

Existing Units Relevel 41A and 41B Olliviers Road, Philipstown, Christchurch

STRUCTURAL DESIGN REPORT



10 March 2026

Revision B

Project 26021

Structural Design Report – Rev B

Project No: 26021
Date: 10 March 2026
Project Name: Existing Units Relevel
Project Address: 41A and 41B Olliviers Road, Philipstown, Christchurch

Revision A – Original Document

Revision B - Updated design based on further investigation into subfloor

1.0 SCOPE OF WORK

Richards Consulting Engineers (RCE) has been engaged to complete a relevel design for the two existing units at 41A and 41B Olliviers Road. Below outlines the list of work which is covered by our PS1, as well as the work which is specifically excluded from our PS1.

The scope of work covered by the attached Producer Statement (PS1-design) is:

- Foundation re-levelling design to bring floor levels to within the MBIE guidance (refer to criteria below).
- Design of new subfloor framing in 41B bathroom space.

Items that are specifically excluded from this work include:

- Alternations to the house outside the foundation re-level.
- Assessment of previous re-level works not affected by RCE re-level.
- Architectural design elements, including but not limited to: claddings, weatherproofing, waterproofing, accessibility and services.
- Superstructure bracing.
- Superstructure reinstatement.
- Cladding repairs, This will be done by an approved LBP as required.
- Civil design or any external landscaping works.

2.0 MEANS OF COMPLIANCE

The design of the structure is in compliance with the New Zealand Building Code (NZBC) section B1.

3.0 DESIGN DOCUMENTATION

The design is described in the following documentation:

- Richards Consulting Engineers drawings titled “Existing Units Re-level – 41A and 41B Olliviers Road - Christchurch” and numbered S0.00, SK.01-SK.05 – REV B

4.0 ASSUMPTIONS

The following assumptions were made as part of the design process:

- The decision to re-level has already been made by another party.
- All existing internal bracing elements will remain in place until the re-levelling has been carried out.
- The house is structurally sound.
- Re-levelling the structure will not improve the foundation’s future performance.
- The decision to replace the floor joists in unit 41B has been made by others.

5.0 DESIGN LOADS

The structure has been determined as having an importance level of 2.

Dead: Standard material loads
Live: 1.0kPa construction loads

Snow and Ice: N/A
Seismic: N/A
Wind: N/A

6.0 GEOTECHNICAL CONDITIONS

RCE have performed a desktop site soil investigation using New Zealand Geotechnical Database (NZGD) listed testing logs. The key findings of the review are as follows:

- The site is classified as “Medium liquefaction vulnerability” by the Christchurch City Council Vulnerability to Liquefaction map. This is equivalent to TC2.
- Based on nearby NZGD listed testing logs, we expect that the main soil strata consist of soil similar to the following: Topsoil down to 500mm below ground level underlain with Silts and Sands.
- Based on nearby NZGD listed testing logs, we believe that new foundations will need to be designed for a Geotechnical Ultimate Bearing Capacity (GUBC) of 100kPa.

RCE note that all the information above has come from online sources; RCE has not performed field testing. The above information has been used as a basis for the design of new foundations, but on-site testing will be required to confirm the geotechnical parameters used.

7.0 SITE INVESTIGATION

RCE completed a site investigation of the two existing units at 41A and 41B Olliviers Road on 28th January 2026. This consisted of a visual and non-invasive inspection of the interior and exterior of the units and a floor-level survey. RCE were not able to gain access to the subfloor during the investigation; all knowledge of the subfloor has come from looking through vents in the perimeter wall. From the site investigation, the following items were noted:

- Floor levels vary 64mm across the structure
- Slopes of up to 5.4% were found
- The larger floor variations (60-50mm) are in localised areas

Further to this, RCE visited the site again on 25 February 2026 after the subfloor space had become accessible. This site visit consisted of a visual inspection of the subfloor space. From the site visit, the following items were noted:

- Previous relevel works have occurred, which consisted of over pinning with a timber packer between the bottom-bottom plate and the perimeter foundation.
- The subfloor is founded on a concrete perimeter footing and internal rock type piles.
- There is three concrete structures within the subfloor which extend up to floor level.
- The floor joists in the bathroom of Unit 41B are constructed such that it will be difficult to level them. We understand that our clients have discussed with the contractor about this and they have decided to replace the floor joists here.
- The bottom-bottom plate will need to be replaced where we are re-levelling the structure

RCE understands that the decision to re-level the structure has been made by another party.

8.0 STRUCTURAL PHILOSOPHY

8.1 Building Description

The two existing units are conjoint at a single wall between 41A's bathroom wall and 41B's bedroom wall. Both units are single-storey dwellings. Due to the age of the structures, it is expected that the primary structure of the units consists of a timber-framed roof structure and timber-framed walls. The building is founded on a concrete perimeter foundation wall with rock-type piles supporting the internal subfloor bearers.

The house is clad with timber weatherboards and corrugated iron roofing. RCE understand that there may have been a chimney and fireplace that has been previously removed. This may mean that there is a concrete base within the structure that the subfloor is connected to. RCE also believes that the structure was initially a single dwelling, which has previously been altered internally to create the two units.

RCE notes that there is existing over pinning re-level works which consist of timber packers between the bottom bottom plate and timber packers between the existing foundations and the internal timber bearers.

8.2 Releveling Criteria

The selected releveling criteria are a 30mm total floor variation and 0.3% slope between any two points greater than 2 metres apart. RCE notes that the levels can be kept relative to each.

Allowance to relax these criteria will be discussed with the contractor where this is not practical and conflicts with construction-related dislevelment. This includes any parts of the building that have inbuilt irregularity. These will be maintained and noted to avoid damaging the character of the structure.

8.3 Releveling Methodology

Outlined below is a summary of the re-leveling methodology:

- The Contractor is to confirm the methodology with the engineer before commencing.
- Asbestos inspections shall take place to locate and remove asbestos as required.
- Allow to remove and reinstate services.
- All connections between the timber subfloor, foundation walls, concrete bases and piles are to be removed or severed.
- Timber framing or flooring identified to have significant moisture or borer damage is replaced.
- The subfloor framing and internal bearers shall then be lifted using mechanical jacks on dunnage.
- The existing bottom-bottom plate and timber packers shall be removed.
- Engineer to verify floor levels before connecting any subfloor or pouring over-pinning grout.
- The perimeter foundation wall shall have a structural repair micro-concrete installed as an overpinning layer. Refer to the section below for overpinning methodology.
- Install new subfloor connections to piles.
- Install new bottom bottom plate and new epoxy anchors from the subfloor framing to the foundation wall.
- At the completion of the re-leveling, the contractor shall ease and adjust all doors, sashes and cupboard doors, drawers and other openable or moving parts.
- The contractor shall make good any cracked linings, claddings, windows, flooring and trims as a result of the re-leveling. This is outside the scope of this re-level design and will be managed by others.
- After re-leveling, cracks in the perimeter concrete foundation will be repaired using epoxy resin injection. Note that this includes the rest of the structure and is not limited to the re-level area. This shall be completed by an approved concrete applicator, ensuring full penetration of the crack.

8.4 Over pinning Mortar Methodology

- Install a new DPC layer to subfloor framing and replace moisture or insect-damaged timber.
- Break out and remove all defective/unsound concrete, using a wire brush.
- Allow to adjust vent heights as required to make vents all level with each other.
- All surfaces must be clean and free from loosely adhering particles or any surface contamination such as dirt, dust, grease, oil etc.
- Form boxing at the top of the foundation wall in line with Sika guidance.

- Wet down the prepared surface until the concrete is fully saturated with water. Once the surface has returned to a matt damp appearance, apply 1 coat of Sika MonoTop Primer, nominally 1mm thick, to the repair interface. Work the material well into the surface using a brush or broom.
- The subsequent micro-concrete must be applied whilst the Sika MonoTop Primer bonding bridge is still wet. If the bond coat does dry before application of the repair mortar, then Sika MonoTop Primer must be reapplied.
- While the bonding coat is still tacky, pour Sika MonoTop Micro Concrete into the cavity to restore line and level.
- Trowel the final surface to achieve a smooth, tight finish to the foundation wall.

8.5 Earthquake resilience

The proposed re-levelling of the foundation will reinstate it to being “no worse” than before the commencement of the recent seismic events. RCE notes that the re-levelling will not improve the future performance of the foundations.

9.0 DURABILITY

The structure is not located within a sea-spray zone, all material treatments will be specified for this environment to achieve a 50-year design life. Refer to RCE specifications for material coatings and treatments.

10.0 SAFETY IN DESIGN

As part of the design process, we have considered the safety of people during the erection, habitation, maintenance and contractors involved in potential future alterations and demolition of the structure.

The proposed structure has a clear use with commonly understood and accepted risks and hazards associated with it. We therefore believe any risks associated with the erection and use of the proposed structure can be managed by employing competent contractors using best practice health and safety and construction methods.

RCE notes that asbestos may be present within the units. Before works commence and asbestos investigation shall be performed by a licensed asbestos inspector. If found all asbestos shall be removed by licensed asbestos removers.

11.0 CONSTRUCTION MONITORING

Richards Consulting Engineers has been engaged by Flow Properties Limited to undertake construction monitoring.

To verify that the structure is constructed in accordance with the design and is structurally adequate. It is required that the following construction monitoring be undertaken:

	Structural Element	Construction monitoring method	Notes/date completed
1	Construction methodology	Submit to RCE before commencing	
2	Asbestos testing to be provided to engineer for review before construction	Submit to RCE before commencing	
3	Subfloor inspection once subfloor access has been provided	By Richards Consulting Engineers	

4	100kPa bearing and excavation for new piles (only if required)	By Richards Consulting Engineers	
5	Post re-levelling floor levels (before jacks removed)	By Richards Consulting Engineers	
6	Sub-floor connections	By Richards Consulting Engineers	
7	Epoxy injection of the foundation wall cracking	By PS3 from the contractor	

Please note a PS4 will be issued on completion of this project.

12.0 REFERENCES

The following design standards and guidelines have been referenced as part of the design process:

- AS/NZS 1170: 2002
- NZS 3101: 2006
- MBIE guidelines titled "Repairing and rebuilding houses affected by the Canterbury Earthquakes" dated December 2012.

Prepared by



Jayden Bracey
BE(hons)

RICHARDS CONSULTING ENGINEERS

Approved by



Sam Richards
CPEng (Civil & Structural)

Project: 26021

10 March 2026

Local Building Consent Authority

**B2 COMPLIANCE IN RESPECT OF EXISTING UNITS RELEVEL DESIGN
AT 41A AND 41B OLLIVIERS ROAD, PHILLIPSTOWN, CHRISTCHURCH, LOT 1 AND LOT 2, DP 612676**

To whom it may concern,

Compliance with Building Code Clause B2 – Durability

The purpose of this letter is to demonstrate how compliance with Clause B2 (Durability) of the Building Code will be achieved for the above project. We can confirm that for specifically designed structural elements that are included within our design documentation:

Material	Means of compliance	Details
Reinforced concrete	B2/AS1	Concrete cover to reinforcing has been selected in accordance with NZS3101, Part 1, Section 3
Structural timber	B2/AS1	Timber treatment has been selected in accordance with Table 1A of B2/AS1
Mild steel structure	Alternative Solution	Protection for mild steel has been specified in accordance with SNZ TS 3404 – Durability requirements for steel structures and components and AS/NZS2312 – Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings. This guide works on a time to first maintenance basis and assumes on-going maintenance. Refer to the attached maintenance plan (optional but recommended).

We trust this provides the information you are seeking.

Prepared by



Jayden Bracey
BE(hons)
RICHARDS CONSULTING ENGINEERS

Approved by



Sam Richards
CPEng (Civil & Structural)



association of
consulting and
engineering



PRODUCER STATEMENT

– PS1 DESIGN

BUILDING CODE CLAUSE(S): B1 only
ISSUED BY: Richards Consulting Engineers Limited
(Engineering Design Firm)

JOB NUMBER: 26021

TO: Flow Properties Limited
(Owner/Developer)

TO BE SUPPLIED TO: Christchurch City Council
(Building Consent Authority)

IN RESPECT OF: Existing Units Relevel
(Description of Building Work)

AT: 41A and 41B Olliviers Road, Philipstown, Christchurch
(Address, Town/City)

LEGAL DESCRIPTION: Lot 1 and Lot 2 DP 612676

N/A ☐

We have been engaged by the owner/developer referred to above to provide (Extent of Engagement):
refer to attached structural report for scope of work
in respect of the requirements of the Clause(s) of the Building Code specified above for Part only, as specified in
the Schedule, 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 (Verification method/acceptable solution) B1/VM1 and B1/VM4 and/or;
- ☐ Alternative solution as per the attached Schedule.

The proposed building work covered by this producer statement is described on the drawings specified in the Schedule, together with the specification, and other documents set out in the Schedule.

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

- Site verification of the following design assumptions: Refer to section 11.0
- All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that:

- the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the Schedule, will comply with the relevant provisions of the Building Code and that;
- the persons who have undertaken the design have the necessary competency to do so.

I recommend the **CM4** level of **construction monitoring**.

I, (Name of Engineering Design Professional) Sam Richards, am

- ☒ CPEng number 228315
and hold the following qualifications BE(Hons)

The Engineering Design Firm holds a current policy of Professional Indemnity Insurance no less than \$200,000
The Engineering Design Firm is a member of ACE New Zealand.

SIGNED BY (Name of Engineering Design Professional): Sam Richards
(Signature below)

ON BEHALF OF (Engineering Design Firm): Richards Consulting Engineers Limited

Date: 10/03/2026

Note: This statement has been prepared solely for the Building Consent Authority named above and shall not be relied upon by any other person or entity. Any liability in relation to this statement accrues to the Engineering Design Firm only. As a condition of reliance on this statement, the Building Consent Authority accepts that the total maximum amount of liability of any kind arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in tort or otherwise, 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.

SCHEDULE TO PS1

Please include an itemised list of all referenced documents, drawings, or other supporting materials in relation to this producer statement below:

Refer to section 3.0

Memorandum from licensed building practitioner: Certificate of design work**13.0SECTION 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: **41A and 41B Olliviers Road**

Suburb: **Phillipstown**

Town/City: **Christchurch**

Postcode:

THE OWNER

Name(s): **Flow Properties Limited**

Mailing address:

Suburb:

PO Box/Private Bag:

Town/City:

Postcode:

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 (✓)	
☐	sole 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
☐	lead 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
☐	lead 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
☒	specialist 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 _____ Chris Burrell-Smith ____ ~~carried out~~ / 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			
All RBW Design work relating to B1	(x)		() Carried out () Supervised
Foundations and subfloor framing	(✓)	<i>Structure foundation re-levelling</i>	() Carried out (✓) Supervised
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	(-)		(-) Carried out (-) Supervised
Damp proofing	(-)		(-) Carried out (-) Supervised
Roof cladding or roof cladding system	(-)		(-) Carried out (-) Supervised
Ventilation system (for example, subfloor or cavity)	(-)		(-) Carried out (-) Supervised
Wall cladding or wall cladding system	(-)		(-) Carried out (-) Supervised
Waterproofing	(-)		(-) Carried out (-) Supervised
Other	(-)		(-) 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
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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: Sam Richards	LBP or Registration number: 228315
The practitioner is a: () Design LBP () Registered architect (✓) Chartered professional engineer	
Design Entity or Company (optional): Richards Consulting Engineers Limited	
Mailing address(if different from below):	
Street address / Registered office: Unit 4a, 303 Blenheim Road	
Suburb: Upper Riccarton	Town/City: Christchurch
PO Box/Private Bag:	Postcode: 8041
Phone number: 03 347 1624	Mobile:
After Hours:	Fax:
Email address: Sam.richards@rcengineers.co.nz	Website: www.rcengineers.co.nz

DECLARATION

I Sam Richards *[name of practitioner]*, LBP,

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

Signature:



Date: 10 March 2026

Project:

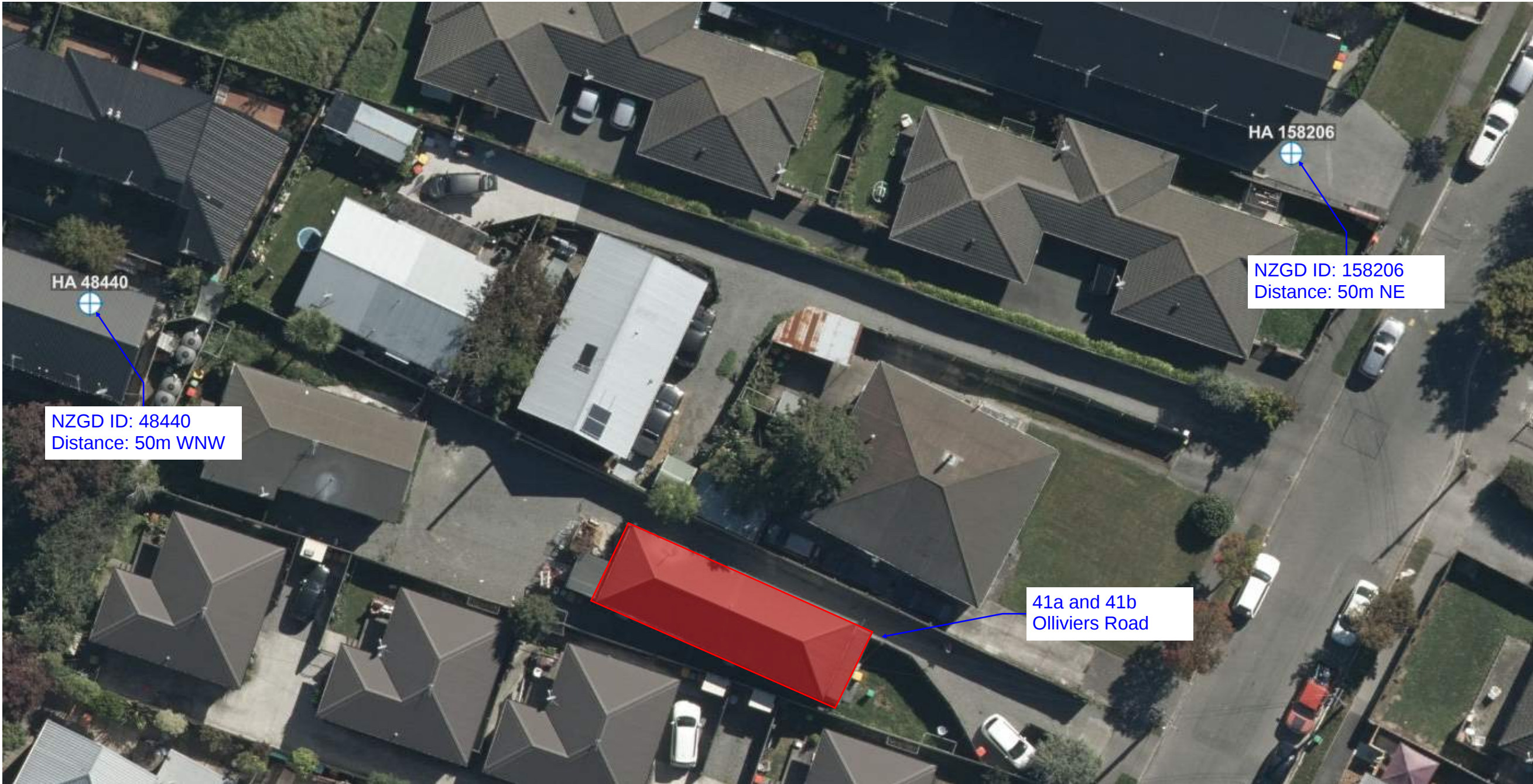
Reference:

By:

Date:

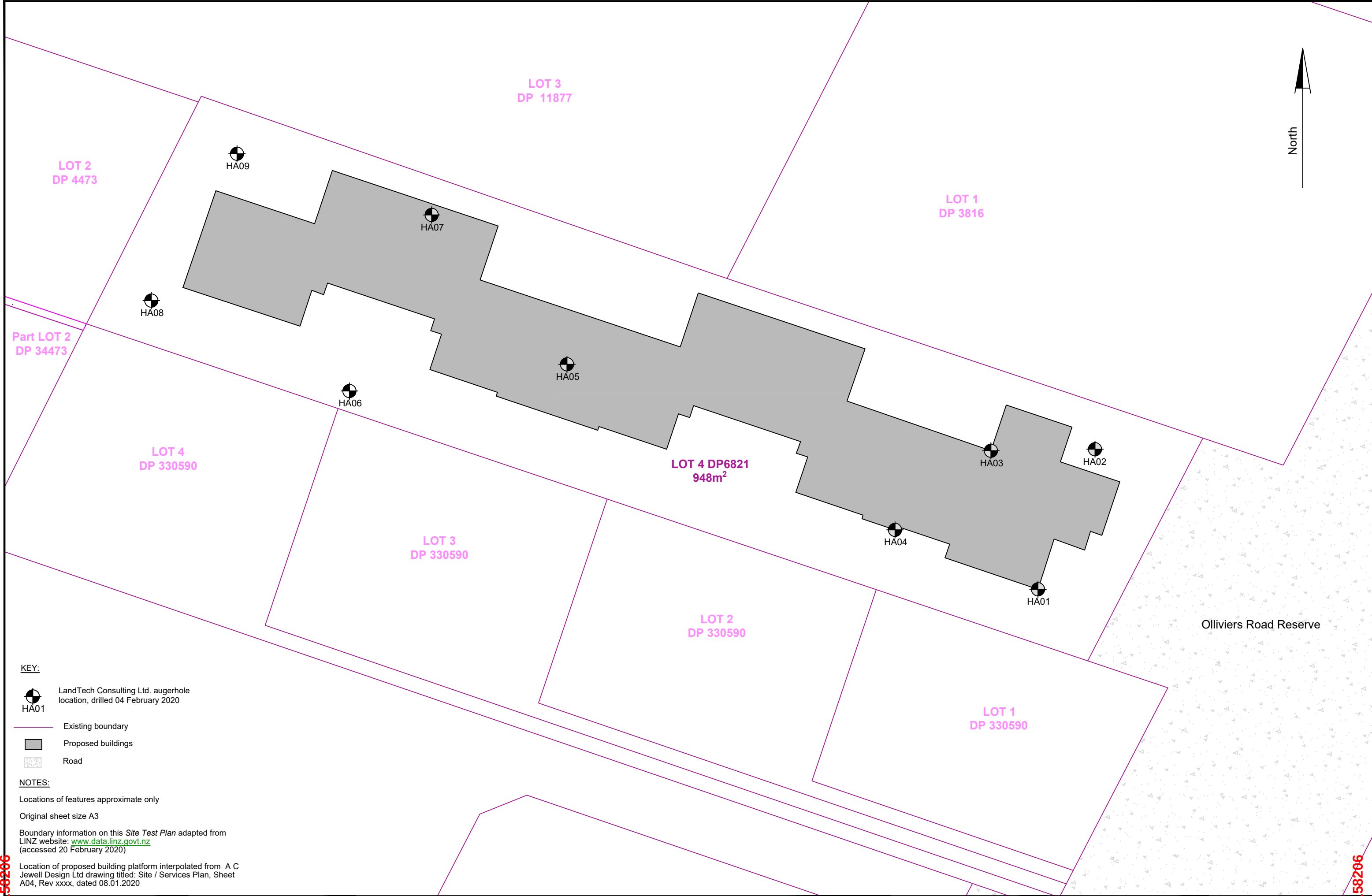
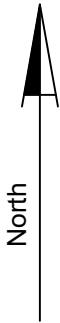
Sketch:

APPENDIX 1: DESKTOP SITE SOIL DATA



N.T.S

NZGD ID: 48440



KEY:

- LandTech Consulting Ltd. augerhole location, drilled 04 February 2020
- Existing boundary
- Proposed buildings
- Road

NOTES:

Locations of features approximate only
Original sheet size A3
Boundary information on this *Site Test Plan* adapted from LINZ website: www.data.linz.govt.nz (accessed 20 February 2020)
Location of proposed building platform interpolated from A C Jewell Design Ltd drawing titled: Site / Services Plan, Sheet A04, Rev xxxx, dated 08.01.2020

NZGD ID 158206

NZGD ID 158206

AMENDMENTS		
DATE	REV	DESCRIPTION
20/02/2020	A	Initial drafting - L Challies

Check all dimensions and levels on site before commencing construction.
This drawing and design remains the property of LandTech Consulting Ltd. and may not be reproduced without approval and permission from LandTech Consulting Ltd.

Site Test Plan

49 Olliviers Road
PHILLIPSTOWN, CHRISTCHURCH

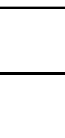


Christchurch Office:
Unit 6, 31 Carlyle Street, Sydenham, Christchurch 8023
Auckland Office:
17 Nils Andersen Road, Whenuapai, Auckland 0618
Postal Address:
PO Box 119, Christchurch 8013
Website: www.landtech.nz Email: info@landtech.nz

Drawing No. LTC20008/ 1	Drawn by: L Challies	Date: 20 February 2020
Scale: 1: 200 (A3)	Checked by: L Stewart	Revision: A
Filename: LTC20008 Drawings LC.dwg		

			Client: Wilford Investments Project: Proposed Residential Residential Units Address: 49 Oliviers Road, Phillipstown, Chirstchurch			Augerhole No. HA01 Sheet No. 1 of 1							
Drill Type: 50mmØ Hand Auger			Project No: LTC20008			Logged By: LC							
Drilled By: LC			Coordinates: NZTM2000 E1572634 N5179335			Shear Vane No: 2004							
Date Started: 4-Feb-20			Ground Conditions: Near Level Garden			Calibration Factor: 1.626							
Date Finished: 4-Feb-20			Groundwater Level (m): Not Encountered (4-Feb-20)			Calibration Date: 25-Jun-19							
Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with <i>Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes</i> , NZ Geotechnical Society Inc., 2005	Groundwater Level (m)	Depth (m)	In-situ Field Testing							
						Shear Strength (kPa)		Dynamic Cone (Scala) Penetrometer					
						Peak: Remoulded:		Depth (m)	Blow Count	Scala Blow Count / 100mm			
						0 50 100 150 200 250				0 5 10 15 20			
FILL	0.5		SILT, minor fine sand, light greyish brown, very stiff, dry, non-plastic, minor organic inclusions [TOPSOIL]	Not Encountered 4-Feb-20	0.5	228+		-0.1	2				
							-0.2	5					
ALLUVIAL DEPOSITS	1.0		SILT, trace fine sand, light brown, mottled orange, hard, dry, non-plastic [ALLUVIAL DEPOSITS]		1.0	UTP		-0.3	5				
							-0.4	5					
							-0.5	3					
							-0.6	6					
							-0.7	7					
							-0.8	7					
							-0.9	7					
							-1.0	7					
							-1.1	7					
							-1.2	8					
							-1.3	6					
							-1.4	4					
							-1.5	4					
							-1.6	4					
							-1.7	2					
							-1.8	2					
							-1.9	4					
							-2.0						
							-2.1	2					
							-2.2	2					
							-2.3	2					
							-2.4	2					
							-2.5	3					
							-2.6	4					
							-2.7	4					
							-2.8	6					
							-2.9	8					
							-3.0						
							-3.1						
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							-4.2						
							-4.3						
							-4.4						
							-4.5						
							-4.6						
							-4.7						
							-4.8						
							-4.9						
							-5.0						
						End of Augerhole 3.0m [TARGET DEPTH ACHIEVED]							
													</

		Client: Wilford Investments Project: Proposed Residential Residential Units Address: 49 Oliviers Road, Phillipstown, Chirstchurch		Augerhole No. HA02 Sheet No. 1 of 1	
Drill Type: 50mmØ Hand Auger		Project No: LTC20008		Logged By: LC	
Drilled By: LC		Coordinates: NZTM2000 E1572636 N5179343		Shear Vane No: 2004	
Date Started: 4-Feb-20		Ground Conditions: Near Level Garden		Calibration Factor: 1.626	
Date Finished: 4-Feb-20		Groundwater Level (m): Not Encountered (4-Feb-20)		Calibration Date: 25-Jun-19	

Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with <i>Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes</i> , NZ Geotechnical Society Inc., 2005	Groundwater Level (m)	Depth (m)	In-situ Field Testing							
						Shear Strength (kPa)		Dynamic Cone (Scala) Penetrometer					
						Peak:  Remoulded:  0 50 100 150 200 250	Depth (m)	Blow Count	Scala Blow Count / 100mm				
FILL	0.5		SILT, minor fine sand, light greyish brown, very stiff, dry, non-plastic, minor organic inclusions [TOPSOIL]	Not Encountered 4-Feb-20	0.5	228+	-0.1	0					
							-0.2	1					
ALLUVIAL DEPOSITS	1.0		SILT, trace fine sand, light brown, mottled orange, hard, dry, non-plastic [ALLUVIAL DEPOSITS]		1.0	UTP	-0.3	4					
							-0.4	3					
							-0.5	3					
							-0.6	4					
							-0.7	4					
							-0.8	6					
							-0.9	6					
							-1.0	5					
							-1.1	5					
							-1.2	5					
							-1.3	5					
							-1.4	4					
							-1.5	4					
							-1.6	3					
							-1.7	3					
							-1.8	3					
							-1.9	6					
							-2.0						
	2.0		Fine sandy SILT, light brown, streaked grey and orange, stiff, saturated, non-plastic		2.0	98	-2.1	2					
							-2.2	2					
							-2.3	2					
							-2.4	2					
							-2.5	4					
							-2.6	4					
							-2.7	6					
							-2.8	6					
							-2.9	8					
							-3.0						
							-3.1						
							3.0		SILT, trace fine sand, grey streaked orange, stiff, wet, non-plastic	3.0	159	-3.2	
	-3.3												
	-3.4												
	-3.5												
	-3.6												
	-3.7												
	-3.8												
	-3.9												
	-4.0												
	-4.1												
	-4.2												
	-4.3												
	4.0		trace clay, no streaks, slightly plastic		4.0		-4.4						
							-4.5						
							-4.6						
							-4.7						
							-4.8						
							-4.9						
							-5.0						
End of Augerhole 3.0m [TARGET DEPTH ACHIEVED]						In-situ field testing in accordance with the following Standards:							
						Scala Penetrometer Testing: NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer							
						Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001							

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			Client: Wilford Investments Project: Proposed Residential Residential Units Address: 49 Oliviers Road, Phillipstown, Chirstchurch		Augerhole No. HA03 Sheet No. 1 of 1				
Drill Type: 50mmØ Hand Auger		Project No: LTC20008		Logged By: GeoCivil					
Drilled By: GeoCivil		Coordinates: NZTM2000 E1572628 N5179343		Shear Vane No: 1999					
Date Started: 4-Feb-20		Ground Conditions: Near Level Garden		Calibration Factor: 1.539					
Date Finished: 4-Feb-20		Groundwater Level (m): Not Encountered (4-Feb-20)		Calibration Date: 17-Jun-19					
Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with <i>Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes</i> , NZ Geotechnical Society Inc., 2005	Groundwater Level (m)	Depth (m)	In-situ Field Testing			
						Shear Strength (kPa)		Dynamic Cone (Scala) Penetrometer	
						Peak:			
						Remoulded:			
						0 50 100 150 200 250			
FILL			SILT, minor fine sand, light greyish brown, very stiff, moist, non-plastic, minor organic inclusions [TOPSOIL]						
	0.5		SILT, trace fine sand, grey, mottled orange, very stiff, moist, non-plastic [ALLUVIAL DEPOSITS]		0.5	212			
ALLUVIAL DEPOSITS			without sand						
	1.0				1.0	220			
			</						

Augerhole No. HA04

Sheet No. 1 of 1

Drill Type:	50mmØ Hand Auger	Project No:	LTC20008	Logged By:	LC
Drilled By:	LC	Coordinates:	NZTM2000 E1572623 N5179339	Shear Vane No:	2004
Date Started:	4-Feb-20	Ground Conditions:	Near Level Garden	Calibration Factor:	1.626
Date Finished:	4-Feb-20	Groundwater Level (m):	1.7m (4-Feb-20) - affected by garden watering	Calibration Date:	25-Jun-19

Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with <i>Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes</i> , NZ Geotechnical Society Inc., 2005	Groundwater Level (m)	In-situ Field Testing			
					Shear Strength (kPa)		Dynamic Cone (Scala) Penetrometer	
					Peak: Remoulded:	Depth (m)	Blow Count	Scala Blow Count / 100mm
					0 50 100 150 200 250			0 5 10 15 20
FILL			SILT, minor fine sand, light greyish brown, very stiff, dry, non-plastic, minor organic inclusions [TOPSOIL]					
ALLUVIAL DEPOSITS	0.5		SILT, trace fine sand, light brown, mottled orange, very stiff, moist, non-plastic [ALLUVIAL DEPOSITS]	Groundwater 1.7m (4-Feb-20) affected by garden watering				
			minor fine sand, stiff, wet					
	1.0							
			heavy orange staining					
	1.5							
			Fine sandy SILT, light brown, streaked orange and grey, very stiff, saturated, non-plastic.					
	2.0		SILT, trace fine sand, light grey, mottled orange, stiff, wet, non-plastic					
			no mottles					
	2.5		trace fine clay, slightly plastic					
	3.0							
			End of Augerhole 3.0m [TARGET DEPTH ACHIEVED]					
	3.5							
	4.0							
	4.5							
	5.0							
					<i>In-situ field testing in accordance with the following Standards:</i> Scala Penetrometer Testing: NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001			

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			Client: Wilford Investments Project: Proposed Residential Residential Units Address: 49 Olliviers Road, Phillipstown, Chirstchurch			Augerhole No. HA05 Sheet No. 1 of 1				
Drill Type: 50mmØ Hand Auger			Project No: LTC20008			Logged By: LC				
Drilled By: LC			Coordinates: NZTM2000 E1572604 N5179348			Shear Vane No: 2004				
Date Started: 4-Feb-20			Ground Conditions: Near Level Garden			Calibration Factor: 1.626				
Date Finished: 4-Feb-20			Groundwater Level (m): Not Encountered (4-Feb-20)			Calibration Date: 25-Jun-19				
Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with <i>Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes</i> , NZ Geotechnical Society Inc., 2005	Groundwater Level (m)	Depth (m)	In-situ Field Testing				
						Shear Strength (kPa)		Dynamic Cone (Scala) Penetrometer		
						Peak: 0 50 100 150 200 250		Depth (m)	Blow Count	Scala Blow Count / 100mm
						Remoulded: 0 50 100 150 200 250				0 5 10 15 20
FILL			SILT, minor fine sand, light greyish brown, very stiff, dry, non-plastic, minor organic inclusions [TOPSOIL]							
ALLUVIAL DEPOSITS	0.5		SILT, trace fine sand, greyish light brown, mottled orange, hard, dry, non-plastic [ALLUVIAL DEPOSITS]		0.5					
			light brown							
	1.0		heavy orange staining		1.0					
	1.5		Silty fine SAND, light brown, loose, moist		1.5					
	2.0		SILT, trace fine sand, trace clay, light grey, streaked orange, stiff, wet, non-plastic		2.0					
			no streaks							
	2.5		trace clay, slightly plastic		2.5					
	3.0		End of Augerhole 3.0m [TARGET DEPTH ACHIEVED]		3.0					
	3.5				3.5					

		Client: Wilford Investments Project: Proposed Residential Residential Units Address: 49 Olliviers Road, Phillipstown, Chirstchurch	Augerhole No. HA06 Sheet No. 1 of 1
Drill Type:	50mmØ Hand Auger	Project No: LTC20008	Logged By: GeoCivil
Drilled By:	GeoCivil	Coordinates: NZTM2000 E1572590 N5179350	Shear Vane No: 1999
Date Started:	4-Feb-20	Ground Conditions: Near Level Garden	Calibration Factor: 1.539
Date Finished:	4-Feb-20	Groundwater Level (m): Not Encountered (4-Feb-20)	Calibration Date: 17-Jun-19

Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with <i>Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes</i> , NZ Geotechnical Society Inc., 2005	Groundwater Level (m)	Depth (m)	In-situ Field Testing		
						Shear Strength (kPa)	Dynamic Cone (Scala) Penetrometer	
						Peak:  Remoulded: 	Depth (m)	Scala Blow Count / 100mm
FILL			Fine sandy SILT, light greyish brown, very stiff, dry, non-plastic, minor organic inclusions [TOPSOIL]				-0.1	3
							-0.2	4
ALLUVIAL DEPOSITS	0.5		SILT, trace clay, trace fine sand, grey, mottled orange, stiff, moist, non-plastic [ALLUVIAL DEPOSITS]		0.5	UTP	-0.3	4
							-0.4	4
							-0.5	5
							-0.6	6
							-0.7	5
							-0.8	6
							-0.9	5
	1.0				1.0	UTP	-1.0	
							-1.1	3
							-1.2	4
							-1.3	3
							-1.4	3
							-1.5	4
							-1.6	4
							-1.7	3
							-1.8	3
							-1.9	4
	2.0				2.0	92	-2.0	
							-2.1	1
							-2.2	1
							-2.3	1
							-2.4	2
	2.5				2.5		-2.5	2
							-2.6	3
							-2.7	3
							-2.8	5
							-2.9	6
	3.0				3.0	80	-3.0	
							-3.1	
							-3.2	
							-3.3	
							-3.4	
							-3.5	
							-3.6	
							-3.7	
							-3.8	
							-3.9	
							-4.0	
							-4.1	
							-4.2	
							-4.3	
							-4.4	
							-4.5	
							-4.6	
							-4.7	
							-4.8	
							-4.9	
	5.0				5.0		-5.0	
			End of Augerhole 3.0m [TARGET DEPTH ACHIEVED]					
				In-situ field testing in accordance with the following Standards:				
				Scala Penetrometer Testing: NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer				
				Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001				

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		Client: Wilford Investments Project: Proposed Residential Residential Units Address: 49 Oliviers Road, Phillipstown, Chirstchurch		Augerhole No. HA07 Sheet No. 1 of 1	
Drill Type: 50mmØ Hand Auger		Project No: LTC20008		Logged By: LC	
Drilled By: LC		Coordinates: NZTM2000 E1572597 N51795358		Shear Vane No: 2004	
Date Started: 4-Feb-20		Ground Conditions: Near Level Garden		Calibration Factor: 1.626	
Date Finished: 4-Feb-20		Groundwater Level (m): Not Encountered (4-Feb-20)		Calibration Date: 25-Jun-19	

Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with <i>Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes</i> , NZ Geotechnical Society Inc., 2005	Groundwater Level (m)	Depth (m)	In-situ Field Testing		
						Shear Strength (kPa)		Dynamic Cone (Scala) Penetrometer
						Peak: Remoulded:	Depth (m)	Scala Blow Count / 100mm
						0 50 100 150 200 250		0 5 10 15 20
FILL			SILT, minor fine sand, light greyish brown, very stiff, dry, non-plastic, minor organic inclusions [TOPSOIL]				-0.1	2
							-0.2	2
ALLUVIAL DEPOSITS	0.5		SILT, trace fine sand, light brown, mottled orange, very stiff, dry, non-plastic [ALLUVIAL DEPOSITS]		0.5	228+	-0.3	2
			stiff, moist				-0.4	3
							-0.5	3
							-0.6	3
							-0.7	4
							-0.8	2
							-0.9	3
	1.0				1.0	127	-1.0	
							-1.1	2
							-1.2	3
							-1.3	2
							-1.4	2
	1.5		Silty fine to medium SAND, light brown, heavy orange staining, loose, wet		1.5		-1.5	2
							-1.6	1
							-1.7	2
							-1.8	3
							-1.9	3
	2.0		SILT, trace fine sand, trace clay, light grey, streaked orange, very stiff, wet, non-plastic		2.0	101	-2.0	
			without sand, stiff				-2.1	1
							-2.2	1
							-2.3	1
	2.5		minor clay, slightly plastic		2.5		-2.4	1
							-2.5	2
							-2.6	2
							-2.7	3
							-2.8	4
							-2.9	5
	3.0				3.0	150	-3.0	
							-3.1	
							-3.2	
							-3.3	
							-3.4	
	3.5				3.5		-3.5	
							-3.6	
							-3.7	
							-3.8	
							-3.9	
	4.0				4.0		-4.0	
							-4.1	
							-4.2	
							-4.3	
							-4.4	
	4.5				4.5		-4.5	
							-4.6	
							-4.7	
							-4.8	
							-4.9	
	5.0				5.0		-5.0	
In-situ field testing in accordance with the following Standards:								
Scala Penetrometer Testing: NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer								
Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001								

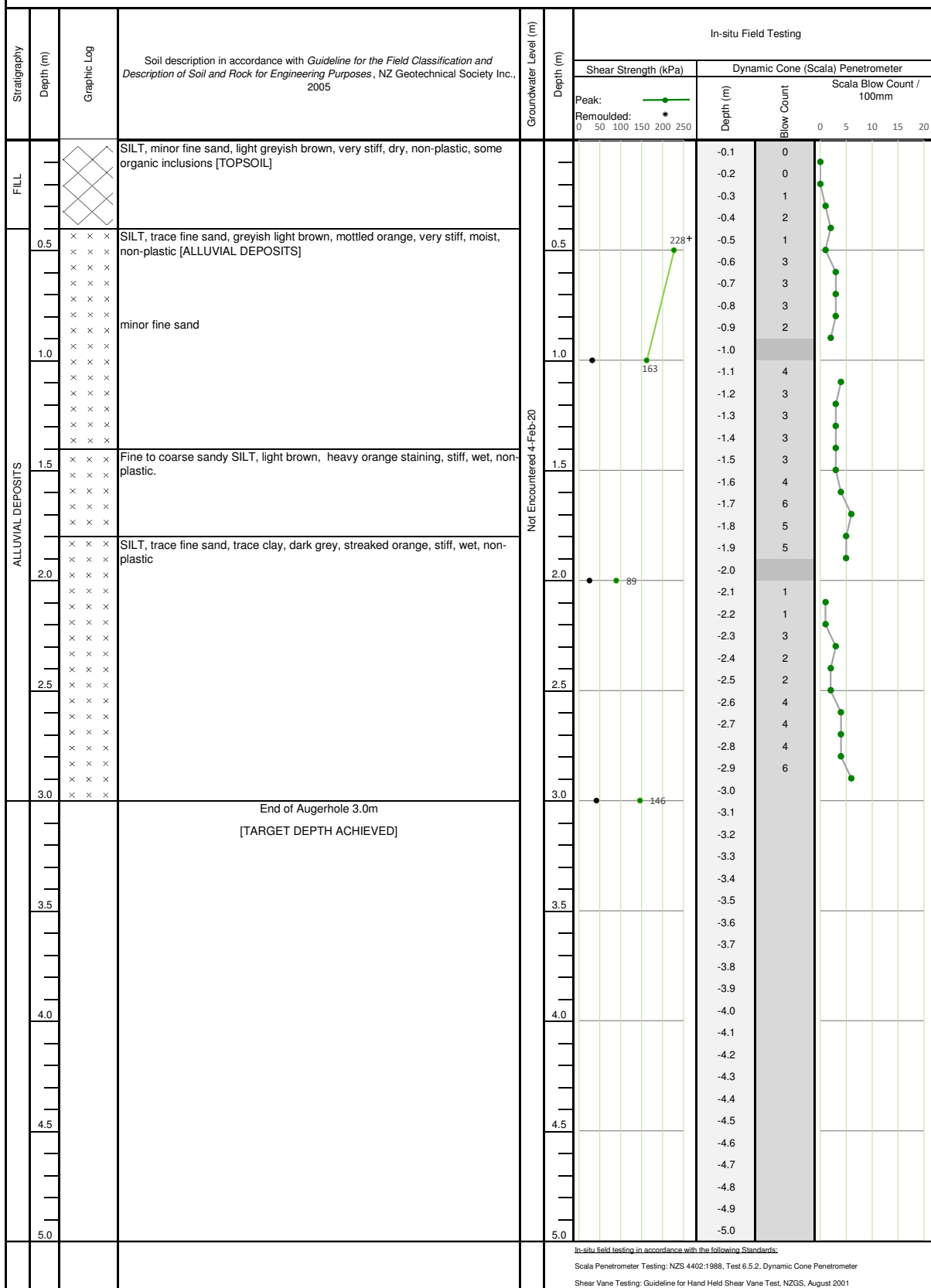
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			Client: Wilford Investments Project: Proposed Residential Residential Units Address: 49 Oliviers Road, Phillipstown, Chirstchurch			Augerhole No. HA08 Sheet No. 1 of 1							
Drill Type: 50mmØ Hand Auger			Project No: LTC20008			Logged By: GeoCivil							
Drilled By: GeoCivil			Coordinates: NZTM2000 E1572579 N5179354			Shear Vane No: 1999							
Date Started: 4-Feb-20			Ground Conditions: Near Level Garden			Calibration Factor: 1.539							
Date Finished: 4-Feb-20			Groundwater Level (m): Not Encountered (4-Feb-20)			Calibration Date: 17-Jun-19							
Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with <i>Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes</i> , NZ Geotechnical Society Inc., 2005	Groundwater Level (m)	Depth (m)	In-situ Field Testing							
						Shear Strength (kPa)		Dynamic Cone (Scala) Penetrometer					
						Peak: 							
						Remoulded: 							
							Depth (m)	Blow Count	Scala Blow Count / 100mm				
									0	5	10	15	20
FILL			Fine to medium sandy sub-angular GRAVEL, trace silt, grey, medium dense, moist [FILL]										
	0.5	x x											

Augerhole No. HA09

Sheet No. 1 of 1

Drill Type:	50mmØ Hand Auger	Project No:	LTC20008	Logged By:	LC
Drilled By:	LC	Coordinates:	NZTM2000 E1572586 N5179362	Shear Vane No:	2004
Date Started:	4-Feb-20	Ground Conditions:	Near Level Garden	Calibration Factor:	1.626
Date Finished:	4-Feb-20	Groundwater Level (m):	Not Encountered (4-Feb-20)	Calibration Date:	25-Jun-19



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Project:	NEW DWELLING RELEVEL 41B OLLIVIERS ROAD CHRISTCHURCH		
Reference:	26021	By:	JB
Date:	09/03/26	Sketch:	

SECTION 1: Joist Design

SECTION 7 – FLOORS

NZS 3604:2011

Table 7.1 – Floor joists – SG 8 up to 2 kPa floor loads (see 7.1.1.1)

(a) 1.5 kPa floor load SG 8 (dry in service)			
Floor joist size	Maximum span* of joists at a maximum spacing (mm) of:		
	400	450	600
(mm x mm)	(m)	(m)	(m)
90 x 45	1.45	1.40	1.25
140 x 35	2.10	2.00	1.80
140 x 45	2.70	2.60	2.00
190 x 45	3.55	3.45	3.15
240 x 45	4.40	4.30	3.90
290 x 45	5.20	5.05	4.60
(b) 2 kPa floor load SG 8 and SG 8 (Wet) (wet in service)			
Floor joist size	Maximum span* of joists at a maximum spacing (mm) of:		
	400	450	600
(mm x mm)	(m)	(m)	(m)
90 x 45	1.60	1.50	1.30
140 x 35	2.20	2.05	1.80
140 x 45	2.50	2.35	2.05
190 x 45	3.40	3.20	2.75
240 x 45	4.30	4.05	3.50
290 x 45	5.20	4.90	4.25
* Spans may be increased by 10 % for joists continuous over 2 or more spans.			