



harper

The Real Estate Collective

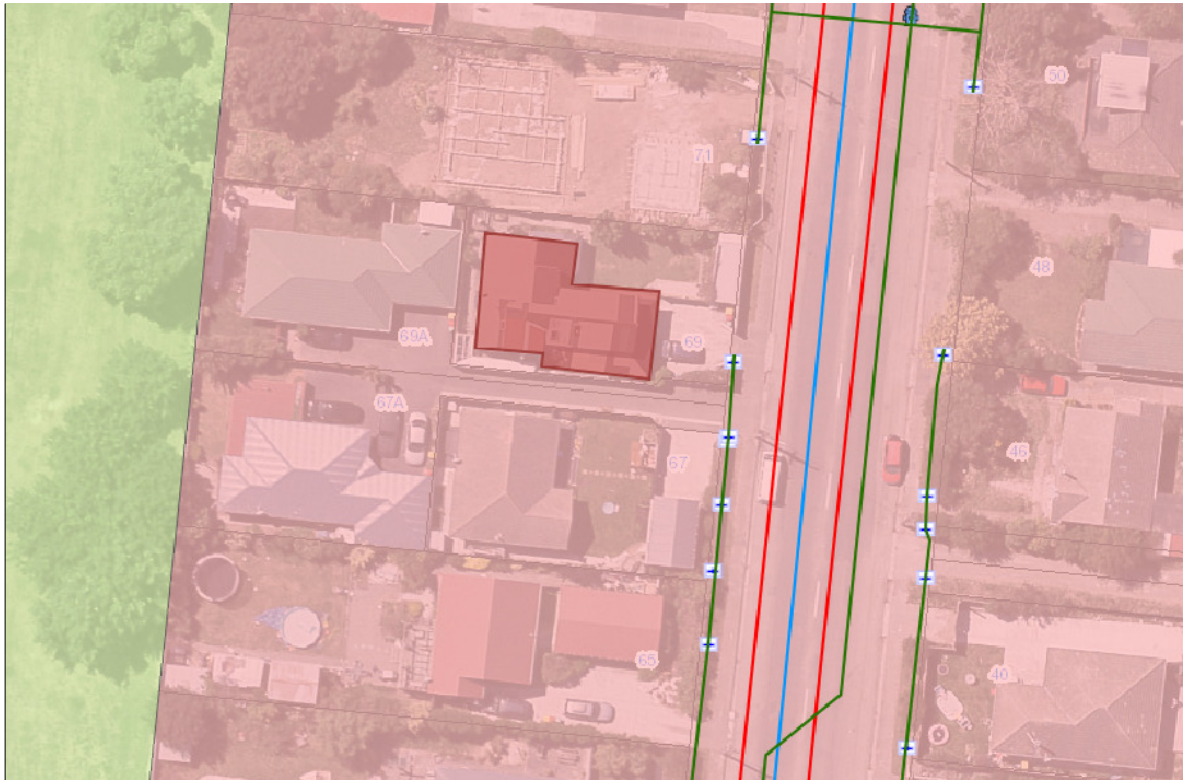
# *Relevelling Documentation*

This information has been supplied by the vendor or the vendor's agents.

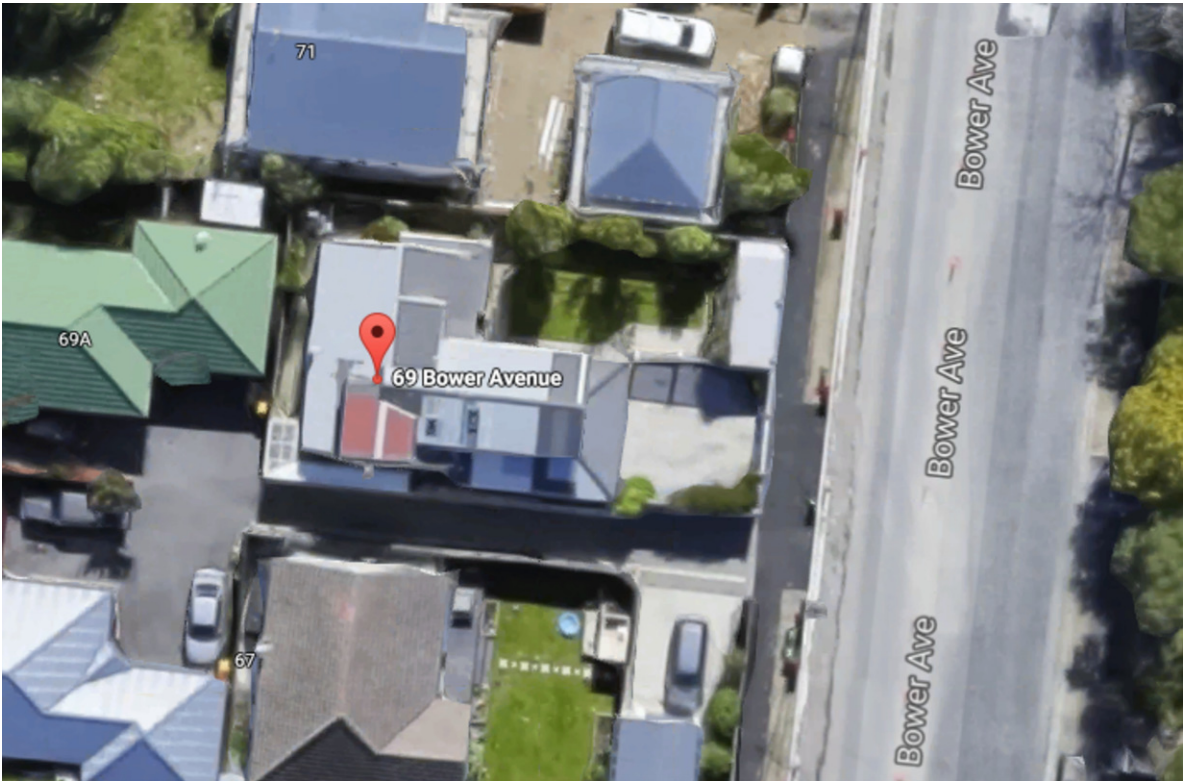
Accordingly, The Network (REAA 2008) is merely passing over the information as supplied to us by the vendor or the vendor's agents. We cannot guarantee its accuracy and reliability as we have not checked, audited, or reviewed the information and all intending purchasers are advised to conduct their own due diligence investigation into the same. To the maximum extent permitted by law The Network Licensed (REAA 2008) do not accept any responsibility to any person for the accuracy of the information herein.



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1 SITE PLAN  
S000 SCALE NTS

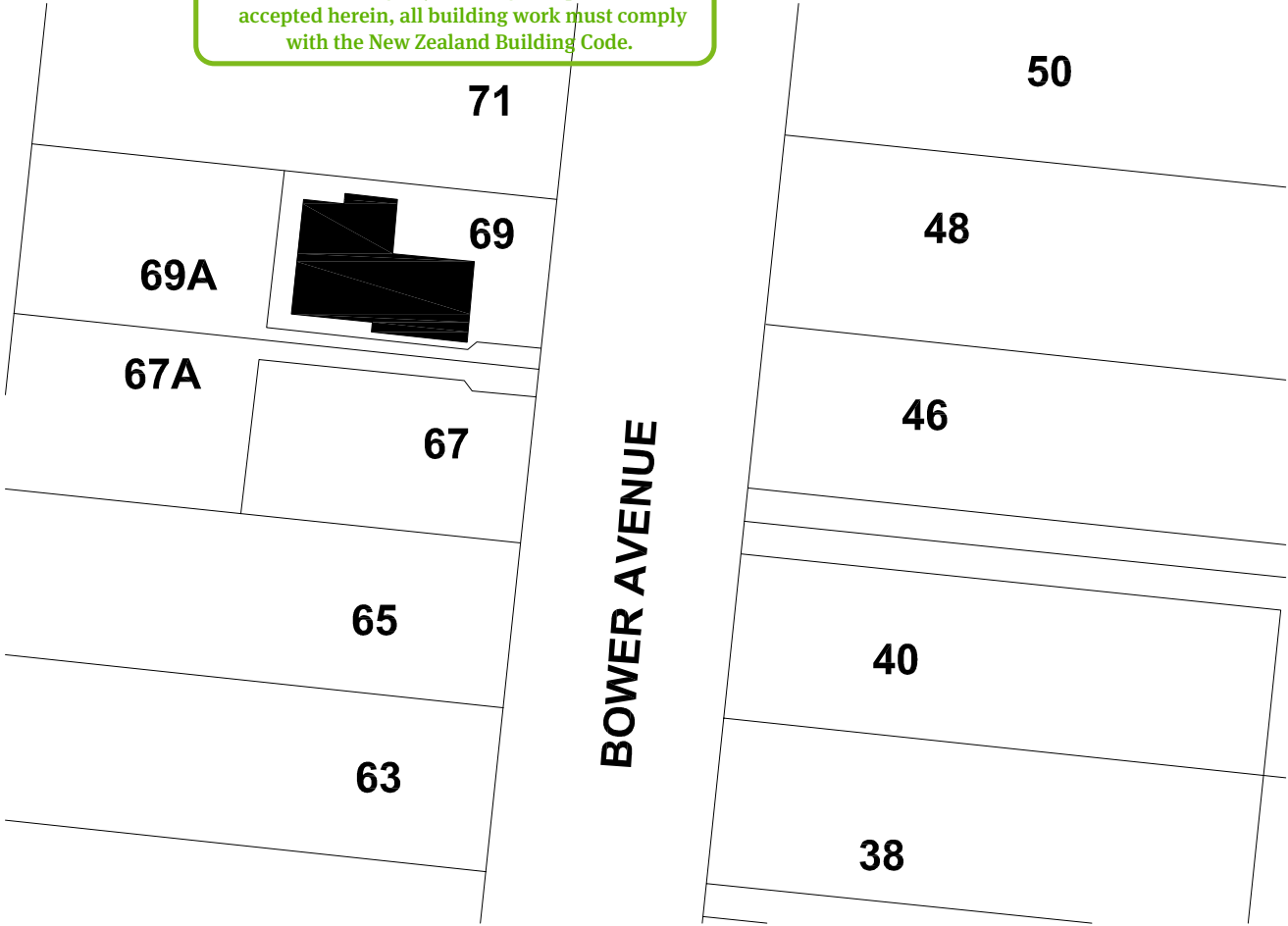


2 AERIAL PHOTO  
S000 SCALE NTS

## DRAWINGS SHEET INDEX

NO.	SHEET NO.	DRAWING TITLE
1	S000	SITE PLAN /AERIAL PHOTO/ LOCALITY PLAN/ SHEET INDEX
2	S001	EXISTING LEVEL PLAN
3	S002	PROPOSED REPAIR PLAN
4	S003	PARTIAL PERIMETER FOUNDATION REPLACEMENT & INTERNAL PILE PACKING DETAIL
5	S004	PILE PACKING / BEARER NOTCHING / FOUNDATION BEARER NOTCHING DETAIL

Christchurch City Council  
BCN/2017/9081  
Exemption from building consent  
11/10/2017  
Sarah Congdon  
Notwithstanding any drawings or specifications accepted herein, all building work must comply with the New Zealand Building Code.



3 LOCATION PLAN  
S000 SCALE NTS

NOTES:  
- Do not scale drawings  
- Dimensions take precedence over scale.  
- Confirm boundaries & level prior to commencing the works.  
- Where discrepancies occurs seek clarification before proceeding on an assumption.  
- Read drawings in conjunction with project specification & consultant drawings.

REV. NO.	DESCRIPTION	DATE	CHECKED BY

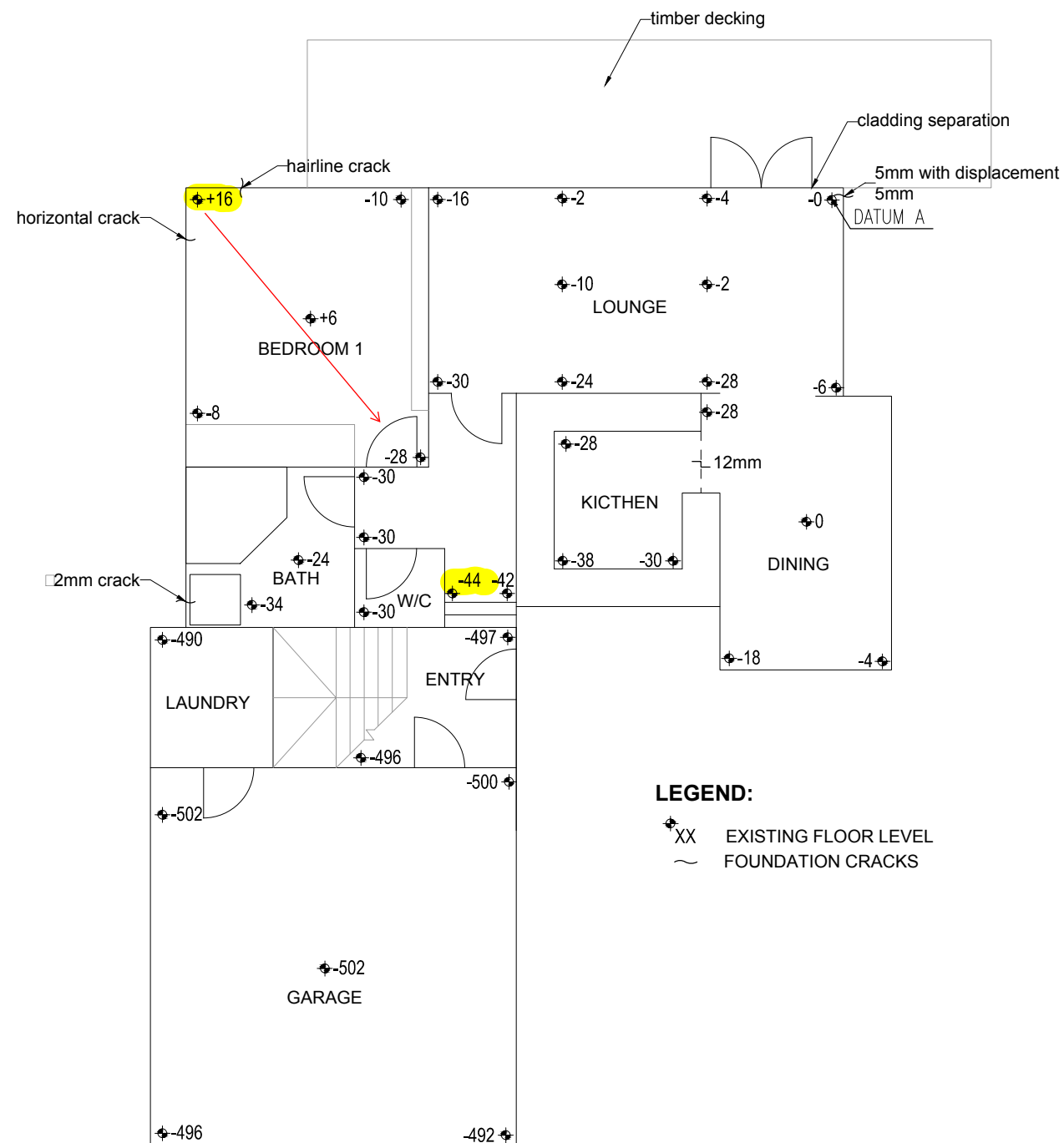
<b>iSTRUCTURES</b> Innovation-Collaboration-Easy P.O. Box 160081, Hornby, Christchurch, 8042 e: admin@istructures.co.nz p: 03 348 5755 www.istructures.co.nz
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------

PROJECT ADDRESS: 69 BOWER AVENUE, NEW BRIGHTON, CHRISTCHURCH 8083, NEW ZEALAND
--------------------------------------------------------------------------------------------

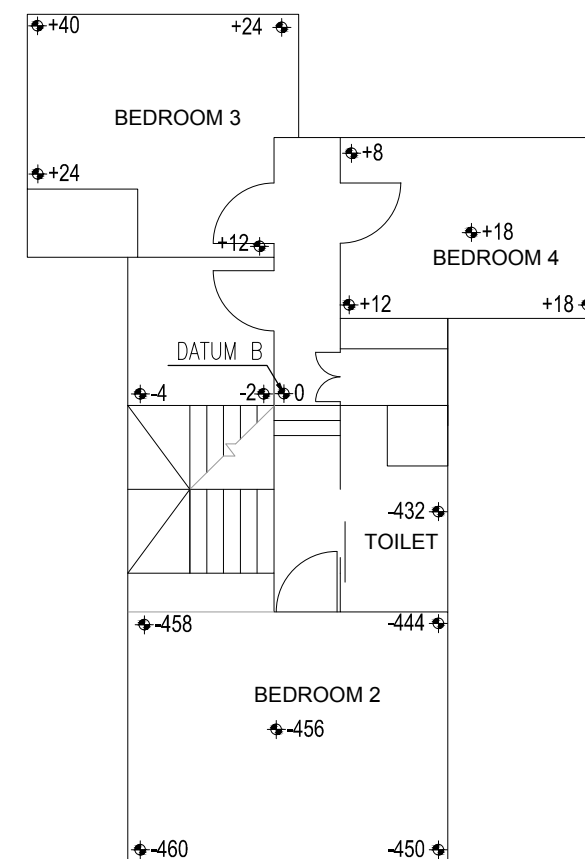
PROJECT TITLE: EARTHQUAKE REPAIRS
--------------------------------------

DRAWING TITLE: SITE PLAN / AERIAL PHOTO / LOCATION PLAN
---------------------------------------------------------------


Designed By: AA	CAD Ref.: DML
Checked By: AB	Drawn By: DML
Scale/Sheet Size: AS SHOWN A3	Drawing No.: S000
Date: 29 JUNE 2017	Rev.
Project Code	



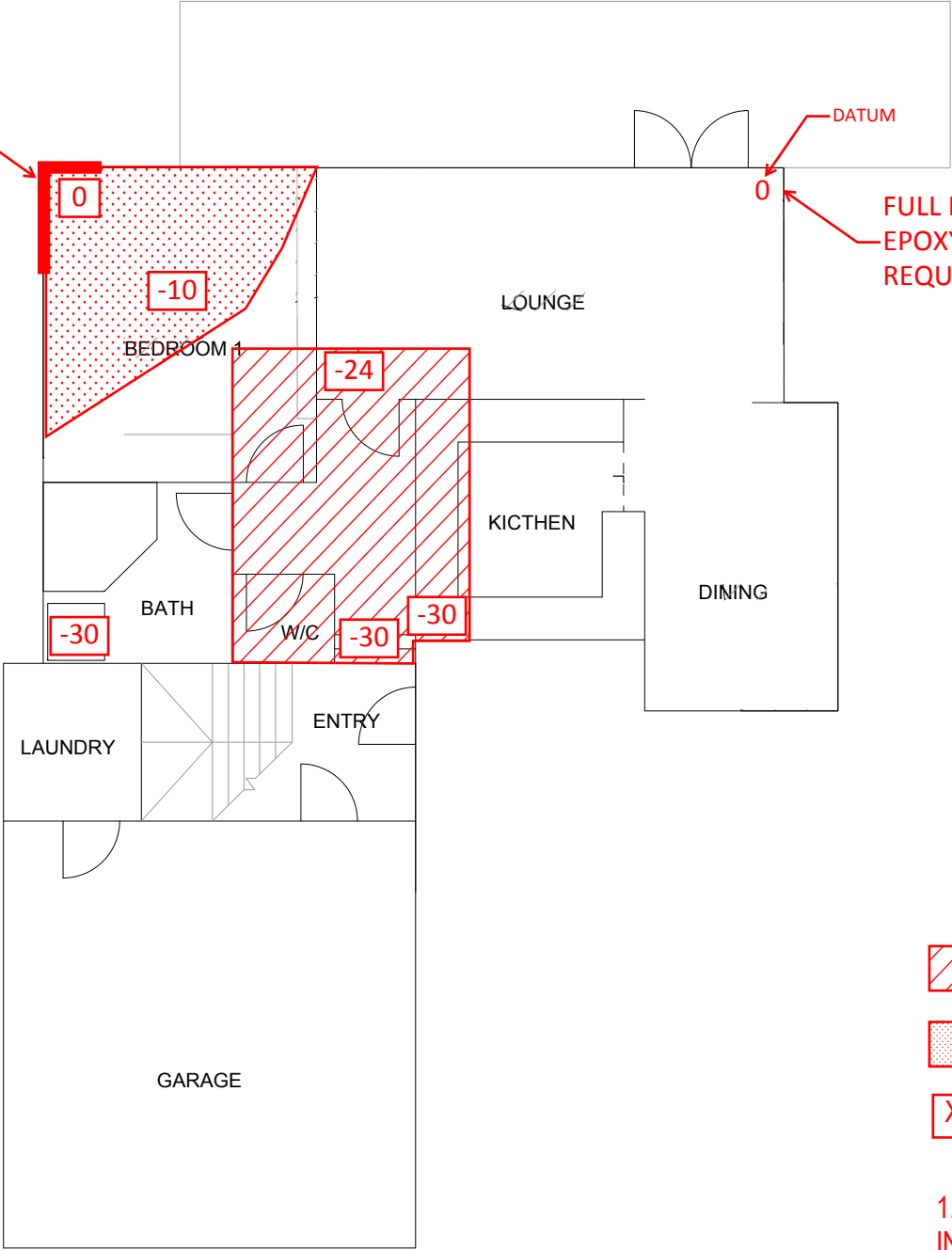
**1 GROUND FLOOR**  
S001 EXISTING FLOOR LEVEL SCALE 1:100






**2 GROUND FLOOR**  
S001 EXISTING FLOOR LEVEL SCALE 1:100

NOTES: - Do not scale drawings - Dimensions take precedence over scale. - Confirm boundaries & level prior to commencing the works. - Where discrepancies occurs seek clarification before proceeding on an assumption. - Read drawings in conjunction with project specification & consultant drawings.	Notes:	REV. NO.	DESCRIPTION	DATE	CHECKED BY	STRUCTURAL:	PROJECT ADDRESS:	PROJECT TITLE:	DRAWING TITLE:	Designed By:	AA	CAD Ref. :
							69 BOWER AVENUE, NEW BRIGHTON, CHRISTCHURCH 8083, NEW ZEALAND	EARTHQUAKE REPAIRS	EXISTING FLOOR LEVEL	Checked By:	AB	Drawn By: DML
					Scale/Sheet Size					AS SHOWN A3	Drawing No. :	Rev.
					Date					29 JUNE 2017	S001	
					Project Code							
						P.O. Box 160081, Hornby, Christchurch, 8042 e: admin@isttructures.co.nz p: 03-348-5755      www.isttructures.co.nz						

FOUNDATION WALL TO REPLACE



NOTE:

-  - FLOOR TO RE-LEVEL
-  - FLOOR TO LOWERED BY 10-20MM
-  - INDICATIVE TARGET LEVEL

- INDICATIVE TARGET LEVELS - THE VALUES SUGGESTED ARE INDICATIVE ONLY AND IT IS RECOMMENDED THAT THE JOINERY AND INTERNAL FIXTURES ARE USED AS GUIDES WHEN RE-LEVELLING.
- FLOOR TO BE RE-LEVELLED BY PACKING METHOD OR REPLACING DAMAGED INTERNAL PILES TO COMPLY WITH THE REQUIREMENTS OF THE BUILDING CODE.

1 PROPOSED REPAIR PLAN  
S002 GROUND FLOOR LEVEL SCALE 1:100

NOTES:  
- Do not scale drawings  
- Dimensions take precedence over scale.  
- Confirm boundaries & level prior to commencing the works.  
- Where discrepancies occurs seek clarification before proceeding on an assumption.  
- Read drawings in conjunction with project specification & consultant drawings.

Notes:

REV. NO.	DESCRIPTION	DATE	CHECKED BY

STRUCTURAL:

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PROJECT ADDRESS:
69 BOWER AVENUE, NEW BRIGHTON, CHRISTCHURCH 8083, NEW ZEALAND

PROJECT TITLE:
EARTHQUAKE REPAIRS

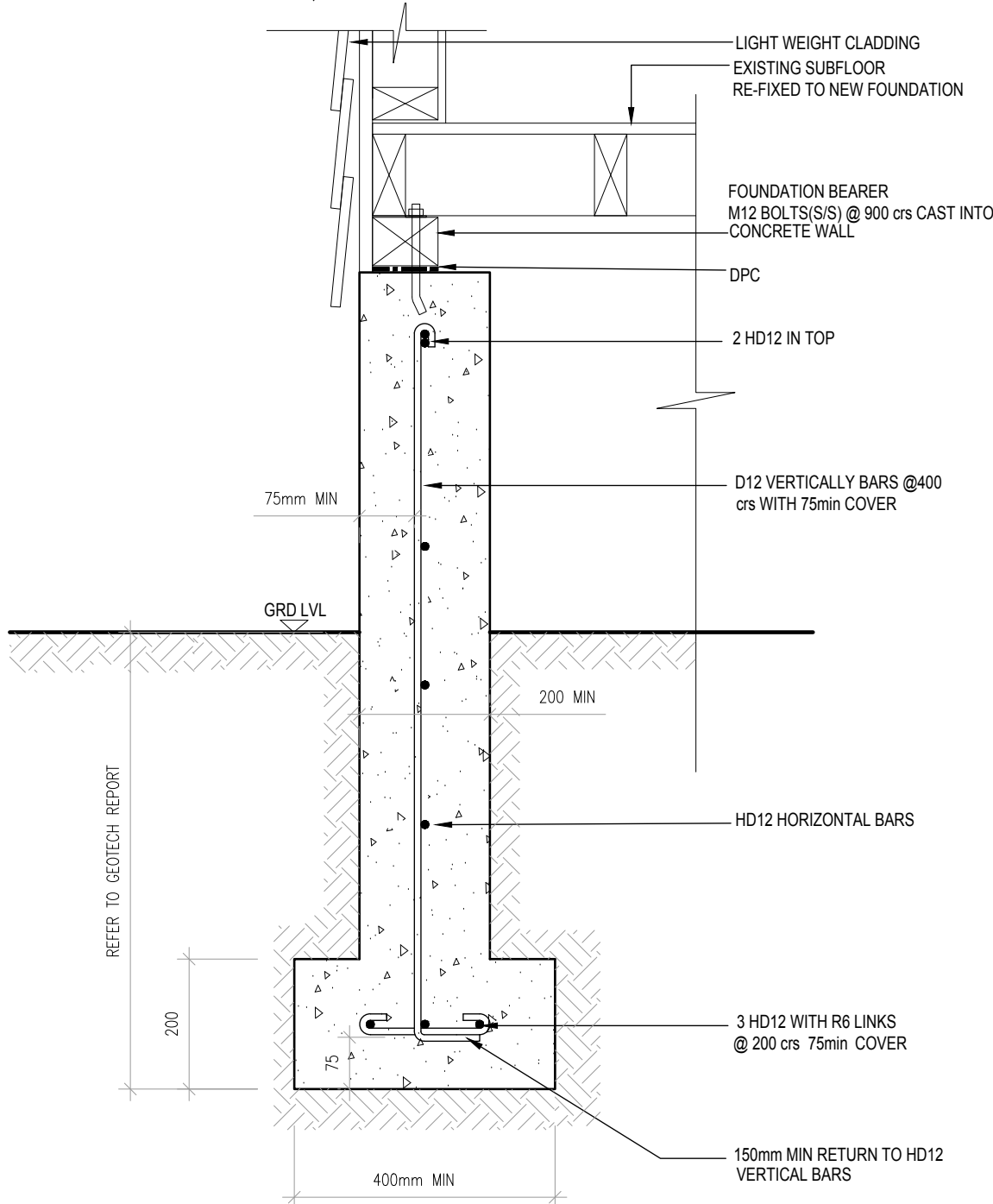
DRAWING TITLE:
PROPOSED REPAIR PLAN

Designed By:	AA	CAD Ref.:	
Checked By:	AB	Drawn By:	DML
Scale/Sheet Size	AS SHOWN A3	Drawing No.:	S002
Date	29 JUNE 2017		
Project Code			



NOTES:

1. THIS DETAILS IS ONLY FOR USE WITH TIMBER WEATHERBOARD CLADDING.
2. REMOVE CLADDING APPROPRIATE DISTANCE TO ALLOW ACCESS TO STRUCTURE.
3. DEMOLISH PERIMETER FOUNDATION AND REBUILD AS PER DETAILS.
4. REINFORCING BEND RADIUS AS PER NZS 3101:2006.
5. ENGINEER TO INSPECT EXCAVATION TO CONFIRM SUITABLE BEARING CAPACITY PRIOR TO CONCRETE BEING POURED.
6. VENTILATION OPENINGS SHALL NOT BE LESS THAN 3500mm PER M OF FLOOR AREA AND EVENLY DISTRIBUTED AROUND THE FOUNDATION PERIMETER AS PER NZS 3604:2011. USE OF ACCETABLE VENTILATION METH OF 6.14.2 (a) VENTILATORS SPACED REGULARLY, COMMENCING 750m FROM THE CORNER AND INTERVALS NOT EXCEEDING 1.8m RECOMMENDED.
7. TO BE READ IN CONJUNCTION WITH SPECIFICATION
8. ALL DIMENSION SHOWN (AREA S MINIMUM UNLESS SPECIFIED OTHERWISE).
9. FOR FOUNDATION >600mm IN DEPTH, REINFORCING AT MAX 400mm VERTICAL C/C.



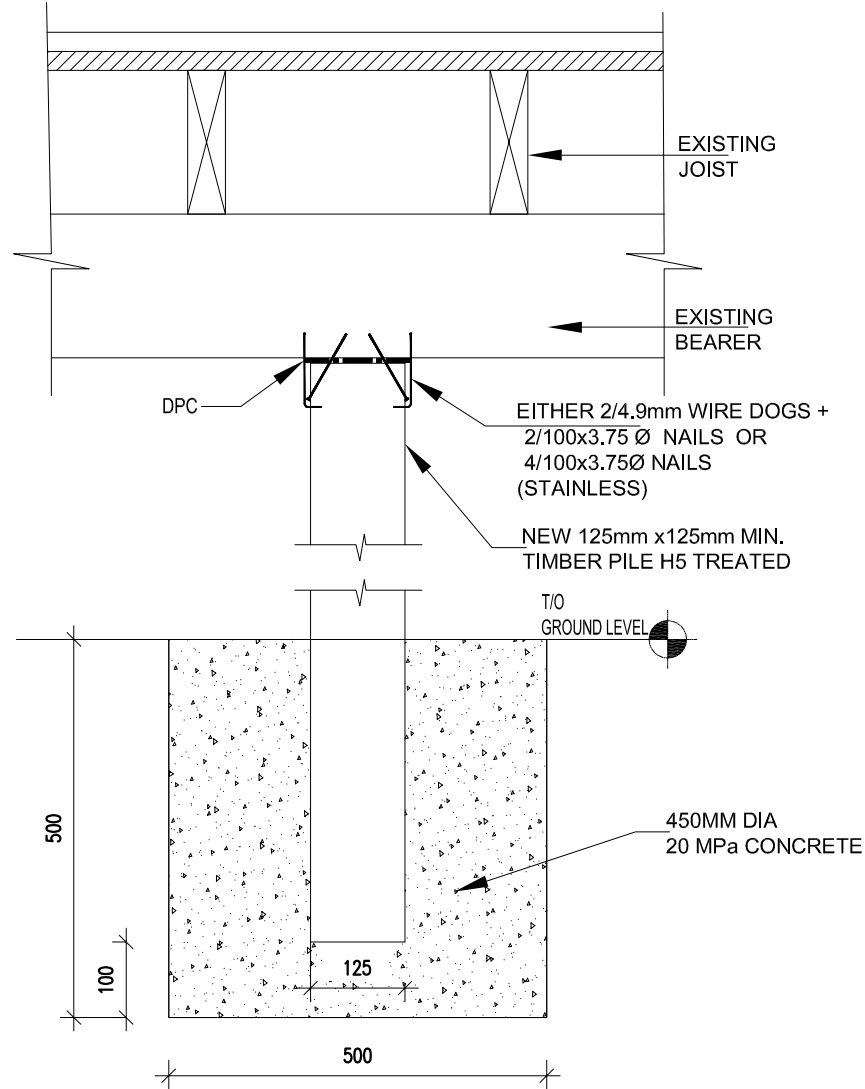
1

S003

REPLACEMENT PERIMETER FOUNDATION

(SECTION)

SCALE 1:20



3

S003

NEW INTERNAL PILE DETAIL

SCALE 1:10

Z:\69 Bower Avenue\200 Engineering Reports\210 Working Folder\pdf

- NOTES:
- Do not scale drawings
  - Dimensions take precedence over scale.
  - Confirm boundaries & level prior to commencing the works.
  - Where discrepancies occurs seek clarification before proceeding on an assumption.
  - Read drawings in conjunction with project specification & consultant drawings.

Notes:	REV. NO.	DESCRIPTION	DATE	CHECKED BY

STRUCTURAL:

i

STRUCTURES

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e: admin@istructures.co.nz

p: 03 348 5755

www.istructures.co.nz

PROJECT ADDRESS:

69 BOWER AVENUE,  
NEW BRIGHTON,  
CHRISTCHURCH 8083,  
NEW ZEALAND

PROJECT TITLE:

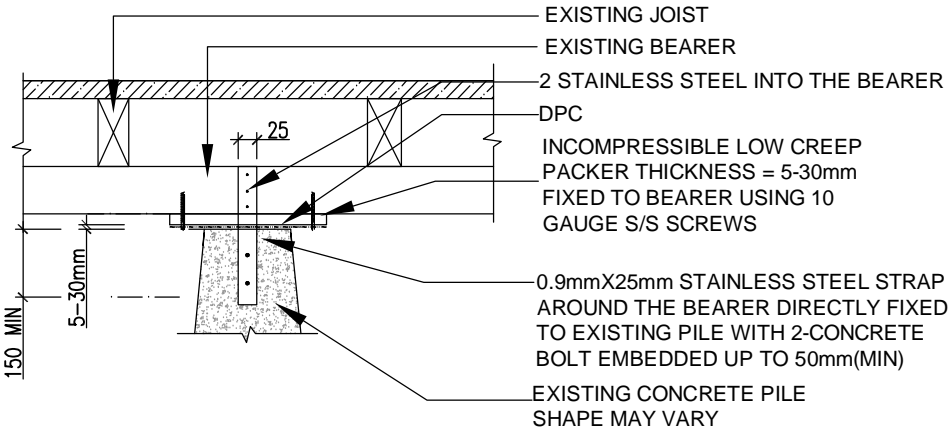
EARTHQUAKE REPAIRS

DRAWING TITLE:

PARTIAL PERIMETER  
FOUNDATION REPLACEMENT &  
INTERNAL PILE PACKING DETAIL

Designed By:	AA	CAD Ref.:	
Checked By:	AB	Drawn By:	DML
Scale/Sheet Size	AS SHOWN A3	Drawing No.:	Rev.
Date	29 JUNE 2017	S003	
Project Code			

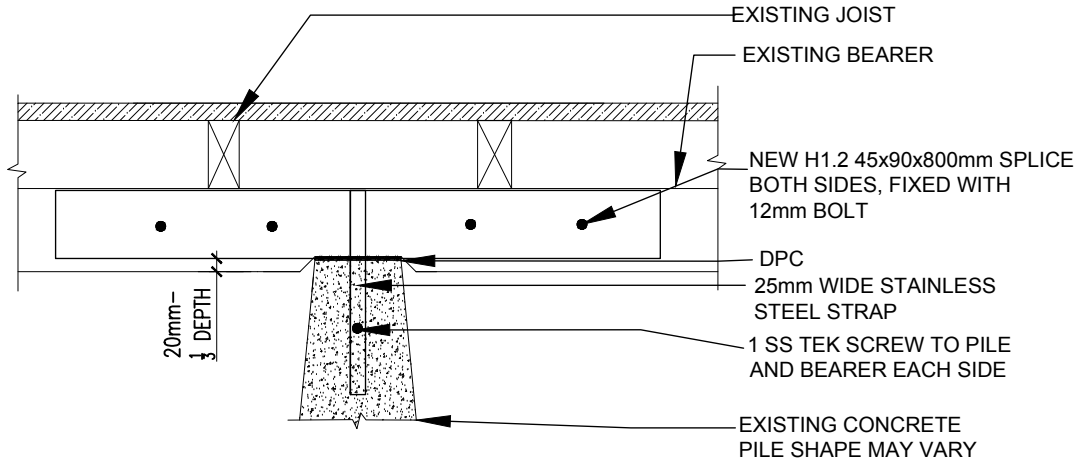
Z:\69 Bower Avenue\200 Engineering Reports\210 Working Folder\pdf



1  
S004

**PILE PACKING DETAIL**

SCALE 1:10

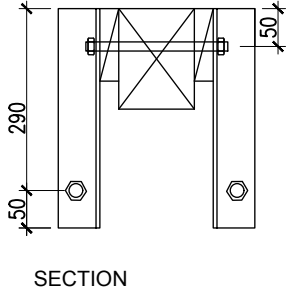
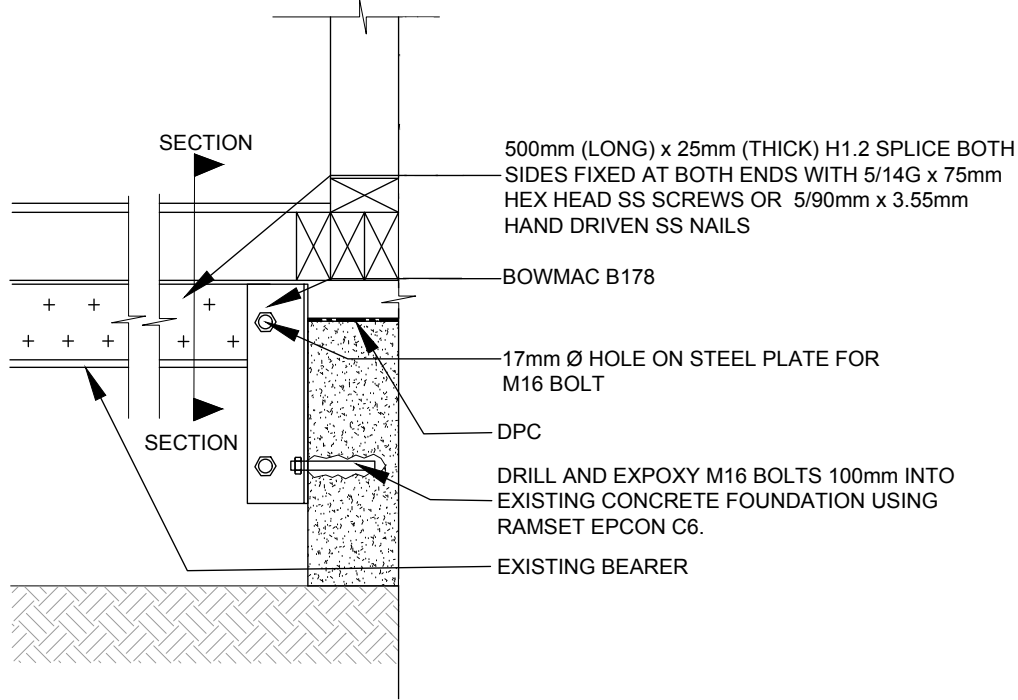


2  
S004

**BEARER NOTCHING DETAIL**

MINIIMUM NOTCHING 20mm

SCALE 1:10



3  
S004

**FOUNDATION BEARER NOTCHING DETAIL**

SCALE 1:10

NOTES:  
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- Dimensions take precedence over scale.  
- Confirm boundaries & level prior to commencing the works.  
- Where discrepancies occur seek clarification before proceeding on an assumption.  
- Read drawings in conjunction with project specification & consultant drawings.

Notes:

REV. NO.	DESCRIPTION	DATE	CHECKED BY

STRUCTURAL:

**i** **STRUCTURES**  
Innovation-Collaboration-Easy

P.O. Box 160081, Hornby, Christchurch, 8042  
e: admin@istructures.co.nz  
p: 03 348 5755 www.istructures.co.nz

PROJECT ADDRESS:
69 BOWER AVENUE, NEW BRIGHTON, CHRISTCHURCH 8083, NEW ZEALAND

PROJECT TITLE:
EARTHQUAKE REPAIRS

DRAWING TITLE:
PILE PACKING/ BEARER NOTCHING/ FOUNDATION BEARER NOTCHING DETAIL

Designed By:	AA	CAD Ref.:	
Checked By:	AB	Drawn By:	SL
Scale/Sheet Size	AS SHOWN A3	Drawing No.:	Rev.
Date	29 JUNE 2017	S004	
Project Code			

## PRODUCER STATEMENT – PS1 – DESIGN

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

**ISSUED BY:** ..... **CAD World NZ Ltd T/A iStructures Ltd** .....  
 (Design Firm)  
**TO:** ..... **Aimee and Jerry Obrecht** .....  
 (Owner/Developer)  
**TO BE SUPPLIED TO:** ..... **Christchurch City Council** .....  
 (Building Consent Authority)  
**IN RESPECT OF:** ..... **Foundation Re-levelling** .....  
 (Description of Building Work)  
**AT:** ..... **69 Bower Ave New Brighton Christchurch 8083** .....  
 (Address)  
**Town/City:** ..... **Christchurch** ..... **LOT** ..... **3** ..... **DP** ..... **81561** ..... **SO** .....  
 (Address)

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

structural solution of floor re-levelling

(Extent of Engagement)

services in respect of the requirements of Clause(s)..... **B1-Structures** .....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.....or  
 (verification method/acceptable solution)

☒ Alternative solution as per the attached schedule..... **iStructures report and drawings** .....

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

**69 Bower Ave New Brighton Christchurch** .....and numbered **S000-S004** dated **29/06/2017** .....; 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 .....
- (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, ..... **Andresito Boiser Jr** ..... am: ☒ CPEng **1013416** # ☐ Reg Arch ..... #  
 (Name of Design Professional)

I am a Member of: ☒ IPENZ ☐ NZIA and hold the following qualifications:.....

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** ..... **Andresito Boiser Jr** ..... (Signature).....  
 (Name of Design Professional)

**ON BEHALF OF** ..... **CAD World NZ Ltd T/A iStructures Ltd** ..... Date **05/10/2017** .....  
 (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, IPENZ AND NZIA**



# Memorandum from licensed building practitioner: Certificate of design work

## Section 45 and Section 30C, Building Act 2004

Please fill in the form as fully and correctly as possible.

If there is insufficient room on the form for requested details, please continue on another sheet and attach the additional sheet(s) to this form.

### THE BUILDING

Street address: **69 Bower Ave**

Suburb: **New Brighton**

Town/City: **Christchurch**

Postcode: **8083**

### THE OWNER

Name(s): **Aimee and Jerry Obrecht**

Mailing address: 69 Bower Ave

Suburb: New Brighton

PO Box/Private Bag:

Town/City: Christchurch

Postcode: 8083

Phone number:

Email address:

### BASIS FOR PROVIDING THIS MEMORANDUM

I am providing this memorandum in my role as the: Please tick the option that applies (✓)	
(x)	<b>sole</b> designer of all of the RBW design outlined in this memorandum – I carried out all of the RBW design myself – no other person will be providing any additional memoranda for the project
(x)	<b>lead</b> designer who carried out some of the RBW design myself but also supervised other designers – this memorandum covers their RBW design work as well as mine, and no other person will be providing any additional memoranda for the project
(x)	<b>lead</b> designer for all but specific elements of RBW – this memorandum only covers the RBW design work that I carried out or supervised and the other designers will provide their own memoranda relating to their specific RBW design
(✓)	<b>specialist</b> designer who carried out specific elements of RBW design work as outlined in this memorandum – other designers will be providing a memorandum covering the remaining RBW design work

### IDENTIFICATION OF DESIGN WORK THAT IS RESTRICTED BUILDING WORK (RBW)

I Andresit Boiser Jr., BSCE, M.Eng, CPeng #1013416 supervised the following design work that is restricted building work

### PRIMARY STRUCTURE: B1

Design work that is restricted building work	Description	Carried out/ supervised	Reference to plans and specifications
Tick (✓) if included Cross (X) if excluded	[If appropriate, provide details of the restricted building work]	[Specify whether you carried out this design work or supervised someone else carrying out this design work]	[If appropriate, specify references]

**Primary structure: B1**

All RBW Design work relating to B1	( )		( ) Carried out ( ) Supervised	
Foundations and subfloor framing	(✓)	<i>Foundation re-levelling</i>	( ) Carried out (✓) Supervised	<i>As per Dwg. Nos. S000 – S004</i>
Walls	(x)		( ) Carried out ( ) Supervised	
Roof	(x)		( ) Carried out ( ) Supervised	
Columns and beams	(x)		( ) Carried out ( ) Supervised	
Bracing	(x)		( ) Carried out ( ) Supervised	
Other	(x)		( ) Carried out ( ) Supervised	

**EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2**

All RBW design work relating to E2	(x)		( ) Carried out ( ) Supervised	
Damp proofing	(x)		( ) Carried out ( ) Supervised	
Roof cladding or roof cladding system	(x)		( ) Carried out ( ) Supervised	
Ventilation system (for example, subfloor or cavity)	(x)		( ) Carried out ( ) Supervised	
Wall cladding or wall cladding system	(x)		( ) Carried out ( ) Supervised	
Waterproofing	(x)		( ) Carried out ( ) Supervised	
Other	(x)		( ) Carried out ( ) Supervised	

**FIRE SAFETY SYSTEMS: C1 – C6**

Emergency warning systems, evacuation and fire service operation systems, suppression or control systems, or other	(x)		( ) Carried out ( ) Supervised	
--------------------------------------------------------------------------------------------------------------------	-----	--	-----------------------------------	--

**Note:** The design of fire safety systems is only restricted building work when it involves small-to-medium apartment buildings as defined by the Building (Definition of Restricted Building Work) Order 2011.

**Note:** continue on another page if necessary.

## WAIVERS AND MODIFICATIONS

Waivers or modifications of the building code are required ( ) Yes ( ☒ ) No

If Yes, provide details of the waivers or modifications below:

Clause	Waiver/modification required
<i>[List relevant clause numbers of building code]</i>	<i>[Specify nature of waiver or modification of building code]</i>

**Note:** continue on another page if necessary.

## ISSUED BY

Name: <b>Andresito Boiser Jr.</b>	LBP or Registration number: <b>CPEng #1013416</b>
The practitioner is a: ( ) Design LBP ( ) Registered architect ( <input checked="" type="checkbox"/> ) Chartered professional engineer	
Design Entity or Company (optional): <b>CAD World NZ Ltd T/A iStructures</b>	
Mailing address (if different from below):	
Street address / Registered office: <b>6 Sonter Road</b>	
Suburb: Wigram	Town/City: <b>Christchurch</b>
PO Box/Private Bag: <b>160081</b>	Postcode: <b>8042</b>
Phone number: <b>03 348 5755</b>	Mobile:
After Hours: <b>021 213 0698</b>	Fax:
Email address: <b>admin@isttructures.co.nz</b>	Website: <b>www.isttructures.co.nz</b>


## DECLARATION

I **Andresito Boiser Jr.** **BSCE, M.Eng, IntPE(NZ), CPEng #1013416**

state that I have applied the skill and care reasonably required of a competent design professional in carrying out or supervising the Restricted Building Work (RBW) described in this form, and that based on this, I also state that the RBW:

- Complies with the building code; or
- Complies with the building code subject to any waiver or modification of the building code recorded on this form.

Signature:



Date: **05 October 2017**



# Inspection Schedule

Date: **05 October 2017**  
Address: **69 Bower Avenue, New Brighton, Christchurch**  
Project: **Foundation Re-levelling**  
Engineer: **Ariel Abalos**

## Purpose:

This is a working document and is to be **maintained on site** and is the responsibility of the contractor.

The contractor is to arrange for the engineering inspections, as detailed below, as and when required.

Please allow a minimum of **48 hours** for the completion of any inspection

Inspection Description	Signed	Date
1. Pre-start Meeting		
2. Pre-pour foundation replacement		
3. Subfloor Connection		
4. Final Inspection		

## Please Note:

- This inspection Schedule is to be read in conjunction with the attached Producer Statement PS1 Design
- All inspection and documents from Engineer are required for the issuance of PS4

# 69 Bower Ave, New Brighton, Christchurch 8083

Foundation re-levelling by underpinning  
Structural Design Calculation Report

## 1. INTRODUCTION

iStructures LTD has been commissioned by Aimee and Jerry Obrecht, to undertake structural engineering design for mechanical slab re-levelling at 69 Bower Avenue, New Brighton.

The existing dwelling is a double-storey timber framed structure with a HardiePlank® Lap Siding external cladding and Corrugated Metal roofing. The foundation of the building is a slab on grade foundation and is classified as Type B foundation.

## 2. MEANS OF COMPLIANCE

The design of the structure conform to the following design code and standards:

- 1 NZS 1170.0 – Structural Design Actions – General Principles
- 2 NZS 1170.1 – Structural Design Action Part 1 – Permanent, Imposed and Other Actions
- 3 NZS 3101 – Concrete Structures Standard

## 3. MATERIAL PROPERTIES

The following material strengths shall be used in the structural analysis and design check of the building.

1. Concrete  
Compressive strength of concrete,  $f'_c$  ----- 25MPa
2. Steel Reinforcement  
Steel yield strength,  $f_y$  ----- 300MPa/ 500MPa

## 4. LOADINGS

All the permanent and imposed loads (construction live load) are considered for the foundation underpinning design. Load combination factors are as specified in NZS1170.0

## 5. LOAD COMBINATIONS

Member design forces were taken from load combinations specified in NZS1170.0 section 4.



# BORELOG / SCALA PENETROMETER RESULTS

**Job Name:**

**Location:** 69 Bower Avenue

**Date:** 6-Oct-17

**Weather:** Sunny

**Date of Testing:** 6-Oct-17



## Test site 1

East of Dwelling

No. of Blows	Depth (mm)	Depth/blow (mm)	Ultimate Bearing Capacity (kPa)	Auger
Start	0			EGL
1	100	100	108	Top soil
1	200	100	108	
1	300	100	108	Light brown/Silty sand/Moist
1	400	100	108	
5	500	20	435	
3	600	33	294	Light brown/Sandy silt/Moist
2	700	50	204	
3	800	33	294	
3	900	33	294	Light brown/Sandy/Moist
4	1000	25	399	
5	1100	20	435	
5	1200	20	435	
5	1300	20	435	
6	1400	17	510	
6	1500	17	510	
4	1600	25	399	
3	1700	33	294	
5	1800	20	435	
8	1900	13	645	
8	2000	13	645	
12	2100	8	840	
Penetrometer End				

Auger terminated @ 1000mm  
bgl, hand auger refusal,

## BORELOG / SCALA PENETROMETER RESULTS

**Job Name:**

**Location:** 69 Bower Avenue

**Date:** 6-Oct-17

**Weather:** Sunny

**Date of Testing:** 6-Oct-17

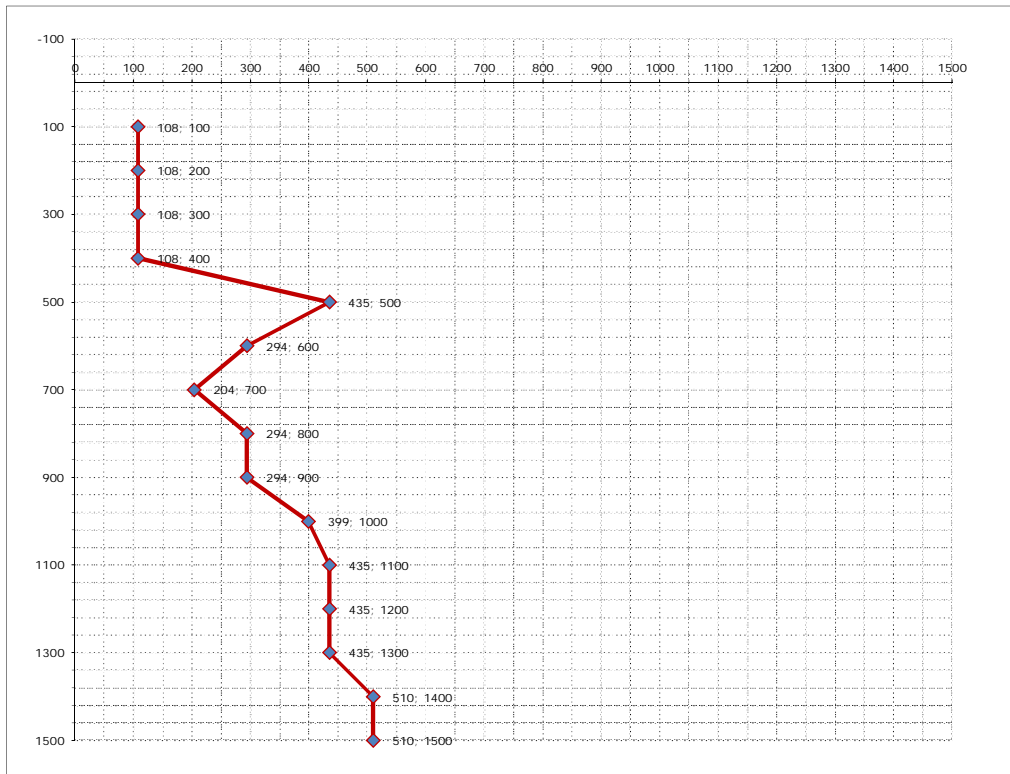


### Test site 2

#### West of Dwelling

No. of Blows	Depth (mm)	Depth/blow (mm)	Ultimate Bearing Capacity (kPa)	Auger
Start	0			
1	100	100	108	
1	200	100	108	
1	300	100	108	
2	400	50	204	
2	500	50	204	
5	600	20	435	
5	700	20	435	
5	800	20	435	
4	900	25	399	
3	1000	33	294	
4	1100	25	399	
4	1200	25	399	
5	1300	20	435	
8	1400	13	645	
8	1500	13	645	
7	1600	14	570	
4	1700	25	399	
4	1800	25	399	
8	1900	13	645	
Penetrometer End				

# SAFE BEARING PRESSURE - kPa



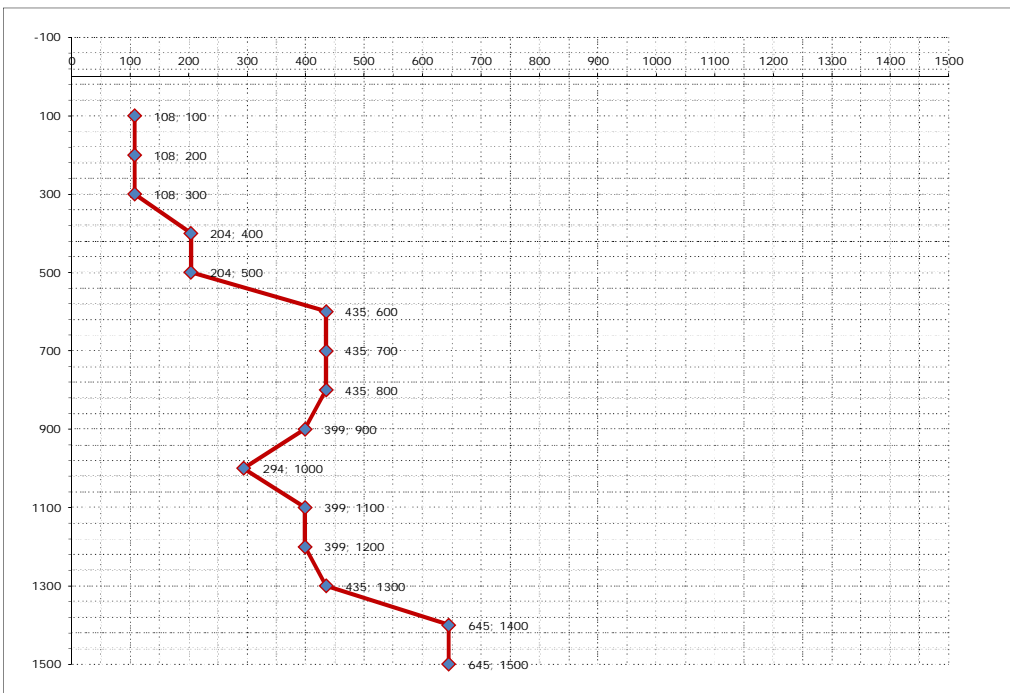
Penetration Depth (mm)

0
69 Bower Avenue
Soil Test site 1

Project:	
Prepared: RV	
Checked: NL	Approved: AB
Date: 10/06/17	



# SAFE BEARING PRESSURE - kPa



Penetration Depth (mm)

0
69 Bower Avenue
Soil Test site 2

Project:	
Prepared: RV	
Checked: NL	Approved: AB
Date: 10/06/17	







DCP1 (EAST OF  
THE DWELLING)





DCP2 (WEST OF  
THE DWELLING)



## ENGINEERING ASSESSMENT REPORT



Client/Owner	Clark Construction Services	Date of Inspection	28 June 2017
Site Address	69 Bower Ave, New Brighton, Christchurch 8083	Date Issued/Revision	04 September 2017/Rev. A

Author	Approved by:
	
<b>Ariel Abalos</b>	<b>Andre Boiser</b>
Engineer BSCE, GIPENZ	Senior Structural Engineer BSCE, M.Eng, MIPENZ, IntPE(NZ) CPEng

## 1. Summary

### Dwelling Description

Number of Storey(s)	2	Residential
Foundation Type	Type B Type C- Garage	Concrete Ring Beam and Internal Piles Slab-on-grade
Wall Cladding	Light	Fibre cement board and weatherboard
Roof Cladding	Light	Corrugated Iron Roof
Floor Area (approx.)	197 m <sup>2</sup>	Approximate
Year Built	1950s	

### Site Description

Topography	Flat	
Technical Category	Green Zone, Technical Category 3, blue	Ref. CERA
Flood Management Area	Within FMA Zone	Refer CCC

### Scope

iStructures Ltd. has been engaged by Clark Construction Services Ltd to carry out a structural assessment of the above-described dwelling. It carried out an inspection on 28<sup>th</sup> June 2017 and subsequently identified a number of repair strategies. Accordingly, it has prepared this report detailing the findings of its investigations.

### Investigation

iStructures carried out the following inspections:

- Visually inspected the interior and exterior of the dwelling.
- Measured all floor heights using a Technidea ZIPLEVEL Pro-2000, digital level and a laser distance meter. The results from which floor slopes and estimated settlement were calculated.
- Wall verticality check.



## 2. Structure Damage Overview

Building Component	Observed Damage	Proposed Repair Action/Compliance
Foundation	<p>Fractures in the footing are present in numerous locations on most elevations. The crack widths vary from 0.5 to 5 mm.</p> <p>Moderate cracks with out-of-plane damaged was also noted.</p>	<p>Repair foundation cracks using Sikadur injection kit - LV or equivalent.</p> <p>Partially replace damaged foundation wall.</p> <p>Only qualified contractor shall carry out the foundation repair.</p> <p>Compliance:</p> <ul style="list-style-type: none"> <li>– Engineers' inspection required for partial replacement.</li> <li>– LBP Builder sign-off.</li> </ul>
Floor Level	<p>The floor level survey indicated a total floor variation of 60 mm in the ground floor and 42mm in the first floor. The slope is exceeding the 0.5% threshold in the lounge and bedroom 1.</p> <p>These indicators suggest a re-levelling based on <i>Table 2.3, Ministry of Business Innovations and Employment (MBIE) Guidance</i>.</p>	<p>As indicated in SK2, re-level the floor by jacking and packing method of internal piles and lowering floor along perimeter wall.</p> <p>Where required, replace damaged internal piles and re-connect to the bearers as per NZS3604.</p> <p>All works should comply with NZS3604.</p> <p>Compliance: LBP Builder sign-off is required.</p> <p>Building consent exemption is required.</p>
Cladding	Some weatherboards were observed to minor cracking and separation.	<p>Repair or replace damaged weatherboards and repaint in accordance with the architectural documentation.</p> <p>LBP Builder sign-off is required.</p>
Roofing	Viewing from the ground level, no visible damage can be seen on the roofing elements. No reported leaking during the site inspection.	No repair required

Walls/Ceiling	On-going repaired by the H.O. was noted during the inspection. However, further repair is expected for the consequential damage due to the re-levelling work.	Allow internal repairs for the consequential damage caused by the re-levelling work.  Compliance: LBP Builder sign-off is required.
Garage	The attached garage structure appears to be in good condition.	No repair required.

### 3. Geotechnical Summary

Lateral Spreading	No lateral spreading/minor liquefaction (refer Figure 1). Ref: CGD
Land Damage/Settlement	No
Site Gradient/Slope	No
Retaining Wall	No
Pre-existing Damage	Difficult to determine
Others (Please Specify)	–

### 4. Further Works Required

Building Consent Required	Building consent exemption for re-levelling
Structural Engineering Design/Input Needed	Yes
Architectural Design/Input Needed	No
Geotechnical Information Needed	Yes

### 5. Engineers Inspection Required for PS4

Inspections	Pre-Start Meeting
	Excavation/Pre-pour foundation replacement
	Pile to bearer connection
	Final Inspection
Documents required from the Builder/Contractor	As-built floor level and construction photos
	Producer Statements
Inspection Booking	24 Hours Notice: By phone <b>348 5755</b> or email: <a href="mailto:admin@isttructures.co.nz">admin@isttructures.co.nz</a>

### 6. Attachments

Site Photos	Appendix A
Geotechnical and FMA Information	Appendix B

Sketches and Details	Appendix C SK1 – Existing Ground Floor Level Plan SK2 – Proposed Repair Plan SK3 – Ground beam details SK4 – Internal Pile replacement and Packing Details
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## 6. Disclaimer

This report has been prepared by iStructures Ltd. for Clark Construction Services. No liability is accepted by iStructures Ltd. or any employee or sub-consultant of iStructures Ltd. with respect to its use by any other party. This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval to fulfil a legal requirement. Unless stated otherwise, this report and assessment herein are based on a visual and non-intrusive walk-around inspection of the building.

Recommendations contained in this report are subject to compliance with land rehabilitation and flood level requirements, which are being assessed by others, and are included for guidance only.

Structural repair recommendations, including consent repairs to the foundation, are subject to further investigation and specific design.

iStructures Ltd. is not responsible for obtaining agreement with the building owner or obtaining the necessary consents from councils for undertaking the building work.

In accepting delivery and/or using this report, the recipient agrees that he/she accepts the report on the basis set out herein.

## Appendix A – Site Photos



Photo 1: Location Map.

### External Photos



Photo 2 –



Photo 3 –





Photo 4 –



Photo 5 –

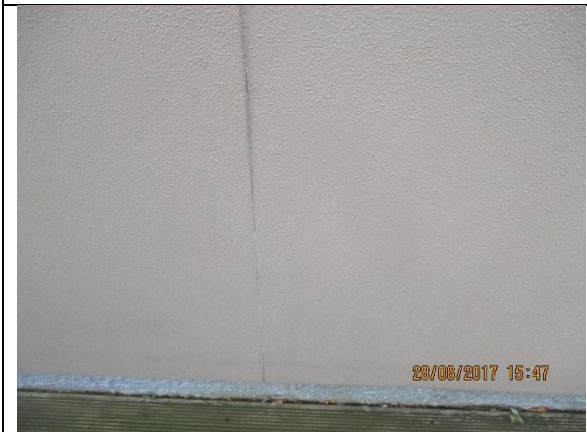


Photo 6 –



Photo 7 –

## Foundation



Photo 8



Photo 9





Photo 10



Photo 11

## Internal Photos



Photo 12



Photo 13



Photo 14 –



Photo 15



## Appendix B – Liquefaction and Flood Data



Figure 1: Liquefaction and Lateral Spreading Map.

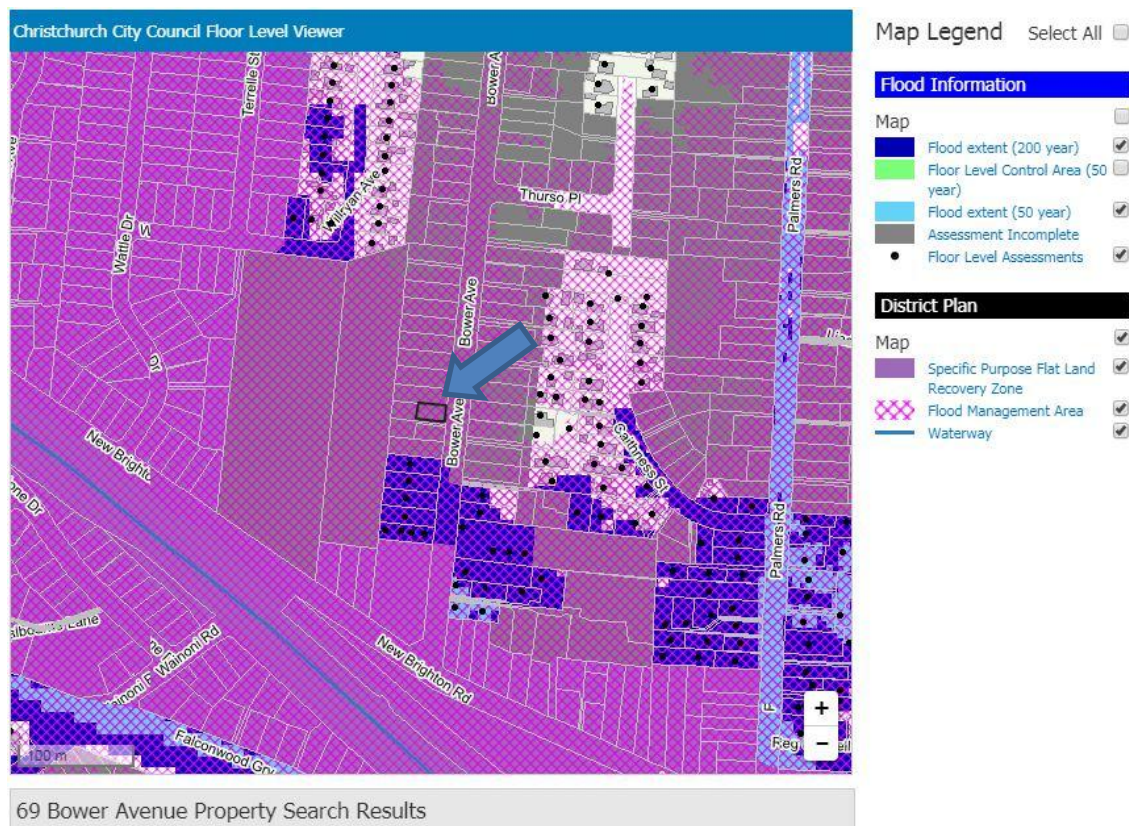
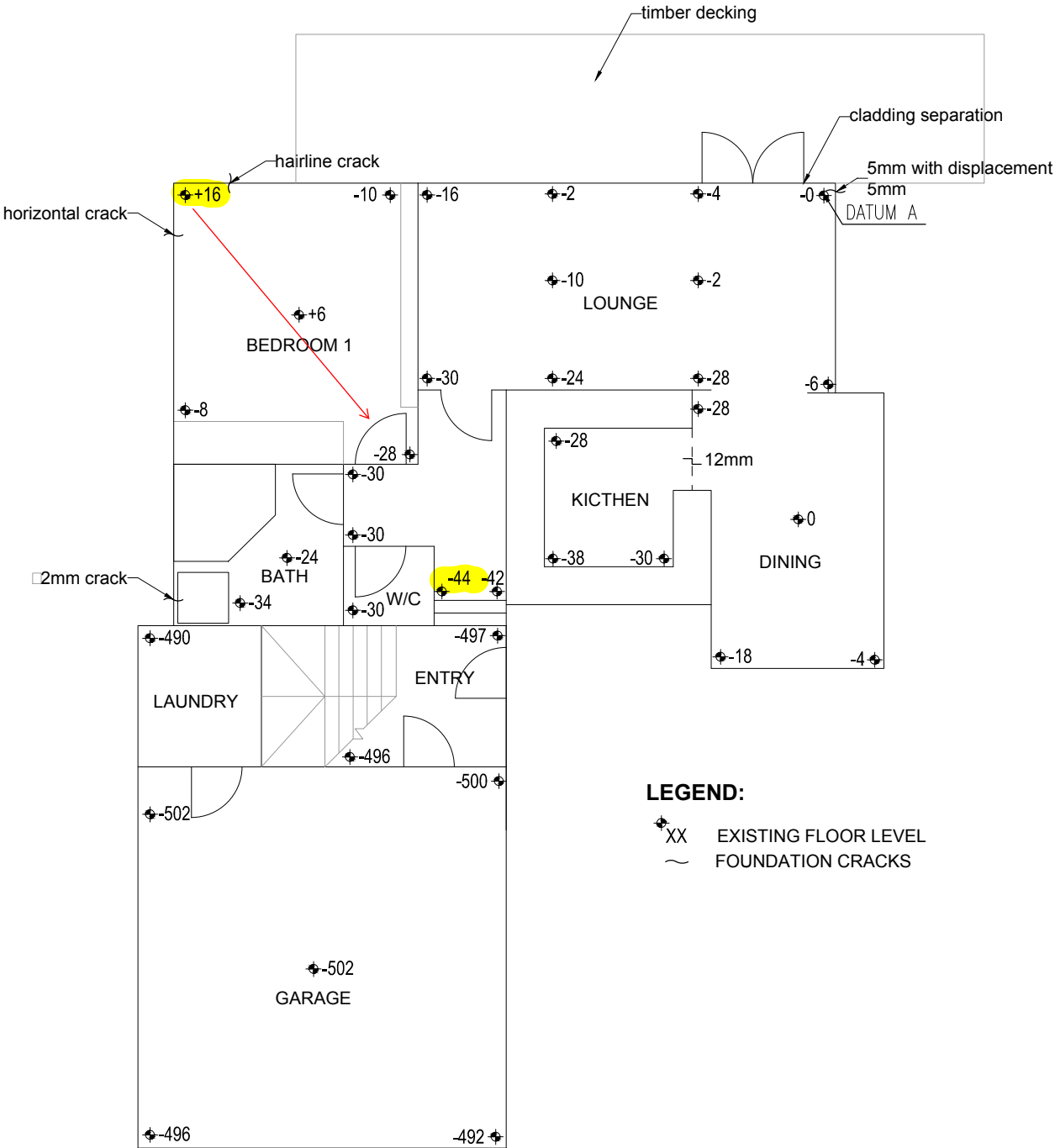
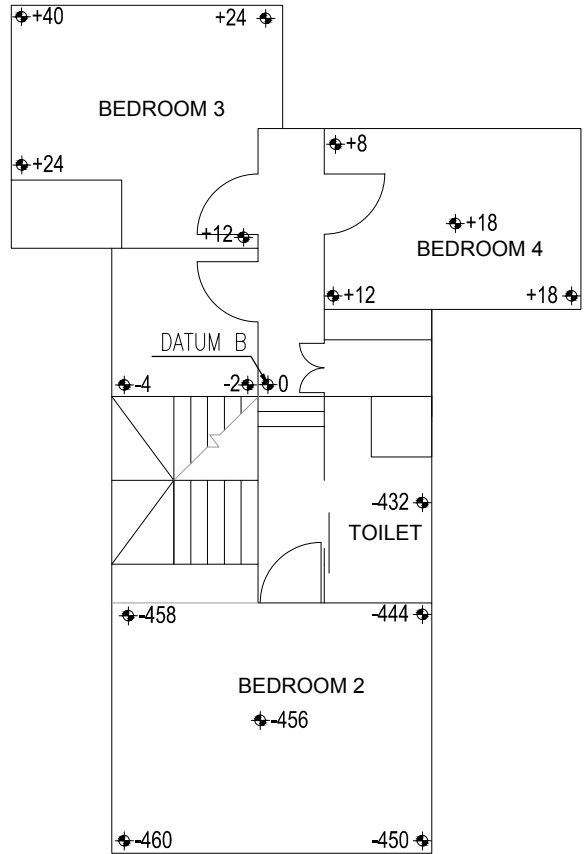


Figure 2: CCC Flood Map.



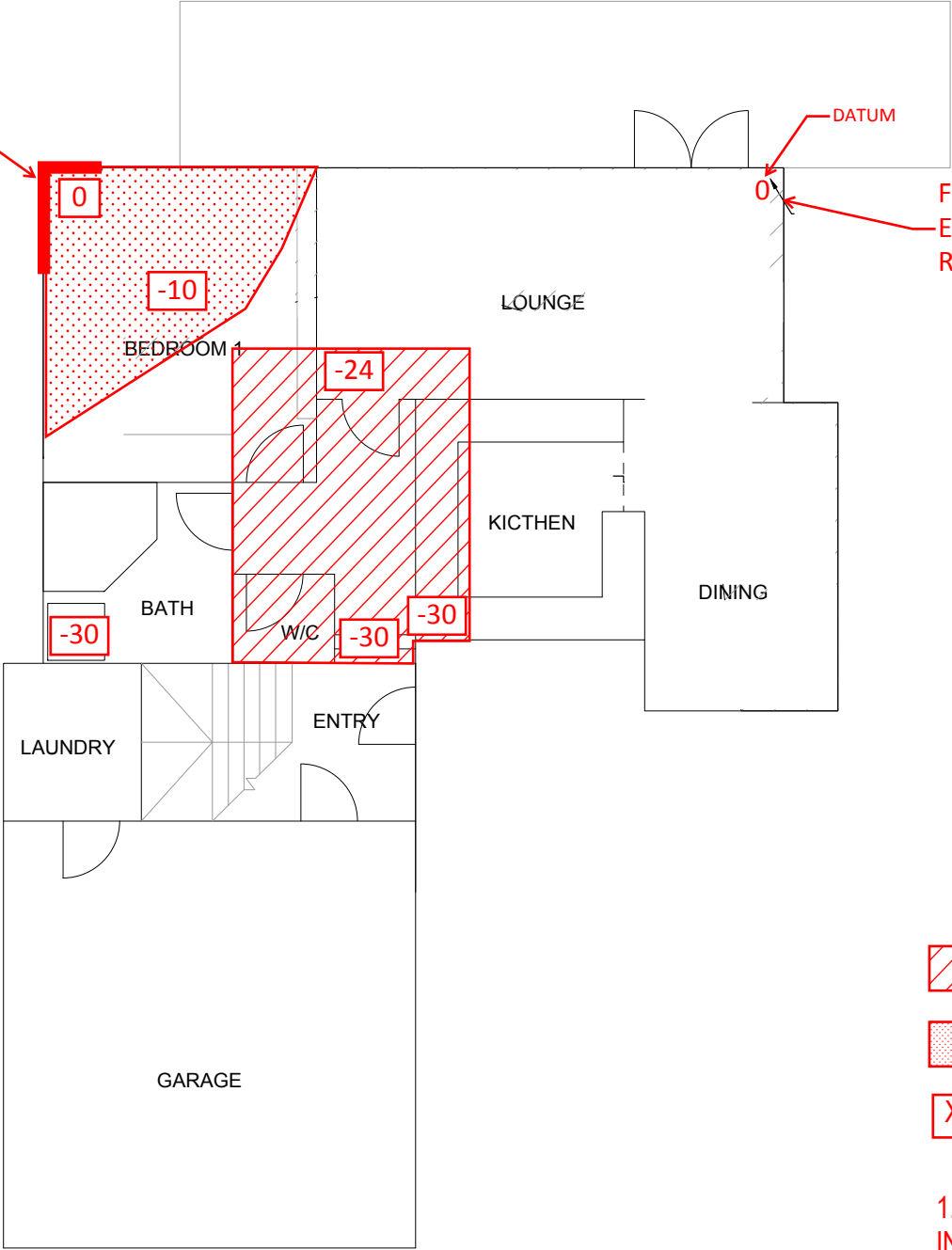
1 **GROUND FLOOR**  
SK1 EXISTING FLOOR LEVEL SCALE 1:100






2 **GROUND FLOOR**  
SK1 EXISTING FLOOR LEVEL SCALE 1:100

<b>NOTES:</b> - Do not scale drawings - Dimensions take precedence over scale. - Confirm boundaries & level prior to commencing the works. - Where discrepancies occurs seek clarification before proceeding on an assumption. - Read drawings in conjunction with project specification & consultant drawings.	Notes:	REV. NO.	DESCRIPTION	DATE	CHECKED BY	<b>STRUCTURAL:</b>  P.O. Box 160081, Hornby, Christchurch, 8042 e: admin@istructures.co.nz p: 03 348 5755 www.istructures.co.nz	PROJECT ADDRESS: 69 BOWER AVENUE, NEW BRIGHTON, CHRISTCHURCH 8083, NEW ZEALAND	PROJECT TITLE: EARTHQUAKE REPAIRS	DRAWING TITLE: EXISTING FLOOR LEVEL	Designed By: AA	CAD Ref.:
										Checked By: AB	Drawn By: DML
										Scale/Sheet Size: AS SHOWN A3	Drawing No.:
										Date: 29 JUNE 2017	Rev.
										Project Code	SK1

FOUNDATION WALL TO REPLACE



NOTE:

-  - FLOOR TO RE-LEVEL
-  - FLOOR TO LOWERED BY 10-20MM
-  - INDICATIVE TARGET LEVEL

- INDICATIVE TARGET LEVELS - THE VALUES SUGGESTED ARE INDICATIVE ONLY AND IT IS RECOMMENDED THAT THE JOINERY AND INTERNAL FIXTURES ARE USED AS GUIDES WHEN RE-LEVELLING.
- FLOOR TO BE RE-LEVELLED BY PACKING METHOD OR REPLACING DAMAGED INTERNAL PILES TO COMPLY WITH THE REQUIREMENTS OF THE BUILDING CODE.

1 PROPOSED REPAIR PLAN  
SK2 GROUND FLOOR LEVEL SCALE 1:100

NOTES:  
- Do not scale drawings  
- Dimensions take precedence over scale.  
- Confirm boundaries & level prior to commencing the works.  
- Where discrepancies occurs seek clarification before proceeding on an assumption.  
- Read drawings in conjunction with project specification & consultant drawings.

Notes:	REV. NO.	DESCRIPTION	DATE	CHECKED BY

STRUCTURAL:

**i** **STRUCTURES**  
*Innovation-Collaboration-Easy*

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PROJECT TITLE:  
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DRAWING TITLE:  
PROPOSED REPAIR PLAN

Designed By:	AA	CAD Ref.:	
Checked By:	AB	Drawn By:	DML
Scale/Sheet Size	AS SHOWN A3	Drawing No.:	Rev.
Date	29 JUNE 2017	SK2	
Project Code			