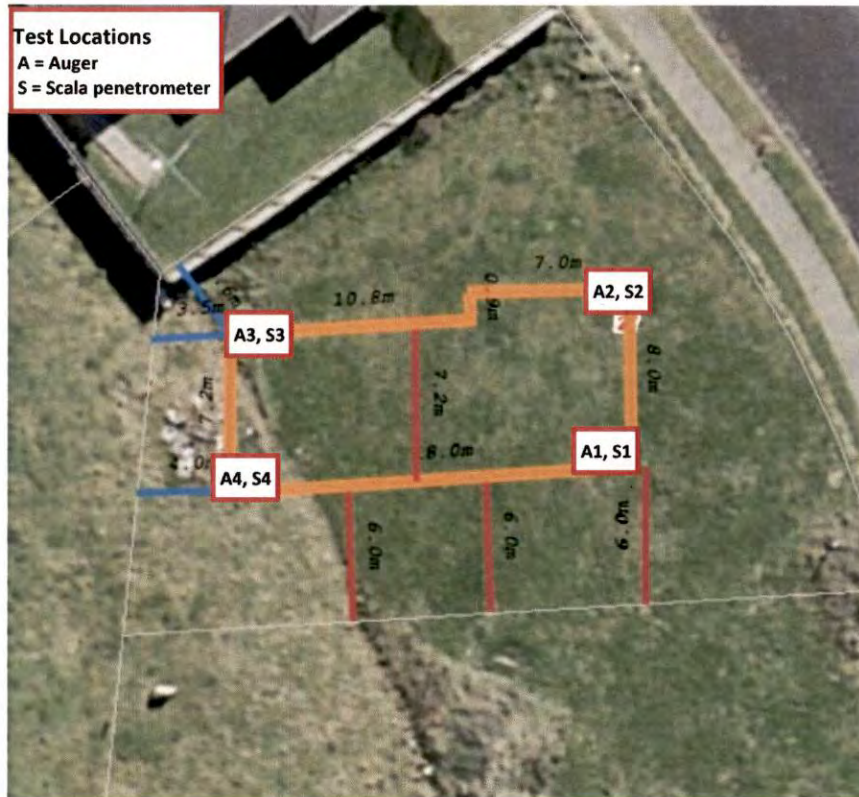
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SCALA PENETROMETER, AUGER & SHEAR VANE TEST SHEET

Client: Hamish Scott  
Client Contact:  
Location: 27 County Drive, Hawera  
Test Date: 14/08/20

Job No: 20123  
Tested By: Jabe Radich



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Client: Hamish Scott  
Client Contact:  
Location: 27 County Drive, Hawera  
Test Date: 14/08/20

### Scala 1



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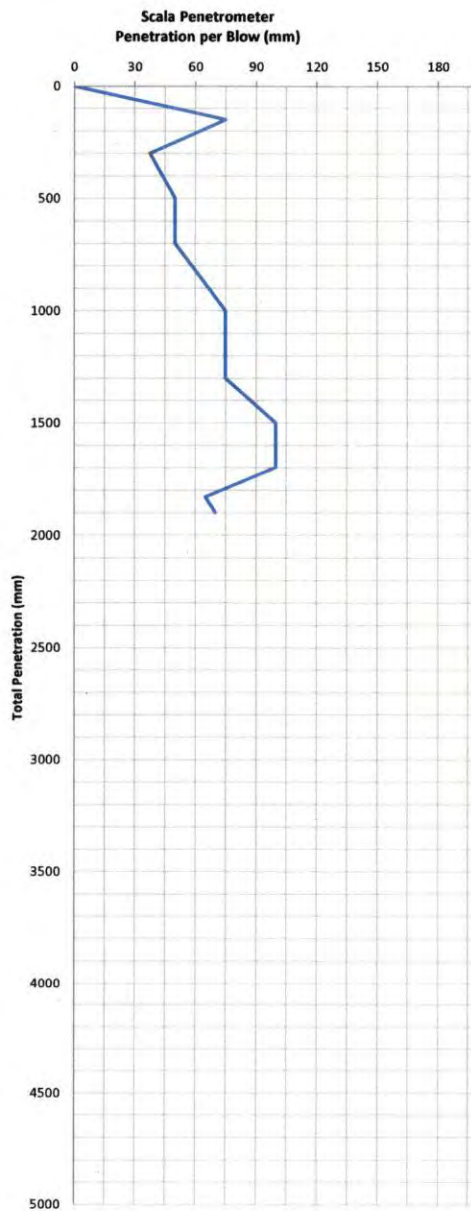


### SCALA PENETROMETER, AUGER & SHEAR VANE TEST SHEET

Client: Hamish Scott  
 Client Contact:  
 Location: 27 County Drive, Hawera  
 Test Date: 14/08/20

Job No: 20123  
 Tested By: Jabe Radich

#### Scala 2



#### Auger 2

Depth (mm)	Description	Log	Shear Strength (kPa)
0	Topsoil		
200			
500	Moist, low plasticity, brown clayey silt loam with a trace of coarse sand		109
1000	Red medium gravels (100 mm layer)		62
1500	Water Content increase		84
2000	Soil becomes light brown		57
2200	Soil becomes stickier		
2500			
3000			54
3500			
4000			68
4500	Black peat		
5000			

EOH

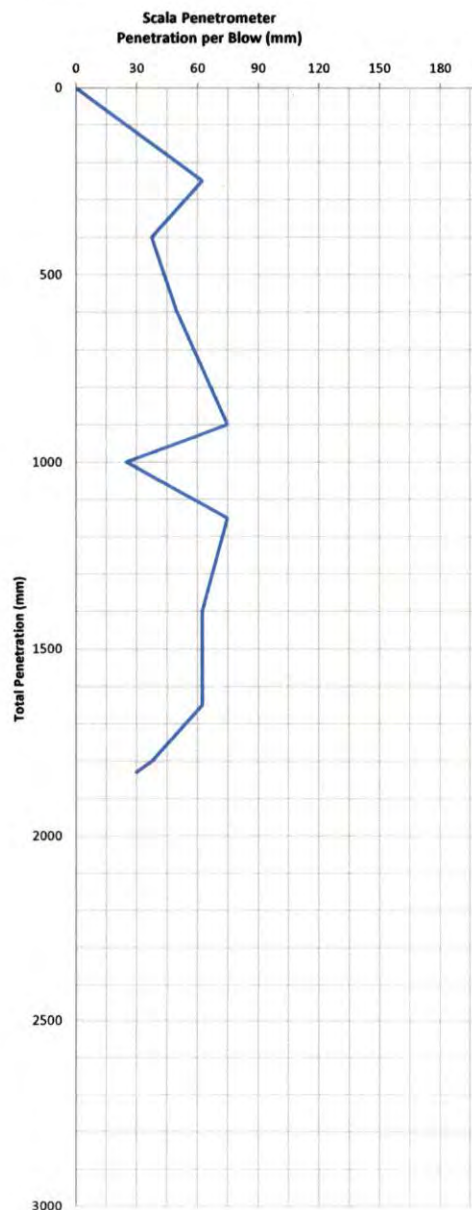


### SCALA PENETROMETER, AUGER & SHEAR VANE TEST SHEET








Client: Hamish Scott  
 Client Contact:  
 Location: 27 County Drive, Hawera  
 Test Date: 14/08/20

Job No: 20123  
 Tested By: Jabe Radich

Scala 3



Auger 3

Depth (mm)	Description	Log	Shear Strength (kPa)
0	Topsoil		
300	Moist, low plasticity, brown clayey silt loam with a trace of coarse sand		
500			109
1000	Water Content increase		75
1500	Soil becomes light brown		114
1900	Water table		
2000	EOH		117

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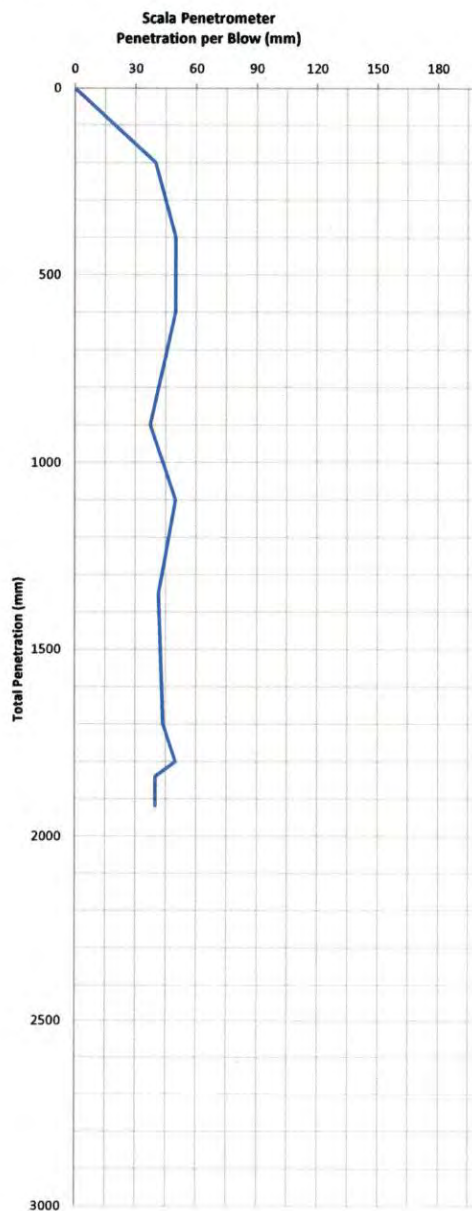


### SCALA PENETROMETER, AUGER & SHEAR VANE TEST SHEET

Client: Hamish Scott  
 Client Contact:  
 Location: 27 County Drive, Hawera  
 Test Date: 14/08/20

Job No: 20123  
 Tested By: Jabe Radich

Scala 4



Auger 4

Depth (mm)	Description	Log	Shear Strength (kPa)
0	Topsoil	⌄ ⌄ ⌄	
300		⌄ ⌄ ⌄	
500	Moist, low plasticity, brown clayey silt loam with a trace of coarse sand	⌄ ⌄ ⌄	163
1000	Water Content Increase	⌄ ⌄ ⌄	120
1500	Soil becomes light brown	⌄ ⌄ ⌄	98
2000	Water table EOH	⌄ ⌄ ⌄	79

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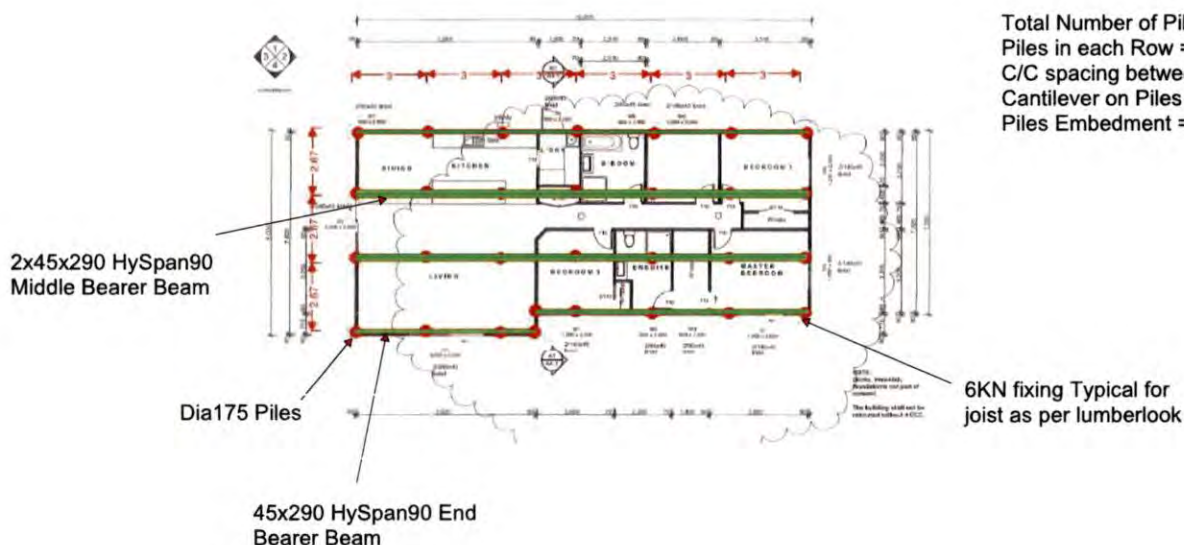


## APPENDIX B - LAYOUT OF BUILDING AND FOUNDATIONS

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## Pile Layout Plan

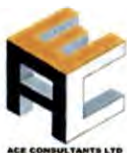


Total Number of Piles = 30Nos.  
Piles in each Row = 7Nos.  
C/C spacing between piles = 3m longitudinal  
Cantilever on Piles = 0.5m to 0.6m Maximum  
Piles Embedment = 4m

### NOTES:

- Drive Dia175 SED Timber piles (H5) Tanapoles Using hammer listed below for required set.
- 500kg Hammer with 1m drop and pile final set of 32mm
- Treat the cut tops of the Tanapoles with generous three coats of Metalx.
- All sub floor fixing shall be stainless steel.
- Bearer to bearer connections used suitable joist hangers.
- All joist to bearer fixing shall be a 6KN connection.
- Provide solid blocking between joist over bearer lines @1.8m max centres and continuous solid blocking at mid- span of joist.
- All pile sizes are indicated on drawing.

SKETCH -1

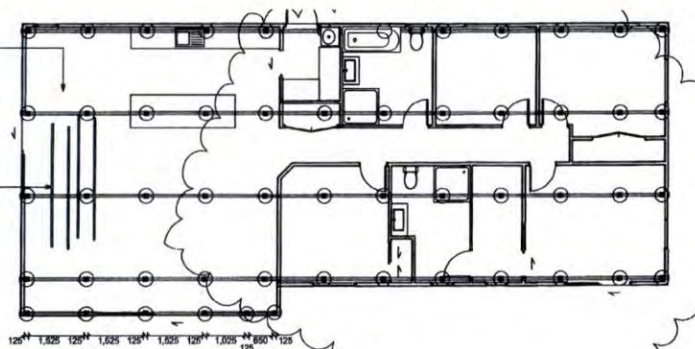


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Indicative only for subfloor Joist Plan  
Layout see sketch 1

140x45 timber floor joists @  
450mm c/s. Nogg along  
bearer lines @ 1.8m c/s



FLOOR FRAMING PLAN  
Scale 1:100



**Table 7.5 – Nailing schedule for hand-driven and power-driven nails (see 7.6)**

Joint	Hand-driven nails		Power-driven nails	
	Length, size & diameter, and type	Number/Location	Length, size & diameter, and type	Number/Location
<b>Floor framing</b>				
Boundary joist to end of each joist	100 x 3.75	2 (end nailed)	90 x 3.15	2 (end nailed)
Curtailed joist not exceeding 3 m long to trimmer	100 x 3.75	3 (end nailed)	80 x 3.15	3 (end nailed)
Curtailed joist to trimmer when half house	100 x 3.75	2 (end nailed)	80 x 3.15	3 (end nailed)
Fitted joint in joist	100 x 3.75	4 (each end)	80 x 3.15	6 (each end)
Herringbone strutting to joist	60 x 2.8	2 (sloaved)	60 x 2.8	2 (sloaved)
Joist to plate on foundation walls	100 x 3.75	12 (sloaved) per 1.5 m length	80 x 3.15	16 (sloaved) per 1.5 m length
Joist to plate or beam	100 x 3.75	2 (sloaved)	80 x 3.15	3 (sloaved)
Lapped joist in joist	100 x 3.75	2 (each side)	80 x 3.15	3 (each side)
Beid blocking between joists to plate beam or stringer	100 x 3.75	4 (sloaved)	80 x 3.15	6 (sloaved)
Beid blocking to joist	100 x 3.75 or 75 x 3.15	2 (end nailed) 4 (sloaved)	80 x 3.15	2 (end nailed)

Flooring				
Sheet decking (not exceeding 31 mm thick): (a) Supports at sheet edges (b) Intermediate supports	60 x 3.05 ring shanked galv. or 60 x 2.8	150 mm centres  300 mm centres	60 x 2.8 ring shanked galv.	150 mm centres  300 mm centres
Strip flooring not exceeding 75 mm wide to floor joist	2½ x finished thickness	1	—	1
Strip flooring not exceeding 150 mm wide to floor joist	2½ x finished thickness	2	—	2

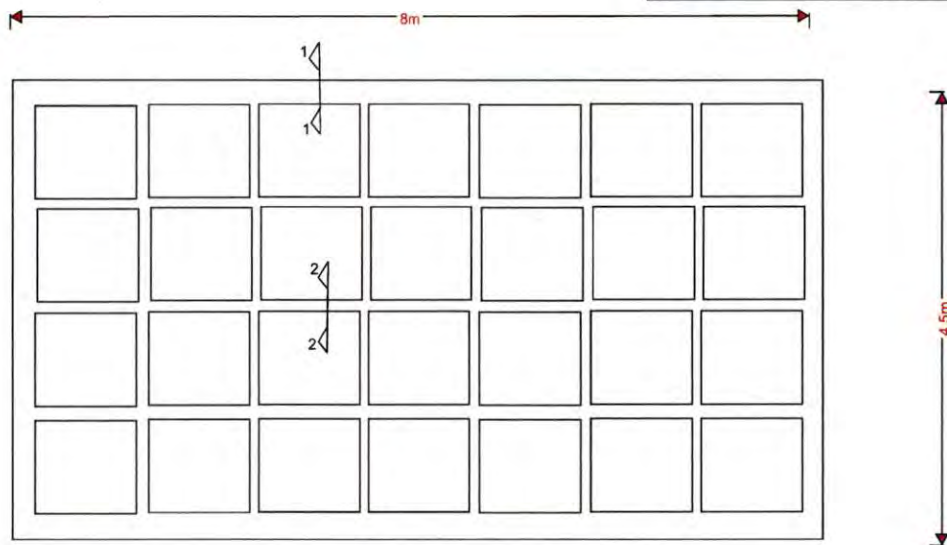
NOTE -  
(1) Nail lengths and diameters are the minimum required.

NOTE -  
(1) Nail lengths and diameters are the minimum required.  
(2) See 4.4 for required protective coatings for metal fasteners.

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NOTES:  
THIS RIBRAFT FLOOR DETAIL HAS BEEN DESIGNED IN ACCORDANCE  
WITH NZS3604, NZS 3101 & THE RIBRAFT TECHNICAL MANUAL 2018  
AS CERTIFIED COMPLYING TO NZ BUILDING ACT 2004 BY CERTMARK  
AUSTRALIA PTY

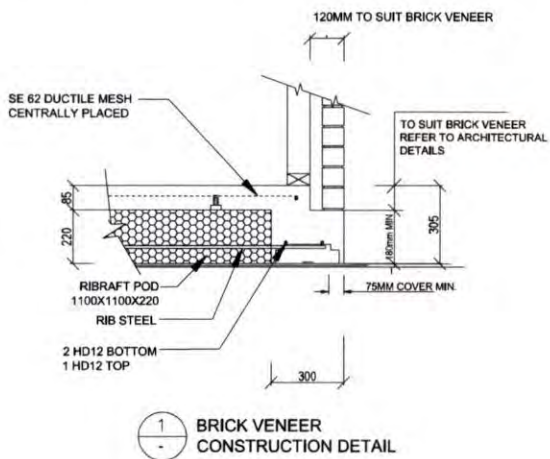


- NOTES:
- DIMENSIONS TO BE CHECKED AGAINST ARCHITECTURAL DRAWINGS
  - CONSTRUCTION OF RIBRAFT SLAB TO BE AS PER FIRTH TECHNICAL MANUAL EXCEPT AS ALTERED BY THIS DESIGN
  - SAWCUTS ARE TO BE MADE WITHIN 24 HOURS OF POURING THE SLAB AND WHERE POSSIBLE UNDER WALL LINES
  - IF UNDERFLOOR HEATING IS INSTALLED, SLAB THICKNESS TO BE INCREASED TO 110MM
  - CONCRETE 20MPA FIRTH RAFTMIX UNLESS IN SEA SPRAY ZONE, THEN 25MPA FIRTH RAFTMIX CONCRETE TO BE USED
  - THE HOUSE FOOTPRINT AND A MIN. OF 1.0M AROUND THE PERIMETER IS TO BE STRIPPED OF TOPSOIL, LOOSE AND DISTURBED GROUND AND FILLED TO REQUIRED LEVEL WITH COMPACTED HARDFILL.
  - min. 100mm HARDFILL TO BE COMPACTED WITH MECHANICAL COMPACTION
  - BLINDING - GAP 7 BLINDING LAYER TO A MINIMUM 500MM PAST THE OUTSIDE EDGE OF SLAB, COMPACT TO A LEVEL LAYER NO GREATER THAN 50MM THICK AND NO HIGHER THAN 305MM BELOW FINISHED GROUND LEVEL
  - INSTALL SPECIFIED STEEL TO FIRTH RIBRAFT FLOOR SYSTEM MANUAL SECTION 2 - INSTALLATION INFORMATION, 3.9 REINFORCING STEEL. ENSURE SPECIFIED MINIMUM COVER REQUIREMENTS ARE MAINTAINED
  - FOR SERVICES AND PIPE PENETRATIONS PLEASE REFER TO THE RIBRAFT TECHNICAL MANUAL SECTION 6.3, TABLE 7, FIGURE 12 & FIGURE 13.

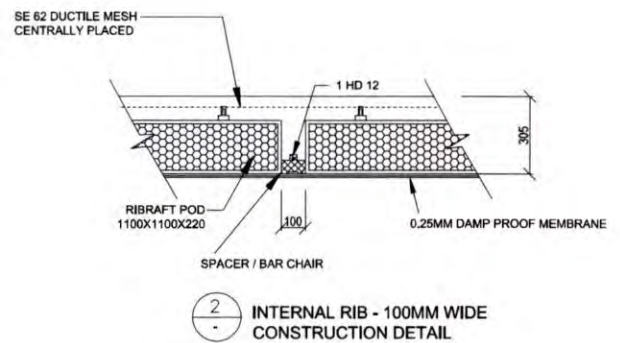


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NOTES:  
THIS RIBRAFT FLOOR DETAIL HAS BEEN DESIGNED IN ACCORDANCE WITH NZS3604, NZS 3101 & THE RIBRAFT TECHNICAL MANUAL 2018 AS CERTIFIED COMPLYING TO NZ BUILDING ACT 2004 BY CERTMARK AUSTRALIA PTY

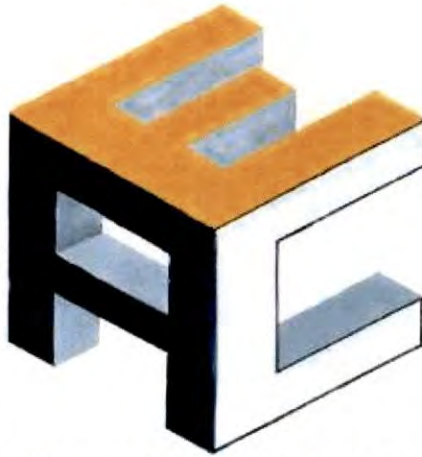


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## **APPENDIX C - STRUCTURAL CALCULATIONS FOR RAFT AND FOUNDATIONS**





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# **Structural Calculations**

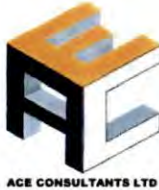
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**Pile Foundation and Garage Raft  
27 Country Drive, Hawera**

Chk: MC  
Rev 0





# GRAVITY LOADING, IMPOSED LOADING (AS/NZS 1170.1:2002)

Building Size      Length = 18 m  
                                  Width = 8 m

## ROOF

Structure = 0.17 kPa  
 Services SDL (insulation incl.) = 0.12 kPa  
 Ceiling Lining = 0.05 kPa  
 Roof PL (Imposed) = 1.10 kN IL2  
 Roof LL (Imposed) = 0.25 kPa  
 lining description plywood

Max DL  
 Min DL

G	Q
0.17	
0.12	
0.05	
0.10	
	0.25
0.44 kPa	0.25 kPa
0.17 kPa	

## FLOOR

Floor Live load = 2.00 kN/m<sup>2</sup>  
 Joist Loads = 45x240 Assumed  
 Plywood = 0.20 kN/m<sup>2</sup>  
 Flooring = 0.15 kN/m<sup>2</sup>  
 Ceiling Lining (Insulation incl.) = 0.05 kN/m<sup>2</sup>

G	Q
	0.05
0.20	2.00 kPa
0.15	
0.05	
0.45 kPa	2.00 kPa

## WALLS

Structure = 0.10 kPa  
 Services = 0.10 kPa  
 Extra Lining = 0.05 kPa  
 =  
 Wall LL (Imposed) = 0.25 kPa

G	Q
0.10	
0.10	
0.05	
	0.25
0.25 kPa	0.25 kPa

# BUILDING SHELL WEIGHTS

## ROOF

Item	Centres (m)	Loading (kPa)
Roofing BMT and type	0.40 Corrugated	0.04
Building paper Type	Standard	0.002
Purlins type	360x45 @ 0.9	0.10 (assumed)
Portal Rafter Section	360x45 @ 9.00	0.01 (assumed)
Fixings (10% of total DL)		0.02
SUM ROOF DL (kPa)		0.17

## WALL

Wall Cladding	0.4 Plumdek	Assumed	0.04
Building Paper	Standard		0.002
Girts	140x45 @ 1.00		0.04
Portal Leg section	90x45 @ 9.00		0.00
Fixings (10% total DL)			0.01
SUM WALL DL (kPa)			0.09

## Applied Frame Loads

## FLOOR

G = 0.45 kPa  
 Q = 2.00 kPa

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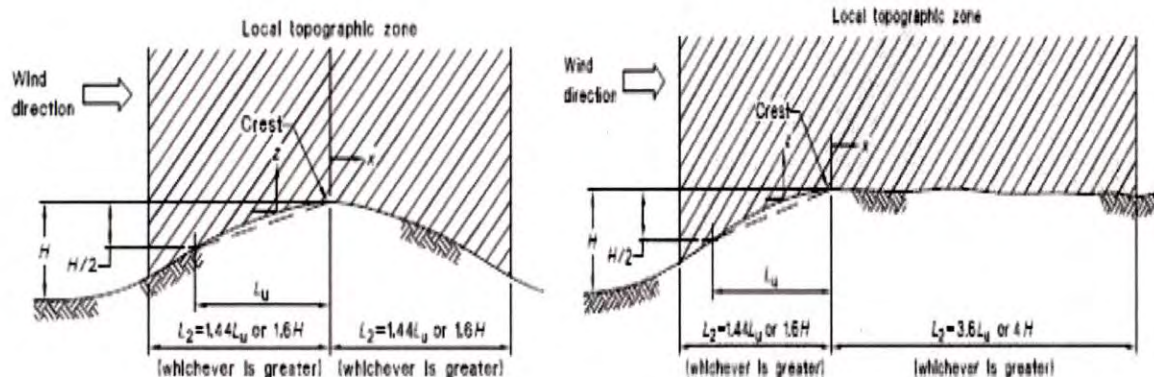
## STRUCTURE PARAMETERS

### Manual Wind Speed Override

High	44.00	m/s
	37.30	m/s

ULS  
SLS

Table 3.1



Check H and Lu in all directions, and use worst one for A.D.

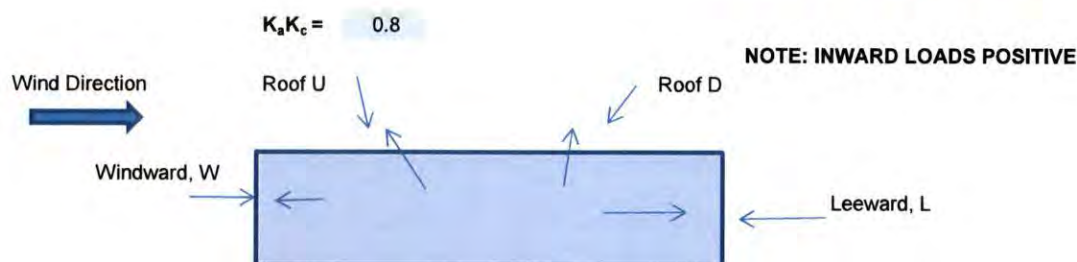
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Sketching and Cfig values

Wind Across N / 0°

	-0.61	-0.16	-0.50	-0.50	
	0.70		0	0.3	-0.3

	Cpe-Cpi	p <sub>ULS</sub>	p <sub>SLS</sub>	$K_a K_c$	crs	=	W <sub>ULS</sub>	W <sub>SLS</sub>	
W	0.70	1.16	0.83	0.8	4.80	=	3.12 kN/m	2.24 kN/m	Load Case 5
U	-0.61	1.16	0.83	0.8	4.80	=	-2.71 kN/m	-1.94 kN/m	Wacross1
D	-0.50	1.16	0.83	0.8	4.80	=	-2.23 kN/m	-1.60 kN/m	
L	-0.30	1.16	0.83	0.8	4.80	=	-1.34 kN/m	-0.96 kN/m	
W	0.70	1.16	0.83	0.8	4.80	=	3.12 kN/m	2.24 kN/m	Load Case 6
U	-0.61	1.16	0.83	0.8	4.80	=	-2.71 kN/m	-1.94 kN/m	Wacross2
D	-0.50	1.16	0.83	0.8	4.80	=	-2.23 kN/m	-1.60 kN/m	
L	-0.30	1.16	0.83	0.8	4.80	=	-1.34 kN/m	-0.96 kN/m	
W	0.70	1.16	0.83	0.8	4.80	=	3.12 kN/m	2.24 kN/m	Load Case 7
U	-0.16	1.16	0.83	0.8	4.80	=	-0.71 kN/m	-0.51 kN/m	Wacross3
D	-0.50	1.16	0.83	0.8	4.80	=	-2.23 kN/m	-1.60 kN/m	
L	-0.30	1.16	0.83	0.8	4.80	=	-1.34 kN/m	-0.96 kN/m	
W	0.70	1.16	0.83	0.8	4.80	=	3.12 kN/m	2.24 kN/m	Load Case 8
U	-0.46	1.16	0.83	0.8	4.80	=	-2.05 kN/m	-1.47 kN/m	Wacross4
D	-0.50	1.16	0.83	0.8	4.80	=	-2.23 kN/m	-1.60 kN/m	
L	-0.60	1.16	0.83	0.8	4.80	=	-2.68 kN/m	-1.92 kN/m	

Wind Across N / 180°

	-0.50	-0.50	-0.61	-0.16	
	-0.30		-0.30	0.0	0.70

	Cpe-Cpi	p <sub>ULS</sub>	p <sub>SLS</sub>	$K_a K_c$	crs	=	W <sub>ULS</sub>	W <sub>SLS</sub>	
W	-0.30	1.16	0.83	0.8	4.80	=	-1.34 kN/m	-0.96 kN/m	
U	-0.20	1.16	0.83	0.8	4.80	=	-0.89 kN/m	-0.64 kN/m	
D	-0.31	1.16	0.83	0.8	4.80	=	-1.37 kN/m	-0.98 kN/m	
L	1.00	1.16	0.83	0.8	4.80	=	4.46 kN/m	3.21 kN/m	

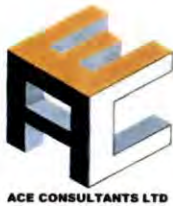




W	-0.30	1.16	0.83	0.8	4.80	=	-1.34 kN/m	-0.96 kN/m
U	-0.50	1.16	0.83	0.8	4.80	=	-2.23 kN/m	-1.60 kN/m
D	-0.61	1.16	0.83	0.8	4.80	=	-2.71 kN/m	-1.94 kN/m
L	0.70	1.16	0.83	0.8	4.80	=	3.12 kN/m	2.24 kN/m
W	0.00	1.16	0.83	0.8	4.80	=	0.00 kN/m	0.00 kN/m
U	-0.20	1.16	0.83	0.8	4.80	=	-0.89 kN/m	-0.64 kN/m
D	0.14	1.16	0.83	0.8	4.80	=	0.62 kN/m	0.45 kN/m
L	1.00	1.16	0.83	0.8	4.80	=	4.46 kN/m	3.21 kN/m
W	-0.30	1.16	0.83	0.8	4.80	=	-1.34 kN/m	-0.96 kN/m
U	-0.50	1.16	0.83	0.8	4.80	=	-2.23 kN/m	-1.60 kN/m
D	-0.16	1.16	0.83	0.8	4.80	=	-0.71 kN/m	-0.51 kN/m
L	0.70	1.16	0.83	0.8	4.80	=	3.12 kN/m	2.24 kN/m

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## SEISMIC LOADING (AS/NZS 1170.5:2004)

### STRUCTURE PARAMETERS

Building Importance Level 2 Design Life 50 years  
Location New Plymouth (Hawera)

Elastic Site Hazard Spect  $C(T) = C_h Z R N(T, D)$

	ULS	SLS	
Period Estimate	$T_1 = 0.4$ secs	$T_1 = 0.40$ secs	
Ductility	$\mu = 1$	$\mu = 1.00$	Section 4.3.1
Site Soil Class	D Shallow Soil Site		Section 4.3.2
Spectral Shape Factor	$C_h(T_1) = 3.00$	$C_h(T_1) = 3.00$	Table 3.1
Hazard Factor	$Z = 0.18$ New Plymouth	$Z = 0.18$	Table 3.3 & 3.4
Return Period Factor	$R_u = 1.00$ 1/500	$R_s = 0.25$ 1/25	Table 3.5 & NZBC B1
Near-fault Factor	$N(T, D) = 1.00$	$N(T, D) = 1.00$	Table 3.7 & 3.3
Elastic Site Hazard Spect	$C(T_1) = 0.54$	$C(T_1) = 0.14$	Eq 3.1(1)

### Seismic Horizontal Design Action

$$C_d(T_1) = C(T_1) S_p / k_m$$

Structural Performance factor	$S_p = 1.00$ $k_m = 1.00$	$S_p = 0.70$ $k_m = 1.00$	Section 4.4.2
Seismic Horizontal Design Action	$C_d(T_1) = 0.540$ ULS	$= 0.095$ SLS	Section 5.2(1)

**SLS = 20% ULS**

Structural Performance factor

$$S_p (\text{ULS}) = 0.7 \text{ for } \mu \geq 2$$

$$S_p (\text{ULS}) = (1.3 - 0.3\mu) \text{ if } \mu \geq 1 \text{ and } < 2$$

$$S_p (\text{SLS}) = 0.7$$

For soil classes A, B, C and  $k_m = \mu$  for  $T \geq 0.7s$

$$k_\mu = \frac{(\mu-1) T_1}{0.7} + 1 \text{ for } T < 0.7s$$

Section 5.2.1.1

For soil class E

$$k_\mu = \mu \text{ for } T \geq 1s \text{ or } \mu < 1.5$$

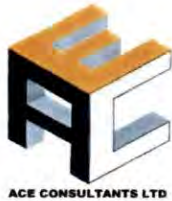
$$k_\mu = (\mu-1.5)T + 1.5 \text{ for } T < 1s \text{ and } \mu \geq 1.5$$

**Wind Loads Will Govern As Light Weight structure**

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## STRUCTURE LOADINGS

### Load Combination

#### Floor

ULS	$1.2G + 1.5Q$	Wuls =	3.84 kPa
SLS	$G + 0.7Q$	Wsls=	2.1 kPa

#### Walls

ULS	1.2G	Wuls =	0.3 kPa
SLS	G	Wsls=	0.25 kPa

Wind ULS	$1.2G + W_u$	Wwind=	1.46 kPa
Wind SLS	$0.9G + W_u$	Wwind=	1.39 kPa

### Floor Loads

ULS	$1.2G + 1.5Q$	Wuls =	3.54 kN/m
SLS	$G + 0.7Q$	Wsls=	1.85 kN/m

Pile Spacing in transverse direction =	2.18 m
Pile Spacing in Longitudinal direction =	3 m
Number of Piles =	28 Nos

This is a relocation home and the existing floor bearers (45-140@450c/c) which can span 2.67m in transverse dir. (see attached calc sheet)

So the bearers are required along the longitudinal direction.

End blocking joist will be installed at the end of piles

Nogging will be installed between the floor joist at bearer beams.

### Load on floor Joist

Spacing between Floor Joist =	450 mm	
Udl load on Floor Joist =	1.728 KN/m	ULS
Udl load on Floor Joist =	0.945 KN/m	SLS

### Piles and Sub Floor

Dia175 timber piles are proposed to be used for the Subfloor.

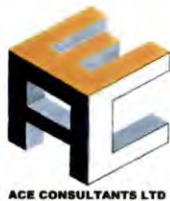
2x45x290 bearer beams for the mid row

1x45x290 bearer beams for the edge rows of piles.

4 rows of piles with 2.67m/c in transverse direction and 3m c/c between each pile in longitudinal direction.

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Seismic Shear for piles

#### BUILDING GEOMETRY

Building Width	=	8.0	m	
Building Lower Height	=	3.00	m	(worst case)
Building Upper Height	=	3.60	m	(worst case)
Area	=	26.4	m <sup>2</sup>	Calculated cross sectional area (standard shape) insert area if required
Wind area	=	26.4	m <sup>2</sup>	Area transferring load to foundation via wind posts

#### WIND LOADS ON BRACING

Base wind pressures	=	1.46	kPa ULS	
	=	1.39	kPa SLS	
C <sub>fig</sub> (Windward + Leeward)	=	1.1	-	
k <sub>s</sub> k <sub>c</sub>	=	0.9	-	
Direct Wind Load	=	37.51	kN	base wind speed * half cross section area * C <sub>fig</sub> * k <sub>a</sub> * k <sub>c</sub>
Check for drag:	=	NA		
h	=	3.40	m	
b	=	18.0	m	
d	=	8.0	m	
C <sub>f</sub> =	=	0.02		Corrugations across wind direction
d/h =	=	2.35	-	
d/b =	=	0.44	-	
Affected Area	=	-138.9	m <sup>2</sup>	
Drag force	=	0.00	kN	
Wind along taken by braces	=	37.51	kN	

#### SEISMIC LOADS ON BRACING

Roof Area	=	180.0	m <sup>2</sup>	
Roof Dead Weight	=	78.8	kN	
Top Half Wall Area	=	78.0	m <sup>2</sup>	
Top Half Wall Weight	=	19.5	kN	
Seismic Horizontal Load	=	53.06	kN	With horizontal coefficient of 0.206
Number of piles provide	=	28.02		Wind load Governs the Horizontal shear of pile
Horizontal Shear Load per pile	=	1.339	kN	

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## Subfloor Bracing Demand

NZS 3603:1993

### Wind Bracing Demand

Building Length	=	18 m
Building Width	=	8 m
Roof Height above Eave	=	0.8 m
Wall height	=	2.4 m
Subfloor Height	=	0.6 m
Building Height to eave	=	3.00 m
Building Height	=	3.80 m
ULS Wind Pressure	=	1.16 kpa

Wind Subfloor Bracing Demand - Along	=	37.51 kN	750 BU
Wind Subfloor Bracing Demand - Across	=	34.3 kN	685 BU

### Earthquake Bracing Demand

Seismic Weight	=	G	Q
Roof Load	=	79 kN	
Wall Load (External)	=	39 kN	
Wall Load (Internal)	=	20 kN	
Floor Load + Subfloor	=	65 kN	134 kN
		202 kN	

$$W_i = G + 0.3Q = 242 \text{ kN}$$

Seismic Coefficient	=	0.54	
Subfloor EQ Bracing Demand	=	131 kN	2616 BU

Subfloor Height	=	0.6 m
Floor Thickness	=	0.02 m
Floor Joist Depth	=	0.14 m
Bearer Depth	=	0.14 m
Pile Cantilever Height	=	0.5 m

For 0.5 m cantilever height, driven pile bracing capacity = 160 BU Max (Wind)  
95 BU (EQ)

#### Along BU Check

Pile along		No	Min BU Req.	Wind Rating	EQ Rating	Wind BU Provided	EQ BU Provided
Line 1	Driven pile	7	188	160	95	1120	665
Line 2	Driven pile	7	188	160	95	1120	665
Line 3	Driven pile	7	188	160	95	1120	665
Line 4	Driven pile	7	188	160	95	1120	665
Total provided						4480	2660
Required						750	2616
Check						OK	OK

#### Across BU Check

Pile Across		No	Min BU Req.	Wind Rating	EQ Rating	Wind BU Provided	EQ BU Provided
Line A	Driven pile	4	114,1899	160	95	640	380
Line B	Driven pile	4	114,1899	160	95	640	380
Line C	Driven pile	4	114,1899	160	95	640	380
Line D	Driven pile	4	114,1899	160	95	640	380
Line E	Driven pile	4	114,1899	160	95	640	380
Line F	Driven pile	4	114,1899	160	95	640	380
Line G	Driven pile	4	114,1899	160	95	640	380
Total provided						4480	2660
Required						685	2616
Check						OK	OK

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## Pile Head Bearer Beam

NZS 3603:1993



Number of Beams = 2 Mid Span  
1 End Span

Beam Size = 45 x 290 mm  
(width) (depth)

Span of Beam (L) = 3.00 m  
Effective Span (L<sub>eff</sub>) = 3.00 m

Wuls = 7.72 kN/m  
Wsls = 4.03 kN/m  
Wwind = 3.02 kN/m

Bending Moment (M\*) = 8.68 kNm (ULS)  
Bending Moment (M\*) = 3.40 kNm (wind)  
Shear Force (V\*) = 11.58 kN (ULS)

Loaded Form UDL

Centre Span Loading  
8.68 kNm (ULS)  
3.4 kNm (wind)  
11.58 kN (SLS)

End Span Loadings  
4.34 kNm (ULS)  
1.7 kNm (wind)  
5.79 kN (SLS)

Load Duration Permanent  
Permanent

Timber Grade SG8  
dry

$k_1 = 0.6$  ULS  
 $k_1 = 0.6$  Wind

Bending strength  $f_b = 14$  MPa  
Compressive Strength  $f_c = 18$  MPa  
Tension Strength  $f_t = 6$  MPa  
Stress in Shear  $f_v = 3$  MPa  
Modulus of Elasticity  $E = 8000$  MPa  
Lower Bound Mod of  $E E_{0.05} = 5600$  MPa  
 $F = 0.8$

Number of Parallel Supports 2  
 $k_4 = 1.14$

Assume no Grid system  
 $k_5 = 1$

max of  $S = 1.35 \times \frac{(L_{eff} \times ((d/b)^2 - 1)^{0.5})^{0.5}}{b} = 0.9$   
or  $3 \times d/b = 19.33$  Yes

$k_3 = 1.00$

Beam fully restrained on tension face only

**BENDING CAPACITY (ULS)**

$M_n = k_1 k_4 k_5 k_s f_b Z = 6.04$  kNm

Mid Span  $FM_n = 9.66$  kNm O.K.  
End Span  $FM_n = 4.83$  kNm O.K.

**BENDING CAPACITY (wind)**

$M_n = k_1 k_4 k_5 k_s f_b Z = 6.04$  kNm

Mid Span  $FM_n = 13.77$  kNm O.K.  
End Span  $FM_n = 6.89$  kNm O.K.

**SHEAR CAPACITY**

$V_n = k_1 k_4 k_5 k_s f_v A_s = 17.85$  kN  
 $A_s = (2bd)/3 = 8700$  mm<sup>2</sup>

$FV_n = 28.56$  kN O.K.

**DEFLECTION** (Beam is supported by Purlins so effective span will be reduced)

Flexural deflection = 2.0 mm  
Shear Deflection = 0.3 mm  
 $d_s = 2$

Total Deflection = 1.1 mm

Deflection =  $\frac{1}{2658}$

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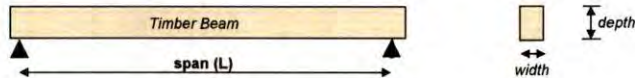




Subfloor Joist

45x145@450c/c

NZS 3603:1993



Number of Beams = 1 Midspan

Beam Size = 45 x 145 mm  
 (width) (depth)

Span of Beam (L) = 2.66 m  
 Effective Span ( $L_{eff}$ ) = 2.66 m

Wuls = 1.73 kN/m  
 Wsls = 0.95 kN/m

Bending Moment ( $M^*$ ) = 1.11 kNm (ULS)  
 Shear Force ( $V^*$ ) = 2.30 kN (ULS)

Loaded Form UDL

1.11 kNm (ULS) Centre Span Loading  
 2.30 kN (SLs)

Z = 157688 mm<sup>3</sup>

Load Duration Permanent  $k_1 = 0.6$  ULS Table 2.4

Timber Grade SG8  
 dry

Bending strength  $f_b = 14$  MPa  
 Compressive Strength  $f_c = 18$  MPa  
 Tension Strength  $f_t = 6$  MPa  
 Stress in Shear  $f_s = 3$  MPa  
 Modulus of Elasticity  $E = 8000$  MPa  
 Lower Bound Mod of  $E E_{p0} = 5600$  MPa  
 F = 0.8

Number of Parallel Supports 2  $k_4 = 1.14$  Table 2.7

Assume no Grid system  $k_5 = 1$  Cl 2.9.2

max of  $S = 1.35 \times \frac{(L_{eff} \times ((d/b)^2 - 1)^{0.5})^{0.5}}{b} = 0.6$   
 or  $3 \times d/b = 9.67$   
 Yes Beam fully restrained on tension face only

$k_6 = 1.00$  Cl 3.2.5.2 Table 2.8

### BENDING CAPACITY (ULS)

$M_n = k_1 k_4 k_5 k_6 f_b Z = 1.51$  kNm Cl 3.2.4

Mid Span  $FM_n = 1.21$  kNm O.K.

### SHEAR CAPACITY

$V_n = k_1 k_4 k_5 f_s A_s = 8.93$  kN  $A_s = (2bd)/3 = 4350$  mm<sup>2</sup> Cl 3.2.3.1

$FV_n = 7.14$  kN O.K.

### DEFLECTION

(Beam is supported by Purlins so effective span will be reduced)

Flexural deflection = 0.0 mm  
 Shear Deflection = 0.3 mm

$d_2 = 2$

Table 2.5  
 NZ timber Design Guide 2007

Total Deflection = 0.1 mm

Deflection =  $\frac{1}{18472}$

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### Pile Carrying Lateral and Vertical Loads (Abutment 1)

1. Piles carrying vertical and horizontal loads.
2. The length of the pile to a soil depth fo+gc is considered to resist of the horizontal loads and the remainder is considered to carry the vertical loads.



#### Soil Properties

Undrained shear strength  $s_u$  = 35 kPa Assumed Lateral resistance reduction factor  $\phi$  = 0.85

#### Applied Loads

Horizontal Load  $H^*$  = 1.3386 kN  
 Max Vertical Load  $N^*$  = 23 kN  
 Vertical Load  $N^*$  (under  $H^*$ ) = 23.152 kN

#### Horizontal Pile Capacity

##### Pile Dimensions

Diameter of the embedded part of the pile shaft  
 Length of the pile shaft  
 Above ground dist. at which  $H^*$  is applied  
 Pile shaft assumed to be unsupported in cohesive soil  
 Centre to centre spacing between embedded piles

$D$  = 0.175 m  
 $L$  = 4 m  
 $e$  = 0.6 m  
 $eo$  = 0.2 m  $\geq$  0.6m  
 3 m  
 no interaction between piles, isolated pile case

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#### Ultimate Lateral Capacity for Isolated and Continuous Piles

Horizontal Load  $H^*$  = 1.3386 kN  $H^*$  = 1.3386166 kN

$\phi H_u = \phi \cdot 9 \cdot s_u \cdot D \cdot [\sqrt{((L+2e+eo)^2 + (L-eo)^2)} - (L+2e+eo)]$   
 $\phi H_u = 56.4$  kN (for isolated piles)  
 $\phi H_u = \phi \cdot 2 \cdot s_u \cdot D \cdot [\sqrt{((L+2e+eo)^2 + (L-eo)^2)} - (L+2e+eo)]$   
 $\phi H_u = 12.5$  kN (for continuous piles)

#### Spacing factor

Spacing factor  $SF$  =  $\frac{\text{centre to centre pile spacing} - D}{3 \times D}$  = 1.00

#### Ultimate Lateral Capacity of Spaced Piles

$\phi H_u \text{ spaced} = \phi H_u \text{ continuous} + \text{spacing factor}(\phi H_u \text{ isolated} - \phi H_u \text{ continuous})$  = 56.369 kN OK  
 Total pile length = 4.20 m

#### Pile Bending

Dist. from good ground to maximum pile shaft moment  
 $gc = \frac{H^*}{\phi \cdot [2 + SF(9-2)] \cdot s_u \cdot D} + eo = 0.23$  m  
 Maximum Pile Shaft Moment  
 $M_{max} = H^* \cdot (e + eo + \frac{gc - eo}{2}) = 1.1$  kN-m

#### Vertical Pile Capacity

Vertical load  $N^*$  = 23.152 kN (ultimate limit state)  $N^*$  = 23.1516 kN

$V^* \leq \phi(V_{su} + V_{bu}) - 1.2W$  Where  $V_{su}$  = pile shaft resistance  $\phi = 0.5$   
 $V_{bu}$  = pile base resistance  
 $W$  = pile selfweight

#### Pile Dimensions

Pile diameter 0.175 m  
 Pile length carrying vertical load 3.77 m  
 Timber unit weight 16 kN/m<sup>3</sup>

#### Soil Properties

Soil undrained shear strength  $s_u$  = 35 kPa  
 Adhesion factor  $\alpha$  = 0.25

#### Pile Shaft Resistance

$V_{su} = C \cdot ca$   $C$  = pile shaft area into rock socket  $ca$  = rock socket adhesion  $V_{su} = 41.23$  kN  
 $= 0.27$  m<sup>2</sup>  $= 150$  kPa  
 $L_r$  = Rock Socket  $= 1.5$  m

#### Pile Base Resistance

$V_{bu} = s_u \cdot \text{pile base area}$   $s_u$  = pile end bearing capacity  $\text{area} = \text{Pile base area}$   $V_{bu} = 0.84$  kN  
 $s_u = 35$  kPa  $\text{area} = 0.0240528$  m<sup>2</sup>

#### Pile Self Weight + weight of Abutment

$W$  = pile volume  $\cdot$  concrete unit weight  $\text{pile volume} = 0.10$  m<sup>3</sup>  $W = 1.54$  kN  
 $\phi_1$  = ULS Strength reduction Factor  
 $= 0.5$   $\phi(V_{su} + V_{bu}) - 1.2W = 464.10$  kN OK  
 $\phi_1$  = Skin Friction in Conjunction with End Bearing  
 $= 0.85$



# HILEY FORMULA FOR DETERMINING PILE SET

## Pile

### Standards Used

There are no applicable standards, this is an alternative solution in terms of the building code.

### Assumptions

Soil types are assumed with parameters taken from standard tables.

A factor of safety of 4 is used unless pile load tests have been undertaken and this can be reduced to 3.

### Description

The sheet calculates the pile set for a maximum pile load and specifies the parameters for the testing.

The achieved set is the average set recorded for 10 drops of the hammer over the specified fall.

Critical Pile Set Design Load =	17.36	kN	SLS Load	
Pile Size =	175.00	Dia		
Pile length =	4.00	m	Pile wt =	461.81 kg
Weight of pile, anvil, helmet and follower	486.8	kg		

### Pile Sets

Hiley Pile Driving Formula; 
$$R = \frac{W \cdot h \cdot \eta}{S + C/2}$$
 Phi= 0.5  
R= 46.3

Where, PhiR = 23.15 kN, ultimate driving resistance

W = 500 kg, weight of the hammer = 4.9 kN

h = 1000 mm, free-fall height of hammer. Hammer type = Winch operated hammer

Trigger drop hammer 1 0.8

Winch operated hammer 0.8

Single acting hammer 0.9

= 800 mm, allowing for hammer free fall efficiency

Soil is assumed to be medium driving ;

$$C = C_c + C_p + C_q; \quad C_c = 1 \text{ mm, elastic compression of pile head or dolly}$$
$$C_p = 4 \times 10^{-4} \text{ mm/mm, elastic compression of the pile itself}$$
$$C_q = 4 \text{ mm, quake of the ground beneath the pile}$$

C = 6.60 mm

n = 0.59 , efficiency of blow

Factor of Safety = 3

S = 32 mm, final set or penetration per blow (mean of 10 blows)

### Adopt -

A final set of 32 mm per blow (mean of 10 blows) using a 500kg hammer with a drop of 1000mm

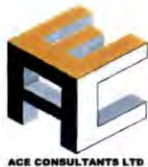
Minimum embedment depth 4m

If driven pile fails to reach required pile set, inform design engineer immediately.

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## Garage Slab and Footing

Wall loading	=	3.5 kN/m	ULS
	=	1.85 kN/m	SLS
Wall frame width	=	150 mm	
Pressure under wall frame	=	24 kPa	

Ok for ground Bearing

### Garage Slab Size

Length	=	8 m	Width=	4.5 m
Loading	=	13 kN	(Point Load)	
Wheel Size	=	200x500 mm	Contact Area	
Pressure under wheel	=	22 kPa		

OK for Ground Bearing

Using the Rib Raft footing supported on timber piles as the ground has uncontrolled fill upto 1m. So the piles are proposed to be drilled into the ground to support the RibRaft footing.

Slab Thickness proposed =	85 mm	
External Rib DL =	0.3*0.22*24	1.584 kN/m
Internal Rib DL =	0.1*0.22*24	0.528 kN/m
Internal Load Bearing Rib DL =		1.584 kN/m

Floor Slab LL =	2.5 kPa	(Garage Loading)
Slab Point Load=	13 kN	(Garage Loading)

85mm thick slab to span between 305mm deep ribs @ 1200mm Centers each way

M*(1.2G)	=	0.18 kNm	
M*(1.5Q)	=	0.225 kNm	
M*(1.5P)	=	1.22 kNm	(per 1.2m)
M*Max(1.2G+1.5P)	=	1.40 kNm	
Ast (area of steel req)	=	81.3 mm <sup>2</sup>	< Min Steel
Ast (Min.area of steel req)	=	123 mm <sup>2</sup>	

SE62 Mesh	=	142 mm <sup>2</sup>	>	123 mm <sup>2</sup>	So Okay
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### Wall Footing

For simplicity, the slab load on external rib is UDL

Wall Load =	3.5 kN/m
Wall Load =	1.85 kN/m
PG =	5.31 kN
PQ =	2.775 kN

W (1.2G+1.5Q)=	11 kN/m
P (1.2G+1.5Q)=	7 kN

M*ULS=	16.1 kNm
Ast (area of steel req)	= 172.465 mm <sup>2</sup>
Ast (Min.area of steel req)	= 193.2 mm <sup>2</sup>

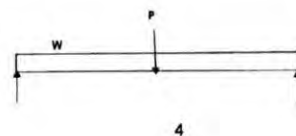
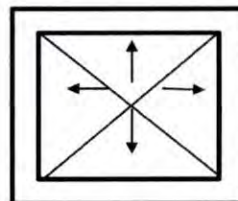
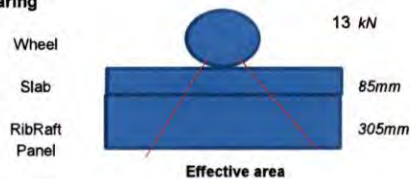
2/H12=226mm <sup>2</sup> /m	>	193.2 mm <sup>2</sup> /m
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### Internal Ribs for Garage

G=	2.2 kN/m
PG=	3.056 kN
PQ=	13 kN

Governing

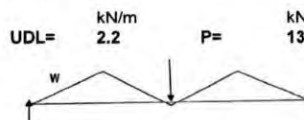
M*max=	17.6 kNm
V*Max=	13.71 kN
Ast (area of steel req)	= 189 mm <sup>2</sup>
Ast (Min.area of steel req)	= 69 mm <sup>2</sup>
1/H12 = 113mm <sup>2</sup>	is Okay



### Shear Check

V*=	19.31 kN
pw=	0.003275 steel ratio
Vc=	0.52 Mpa
Vi=	0.47 Mpa
	< 0.52 Mpa
	So Ok

No Stirrups Required



### Shear Check

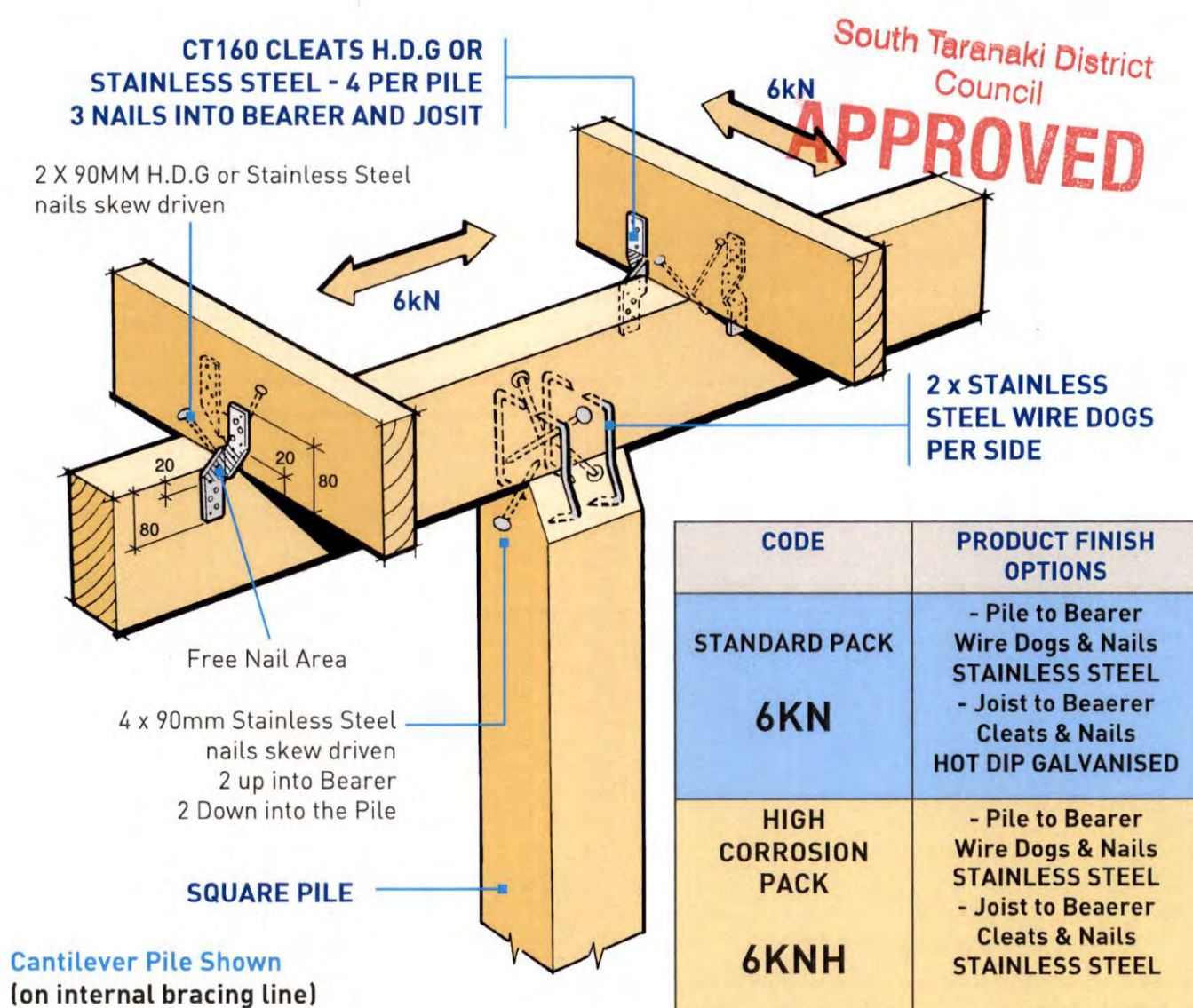
V*=	13.71 kN
pw=	0.003767 steel ratio
Vc=	0.54 Mpa
Vi=	0.79 Mpa
Av=	32 mm <sup>2</sup>
	> 0.54 Mpa
	So Ok



# 6kN PILE FIXING

## FOR CANTILEVER PILES

- The 6kN Pile Fixing must be installed in accordance with this brochure
- Auckland University Tested Ref. 4613
- All Subfloor construction must be in accordance with NZS 3604:2011
- NZS 3604 requires lines of lateral support to floor joists within 300mm of bearer or bracing lines, refer clause 7.1.2
- Joists deeper than 150mm require solid hogging over cantilever pile



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**LUMBERLOK**  
Timber Connectors

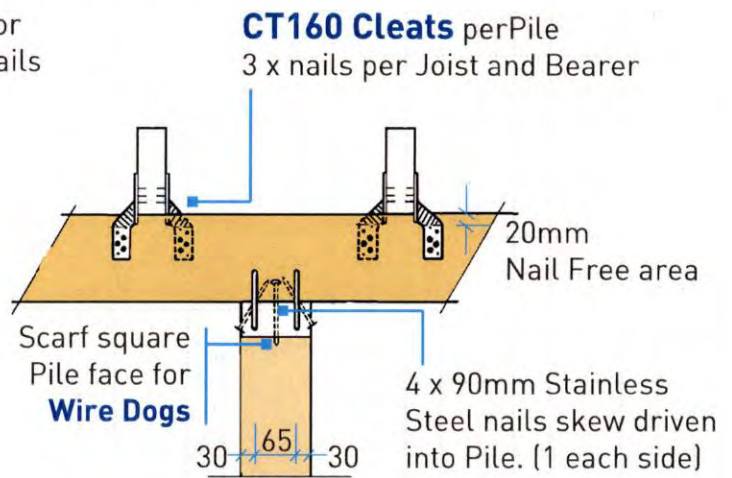
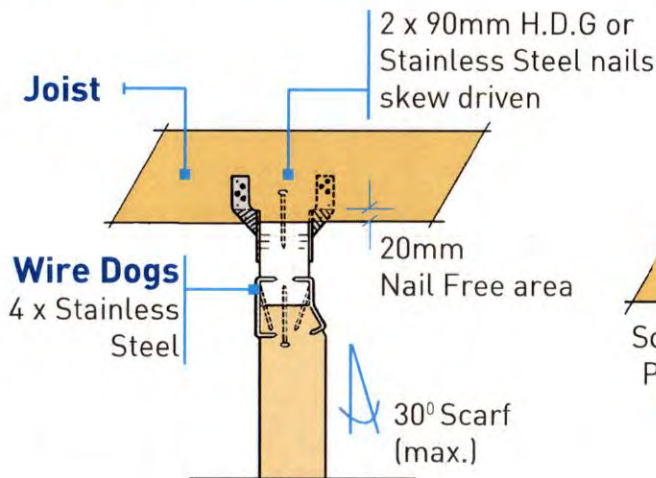
[www.mitek.nz.co.nz](http://www.mitek.nz.co.nz)

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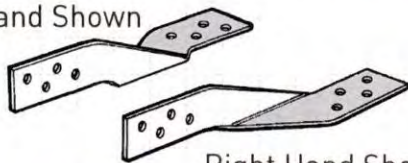


# 6KN PILE FIXING



## SQUARE PILE DETAIL

Left Hand Shown



CT160RH

CT160LH

85mm min.

85mm min.

Wire Dogs x 4

Round Pile Shown.  
(140mm min.)

## EXTERNAL BRACING LINE

Wire Dogs

bent on site to allow each prong to enter each timber surface at 90°

Pile

## CORROSION HAZARD USE TABLE

Standard Pack 6KN

- Zones B & C

- If Joist to Bearer fixing ABOVE 600mm from ground level

Pile to Bearer fixings Stainless Steel (304).  
Joist to Bearer fixings Hot Dip Galvanised

High corrosion pack 6KNH

- Zone D

- All fixings BELOW 600mm from ground level

All items Stainless Steel (304).

## 6kN Joint Fixing Schedule

PILE to BEARER - Wire Dog Staple (4 per joint) Stainless Steel  
- 4 x 90mm skew nails (1 per face) Stainless Steel

JOIST to BEARER - CT160 Cleats (4 per pile) 160mm long  
- 3 nails per Cleat into Joist  
- 3 nails per Cleat in Bearer  
- 2 skew nails 90mm (1 per side)

NAILS - 24 x 45mm 3.55 dia. spiral nails.  
- 4 x 90mm x 4 dia. St nails (6KN pack only)  
- 8 x 90mm x 4 dia. St nails (6KNH pack only)

## 6kN Pile Set Contents

4 x Stainless Steel Wire Dogs

4 x CT160 Cleats

24 x 45mm 3.55 dia Spiral Nails

90mm Stainless Steel nails to suit (4-6KN pack / 8-6KNH pack)

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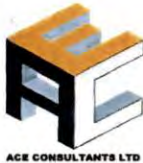
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SED POLE

NZS 3603:1993

## POLE CAPACITY TABLES - SUMMARY

### BENDING

$$\phi M_n = \phi k_1 k_{20} k_2 (k_{22} f_b \pi d^3 / 32) \text{ (kNm)}$$

$$\phi = 0.8$$

$$k_{22} = 1.0$$

$$k_1 = 1.0$$

$$f_b = 38 \text{ MPa}$$

$$k_{20} = 0.85$$

$$E = 1.12 \times 8.7 \text{ GPa}$$

$$k_{21} = 0.85$$

Pole Height (m)	$\phi M_n$ (kNm)						
	150Ø	175Ø	200Ø	225Ø	250Ø	275Ø	300Ø
2.40	9.58	14.65	21.25	29.59	39.86	52.26	67.01
3.00	10.22	15.50	22.34	30.94	41.51	54.24	69.34
3.60	10.90	16.39	23.47	32.34	43.20	56.28	71.72
4.20	11.60	17.30	24.63	33.77	44.94	58.34	74.16
4.80	12.33	18.25	25.83	35.25	46.73	60.46	76.65
5.40	13.09	19.24	27.07	36.77	48.56	62.64	79.19
6.00	13.88	20.26	28.34	38.34	50.44	64.86	81.80
6.60	14.70	21.31	29.66	39.95	52.37	67.14	84.45
7.20	15.55	22.40	31.02	41.60	54.35	69.47	87.17

### AXIAL

$$\phi N_c = \phi k_1 k_0 k_{20} k_2 k_{22} f_c A \text{ (kN)}$$

$$A = \pi d_p^2 / 4$$

$$S = k_{10} 1.35 L / d$$

$$\phi = 0.8$$

$$k_{21} = 0.9$$

$$d_p = \text{SED}$$

$$k_{10} = 1.5$$

$$k_1 = 1.0$$

$$k_{22} = 1.25$$

$$d \text{ at } 0.4L \text{ from SED}$$

$$k_0 = \text{derived from } S$$

$$f_c = 18 \text{ MPa}$$

$$k_{20} = 1.0$$

Pole Height (m)	$\phi N_c$ (kN)						
	150Ø	175Ø	200Ø	225Ø	250Ø	275Ø	300Ø
2.40	81.2	145.8	242.5	367.0	516.0	691.1	887.6
3.00	54.2	98.4	162.4	251.4	375.3	530.3	705.4
3.60	37.4	69.3	115.7	181.5	273.6	384.9	540.5
4.20	28.0	51.3	86.4	138.6	208.5	295.9	388.6
4.80	22.1	39.5	67.0	105.9	162.8	234.4	322.7
5.40	17.8	32.2	53.4	84.7	126.8	189.0	264.6
6.00	14.8	26.3	43.9	68.7	104.6	153.1	216.6
6.60	12.3	22.5	36.8	57.8	86.9	126.6	179.1
7.20	10.5	19.4	31.7	49.6	74.2	108.9	150.6

$S > 50$

$S > 85$  (included for interpolation only)

Note:  $S \leq 85$  for Wind and Earthquake,  $S \leq 50$  All other load cases.

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New Zealand  
Institute of Architects  
Incorporated



Building Code Clause(s) **B1**

## PRODUCER STATEMENT – PS1 – DESIGN

(Guidance on use of Producer Statements (formerly page 2) is available at [www.engineeringnz.org](http://www.engineeringnz.org))

**ISSUED BY:** All Civil Engineering (ACE) Ltd  
(Design Firm)

**TO:** Hamish Scott  
(Owner/Developer)

**TO BE SUPPLIED TO:** South Taranaki District Council  
(Building Consent Authority)

**IN RESPECT OF:** Design of foundations and piles for relocatable house  
(Description of Building Work)

**AT:** 27 County Drive, Hawera  
(Address)

Town/City: Hawera **LOT** 42 **DP** 412125 **SO**  
(Address)

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

Design of foundations and piles

(Extent of Engagement)

services in respect of the requirements of Clause(s) **B1** of the Building Code for  
☐ All or ☒ Part only (as specified in the attachment to this statement), of the proposed building work.

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

☒ Compliance Documents issued by the Ministry of Business, Innovation & Employment **B1** of  
(verification method/acceptable solution)

☐ Alternative solution as per the attached schedule

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

10m Bridge on accessway to 460 Gordon Road, Te Aroha and numbered ACE Sheets 1 to 4  
together with the specification, and other documents set out in the schedule attached to this statement.

**On behalf of the Design Firm, and subject to:**

- (i) Site verification of the following design assumptions Ground conditions and embedment as specified in the design
- (ii) All proprietary products meeting their performance specification requirements;

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

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

I, Martin Donald Cockitt am: ☒ CPEng 173183 # ☐ Reg Arch #  
(Name of Design Professional)

I am a member of: ☒ Engineering New Zealand ☐ NZIA and hold the following qualifications: BEng, CEng, CPEng, IntPE

The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than \$200,000\*.

The Design Firm is a member of ACENZ: ☐

**SIGNED BY:** Martin Donald Cockitt (Signature) Martin Cockitt  
(Name of Design Professional)

**ON BEHALF OF:** All Civil Engineering (ACE) Ltd Date: 14/9/20  
(Design Firm)

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

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