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We cannot guarantee its accuracy and reliability as we have not checked, audited, or reviewed the information and all the intending purchasers are advised to conduct their own due diligence investigation into the same.

To the maximum extent permitted by law Ownly (REAA 2008) and Sold On Kapiti Limited does not accept any responsibility to any person for the accuracy of the information herein.



CODE COMPLIANCE CERTIFICATE

Section 95 Building Act 2004 [Form 7 – Building (forms) Regulations 2004]



Consent No(s): 230147

The Building			
Street address of building:	168 Karuhiruhi Street, Waikanae	Building name:	N/A
Current, Lawfully established, use:	Detached Dwelling	Location of building within site/block number:	Central
Level/unit number:	-	Intended life of the building if 50 years or less:	-
Legal description of land where building is located:	Lot 68 DP 582129	Year first constructed:	2023
The Owner			
Name of owner:	Glen Parsons and Lynne Parsons	Street address /registered office:	168 Karuhiruhi Street Waikanae
Contact person:	As above	Phone numbers:	
Mailing address:	168 Karuhiruhi Street Waikanae 5036	Landline:	-
Email address:	glen.parsons@outlook.co.nz	Mobile:	0274451359
Website:	N/A	Daytime:	-
		After hours:	-
		Facsimile number:	-
First point of contact for communications with the Kapiti Coast District Council:			
As above			
Building Work			
Building Consent No(s):	230147	Issued by:	Kapiti Coast District Council

Code Compliance

The building consent authority named below is satisfied, on reasonable grounds, that:

- (a) the building work complies with the building consent

A handwritten signature in blue ink, appearing to read 'Michelle Salmon', is written over a light blue circular stamp.

Michelle Salmon –
Building Inspections Team Leader
On behalf of **Kapiti Coast District Council**

Date: 29/01/2025

Bill Francis
PO Box 287
Paraparaumu 5254

23 March 2023

Dear Building Consent Applicant / Building Owner

Approval of Building Consent – Detached Residential / Outbuilding: 230147

Location: 168 Karuhiruhi Street, Waikanae
Legal Description: Lot 68 DP 582129
Description: New single level dwelling with slab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.

I am pleased to inform you that the above building consent application has been approved. The building consent documents have been issued and are enclosed.

The building consent attached to this letter is consent under the Building Act 2004 to undertake building work in accordance with the plans and specifications that accompanied your application. Under section 49 of that Act, Council is satisfied that the provisions of the building code would be met if the proposed building work were completed in accordance with those plans and specifications. This consent does not affect any duty or responsibility under any other Act or permit any breach of any other Act.

This building consent does not give or imply any rights to transgress beyond your legal boundaries. Any work that is required beyond your legal boundaries can only be undertaken with the permission of the affected owner/s.

Building work related to this consent may not yet commence because you need to obtain resource consent/s under the Resource Management Act 1991 or the proposal must be amended to comply with the requirements of the District Plan. See attachments for further details.

Before starting any work please read ALL the building consent documents carefully and in full so that you, as the owner, understand the conditions under which the consent has been issued.

Please note that this building consent includes restricted building work, the details of this are included in this letter.

Owner responsibilities

The owner is responsible for ensuring:

- building work starts within 12 months of the approval of the building consent and that work progresses at a reasonable pace.
- written notice of every licensed building practitioner undertaking restricted building work is provided to Council before that work commences, and any changes are advised in writing
- the approved building consent documents are kept on site during construction and available for the District inspector at inspections
- all required inspections are completed and that a Code Compliance Certificate is obtained once the work has been completed. The list of supporting documentation required before issue of the Code Compliance Certificate and information on filling out the application form for code compliance certificate is attached. Failure to obtain a final inspection and a code compliance certificate may affect your insurance cover and could affect future re-sale of your property.
- a Corridor Access Request is made and a Works Access permit is obtained before undertaking work in the legal road/road reserve, including installing a vehicle access crossing from the public road into your property. The process to be followed and the forms can be found on the Council website under Council Services/Roads or Council Services/Frequently asked questions/Access & Transport.
- before any excavations are undertaken a "Before U Dig" inquiry is made to check for locations of any underground services.
- no work with noisy equipment is to be carried out before 7.30 a.m. or after 6 p.m. Monday to Saturday. During the week there may be workers on site from 6.30 a.m. quietly preparing for work. Work with noisy equipment is not permitted on Sundays and public holidays.
- all loose materials that are capable of being carried by the wind are either secured or removed from the site. All activities must be carried out in a manner that keeps to a minimum the dust nuisance to adjacent properties.
- no damage occurs to public property, for example footpaths, water meters or retaining structures. Should damage occur you will be required to pay for any repairs.
- obtaining an amendment to the building consent for any changes to the approved building consent, prior to that work being undertaken.
- meeting the requirements of any easements, consent notices, covenants, and like listings registered on the title.
- the development contributions invoiced, if any, must be paid before a code compliance certificate can be issued.
- all maintenance recommended by the manufacturers is carried out at the required intervals.

General requirements

Note: Your attention is drawn to the notes contained in the 'Addendum to the Consent' and guidance documents referred to.

The following information is relevant to this building consent:

1. The Building Inspector is to be given 24 hours' notice before carrying out the inspections on the attached list. To arrange for inspections by the District Inspector, please contact the building inspectorate on 04 296 4700 between the hours of 8.00am and 4.30pm.
2. You are responsible for the safety of visitors to the work site including those undertaking building inspections. You must provide safe access to parts of the construction necessary for inspection. Ladder access must be securely founded and tied. Scaffold access and roof edge protection is generally required.
3. If required inspections, including those by designers of specifically designed elements, are not undertaken you may experience difficulty in obtaining a Code Compliance Certificate for the project. We suggest that at the time of the first inspection you discuss the inspection requirements with the inspecting officer.
4. This building consent will lapse and be of no effect if the building work concerned has not been commenced within 12 calendar months after the date of issue, or within such further period as the territorial authority allows.
5. The contractor is to leave the site clear of all demolition materials and in a tidy state.
6. Easements, consent notices, covenants, and like listings registered on the title are the responsibility of the applicant.
7. Note and comply with endorsements on approved plans.

Restricted Building Work

The following building work associated with this building consent is restricted building work [Section 7 and 402(1)(n) of the Building Act 2004 and Building (Definition of Restricted Building Work) Order 2011]:

Description of restricted building work including design work that is restricted building work
Primary structure
Foundations and subfloor framing
Walls
Roof
Columns and beams
Bracing
Other
External moisture management systems
Damp proofing
Roof cladding or roof cladding system
Ventilation system (for example subfloor or cavity)
Wall cladding or wall cladding system
Waterproofing
Other

Please note that the design work and restricted building work must be supervised or carried out by a licensed building practitioner who is licensed to carry out or supervise that kind of building work.

You or your agent will need to provide their details to the Council in writing prior to commencement of the building work. If after the restricted building work commences the named licensed building practitioner(s) ceases to be engaged to carry out or supervise the restricted building work under the building consent, this must also be advised in writing as must also the details of any other licensed building practitioner(s) subsequently engaged to carry out or supervise the restricted building work (Section 87 of the Building Act 2004). A form "Advice of licensed building practitioner(s)" is enclosed for you to use to advise the Council of licensed building practitioner details.

Please also note that it is an offence to engage another person to carry out or supervise restricted building work who is not a licensed building practitioner (Section 86 of the Building Act 2004).

Other reference material

- Guide for completing an application for code compliance, <https://www.kapiticoast.govt.nz/your-council/planning/building/code-compliance-certificate/>
- A guide to the inspection process <https://www.kapiticoast.govt.nz/your-council/planning/building/building-services-inspections/>

If you have any questions regarding your building consent or your responsibilities, please contact Kapiti Coast District Council on 04 296 4700 or toll free on 0800 486 486.

Building Consent

[Form 5, Building (Forms) Regulations 2004]

230147

Section 51, Building Act 2004

The building

Street address of building: 168 Karuhiruhi Street, Waikanae

Legal description of land where building is located: Lot 68 DP 582129

Valuation number: 1494195265

Building name:

Location of building within site/block number:

Level/unit number:

The owner

Name of owner: Glen Parsons

Contact person:

Mailing address: 45 Kapanui Road, Waikanae 5036

Street address/registered office: As above

Phone numbers:

Landline: - *Mobile:* 0274451359

After hours: - *Fax number:* -

Email address: glen.parsons@outlook.co.nz

Website: -

First point of contact for communications with the council/building consent authority:

Full Name: Bill Francis

Mailing Address: PO Box 287, Paraparaumu 5254

Phones: -: -: 0272499519: -

Fax: -

Email: coastarchdesign@gmail.com

Building work

The following building work is authorised by this building consent:

New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.

Detached Dwelling

This building consent is issued under section 51 of the Building Act 2004. This building consent does not relieve the owner of the building (or proposed building) of any duty or responsibility under any other Act relating to or affecting the building (or proposed building). This building consent also does not permit the construction, alteration, demolition, or removal of the building (or proposed building) if that construction, alteration, demolition, or removal would be in breach of any other Act.

Conditions of building consent

This building consent is subject to the following conditions:

1. Refer to the list of inspections required. Under section 90 of the Building Act 2004 agents authorised by the Council (acting as a Building Consent Authority) are entitled, at all times during normal working hours or while building work is being done, to inspect—
 - a. land on which building work is being or is proposed to be carried out; and
 - b. building work that has been or is being carried out on or off that building site; and
 - c. any building.

Compliance schedule

A compliance schedule is not required for the building.

Attachments

Copies of the following documents are attached to this building consent:

- List of required inspections and supporting documentation required
- Building Consent Addendum
- Plans and specifications
- Certificate attached to PIM.
- Advice of licensed building practitioners

Note: The cover letter and all attachments to this building consent should be read fully to ensure you understand all conditions of this consent.

Signature 

Position Building Officer

On behalf of: KAPITI COAST DISTRICT COUNCIL

Date: 21/03/23

Certificate attached to Project Information Memorandum 230147

Section 37, Building Act 2004

Restrictions on Commencing Building Work Under the Resource Management Act 1991

The building work referred to in the attached Project Information Memorandum is also required to have the following resource consents under the Resource Management Act 1991:

Resource Consent is required to comply with Consent Notice Conditions 8 & 9.

As these resource consents will or may materially affect the building work to which the attached Project Information Memorandum relates, until they have been granted no building work may proceed.

Failure to comply with the requirements of this notice may result in legal action being taken against you under the Resource Management Act 1991.

Signature:



Position:

RMA Compliance & Resource Consents Projects Officer

On behalf of:

Kāpiti Coast District Council

Date

22 March 2023

Relevant Information

Issued in accordance with Building Consent No. 230147

1. Both hot and cold water pipes are to be tested to 1500kPa pressure.
2. Any external cladding system must be completed before a pre-lining inspection for the affected wall can take place.
3. The owner/builder is responsible for clearly defining the site boundary lines and pegs. This may require a survey. NOTE: established fences are not necessarily on the boundary.
4. Plan notes take precedence over general specifications.

Building Consent Addendum to 230147

Application	Building Consent No. 230147
Bill Francis	
PO Box 287	
Paraparaumu 5254	

Project	
Description:	New (& prebuilt) House, Unit, Bach, Crib, Town House etc. Being Stage 1 of an intended 1 Stages New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.
Intended Life:	Indefinite, but not less than 50 years
Intended Use:	Detached Dwelling
Estimated Value:	\$475,000
Location:	168 Karuhiruhi Street, Waikanae
Legal Description:	Lot 68 DP 582129
Valuation No:	1494195265

Specific requirements

1. The inspection of all specific design components covered by a producer statement design (PS1), where the designer has recommended construction monitoring, is the responsibility of the Design Engineer who is also required to supply a written report (PS4) to the Council. It is the Design engineer's responsibility to confirm design assumptions.
2. Names and registration numbers of the plumber and drainlayer are required before work commences.
3. A certifying plumber/drainlayer is to complete the attached producer statement forms and return to Council. Also provide a neat `as built` drainage plan showing sewer, stormwater and water.

KAPITI COAST DISTRICT COUNCIL

Consent No: 230147

Building Category: R1

Site Address: 168 Karuhiruhi Street, Waikanae

Owner/Agent: Bill Francis

Inspections

The following inspections are required:

- 1 Foundation
- 1 Pre-Slab Building
- 1 Pre-Slab Plumbing
- 1 Drainage
- 1 Preline Building
- 1 Postline / Wet area Pre Application
- 1 Pre Wrap
- 1 Pre Clad
- 1 Brick Veneer
- 1 Wet Area Post-application
- 1 Preline Plumbing
- 1 Final Inspection
- 12 Total Inspections

Documentation

The following documentation is required:

- 1 Application for CCC
- 1 Electrical safety certificate - Electrician
- 1 As-built drainage plan
- 1 Drainage (Form 126) for stormwater & private Sewer installation
- 1 Plumbing (Form 125) for pressure test and installation piped services
- 1 Construction review PS4 statement for structural engineering
- 1 Construction review PS4 statement for geo-technical engineering
- 1 Membrane applicator certificates - internal wet area
- 1 Record of Work

Building Practitioners

- 1 Designer 1

Bill Francis:

Practitioner Number
BP111338
Date Licensing Class First Granted
14/11/2011
Region
Wellington Region
Town/City

Paraparaumu
Postal Code
5032

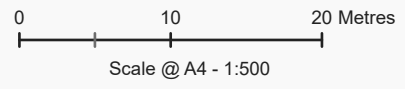
Contact Information

Primary Email: coastarchdesign@gmail.com
Mobile: 0272499519

[https://kete-lbp.mbie.govt.nz/practitioner/
?id=3020bd75-88fb-e011-a855-005056ae0567](https://kete-lbp.mbie.govt.nz/practitioner/?id=3020bd75-88fb-e011-a855-005056ae0567)

Stuart Preston
Certa Engineering Ltd

1 Designer 2



Date Printed: March 13, 2023

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Operative District Plan 2021 - Natural Hazards

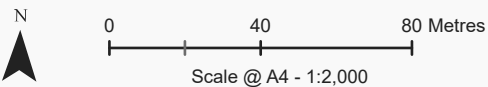
Lot 68 DP 582129



Key to map symbols

- Stream Corridor
- Flood Storage Area
- Ponding Area

The 'Key to map symbols' column above will be empty if no relevant District Plan Features are present in the area shown on this map.



Date Printed: March 13, 2023

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Latest Flood Hazards

Lot 68 DP 582129



Key to map symbols

- Stream Corridor
- Storage
- Ponding

The 'Key to map symbols' column above will be empty if no Flood Hazards are present in the area shown on this map.

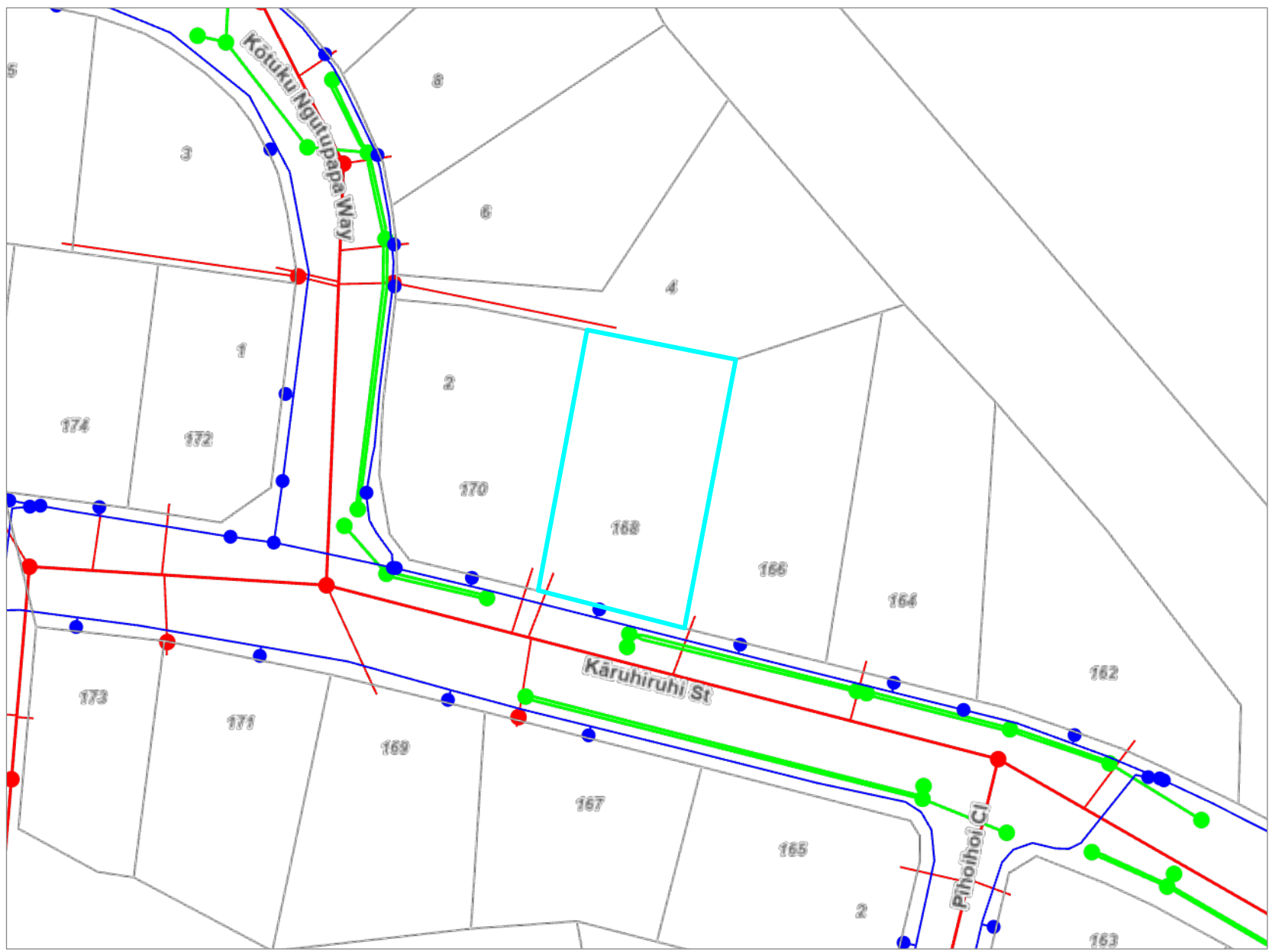


0 40 80 Metres

Scale @ A4 - 1:2,000

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Key to map symbols

- WS Node
- WS Pipe
- SW Point
- SW Pipe
- WW Point
- WW Pipe
- WW Lateral

The 'Key to map symbols' column above will be empty if no Services are present in the area shown on this map.



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APPROVED
BY BUILDING
Mike Dymond
20/03/2023

230147
Received by
Kapiti Coast District Council
06/03/23

PROPOSED DWELLING

FOR PARSONS LOT 68 STAGE 2 MANU PARK, WAIKANAE

CONTENTS:

- 1 - SITE PLAN
- 2 - DRAINAGE PLAN
- 3 - FLOOR PLAN
- 4 - FOUNDATION PLAN
- 5 - ROOF PLAN
- 6 - ELEVATIONS
- 7 - SECTION
- 8 - BRACING PLAN
- 9 - ELECTRICAL PLAN
- 10 - DETAILS
- 11 - DETAILS
- 12 - DETAILS
- 13 - DETAILS
- 14 - DETAILS
- 15 - DETAILS
- 16 - JOINERY SCHEDULE
- 17 - E2 MATRIX

NOTES:

CAUTION - PLANS HAVE BEEN DIGITALLY REPRODUCED & MAY NOT BE TO SCALE.

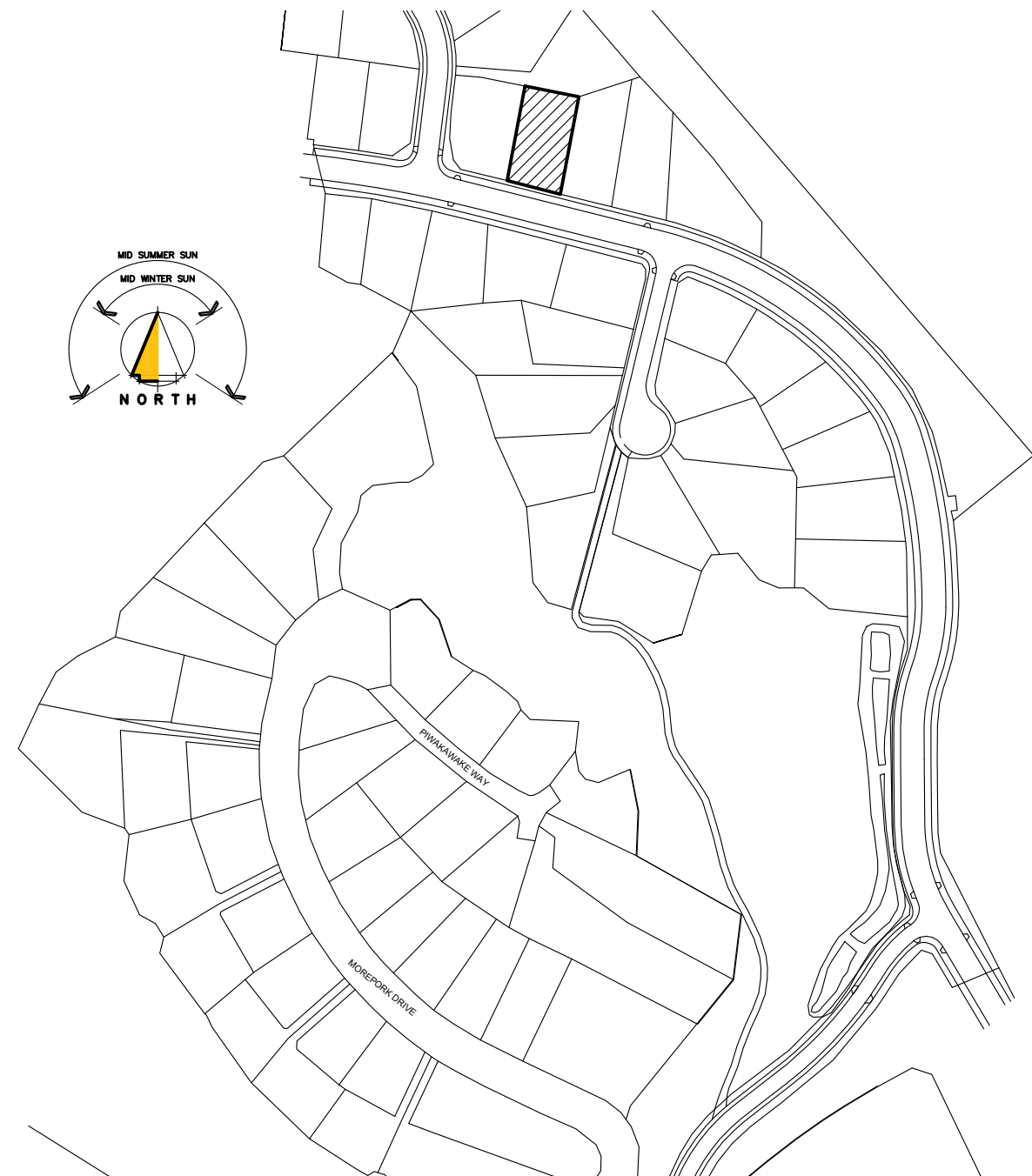
ALL WORK CARRIED OUT TO CONFORM TO RELEVANT BUILDING CODE & STANDARDS FOR LIGHT TIMBER FRAMED CONSTRUCTION.

ALL WORK CARRIED OUT UNDER JURISDICTION OF PRODUCER STATEMENT TO MEET THE ENGINEER REQUIREMENTS FULLY.

EAVE FLASHINGS FOR ALL PROFILED METAL ROOFING IN VERY HIGH WIND ZONES & IN ANY WIND ZONE WHERE ROOF PITCH IS LESS THAN 10°

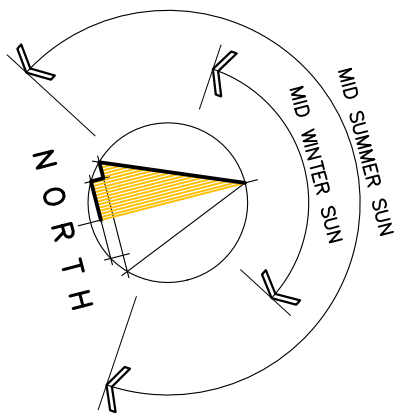
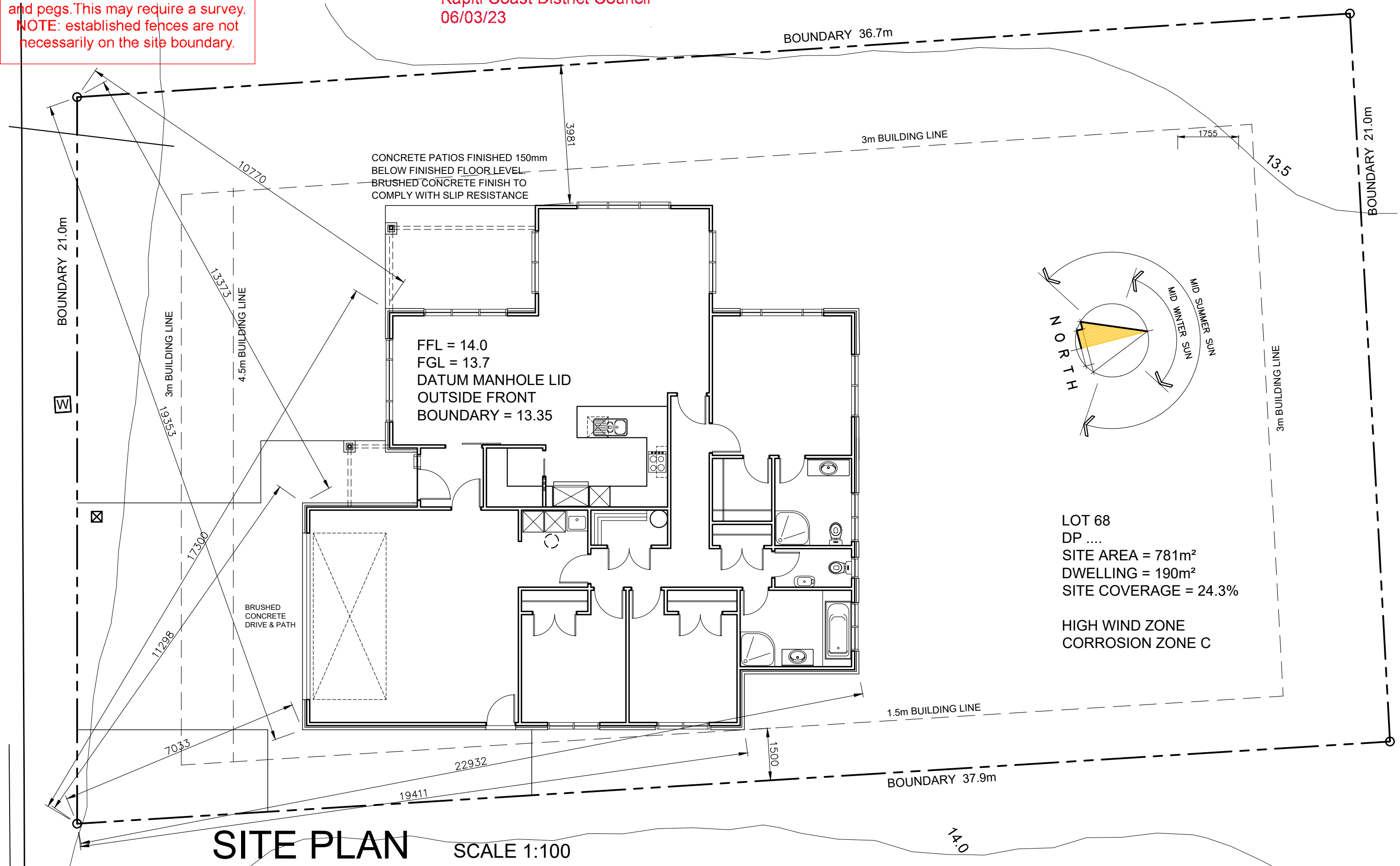
C O A S T A L
ARCHITECTURE LTD.

CAUTION
Plans have been digitally
reproduced and may not
be to scale.



BOUNDARY LINES
The Owner/Builder is responsible for clearly defining the site boundary lines and pegs. This may require a survey.
NOTE: established fences are not necessarily on the site boundary.

230147
Received by
Kapiti Coast District Council
06/03/23




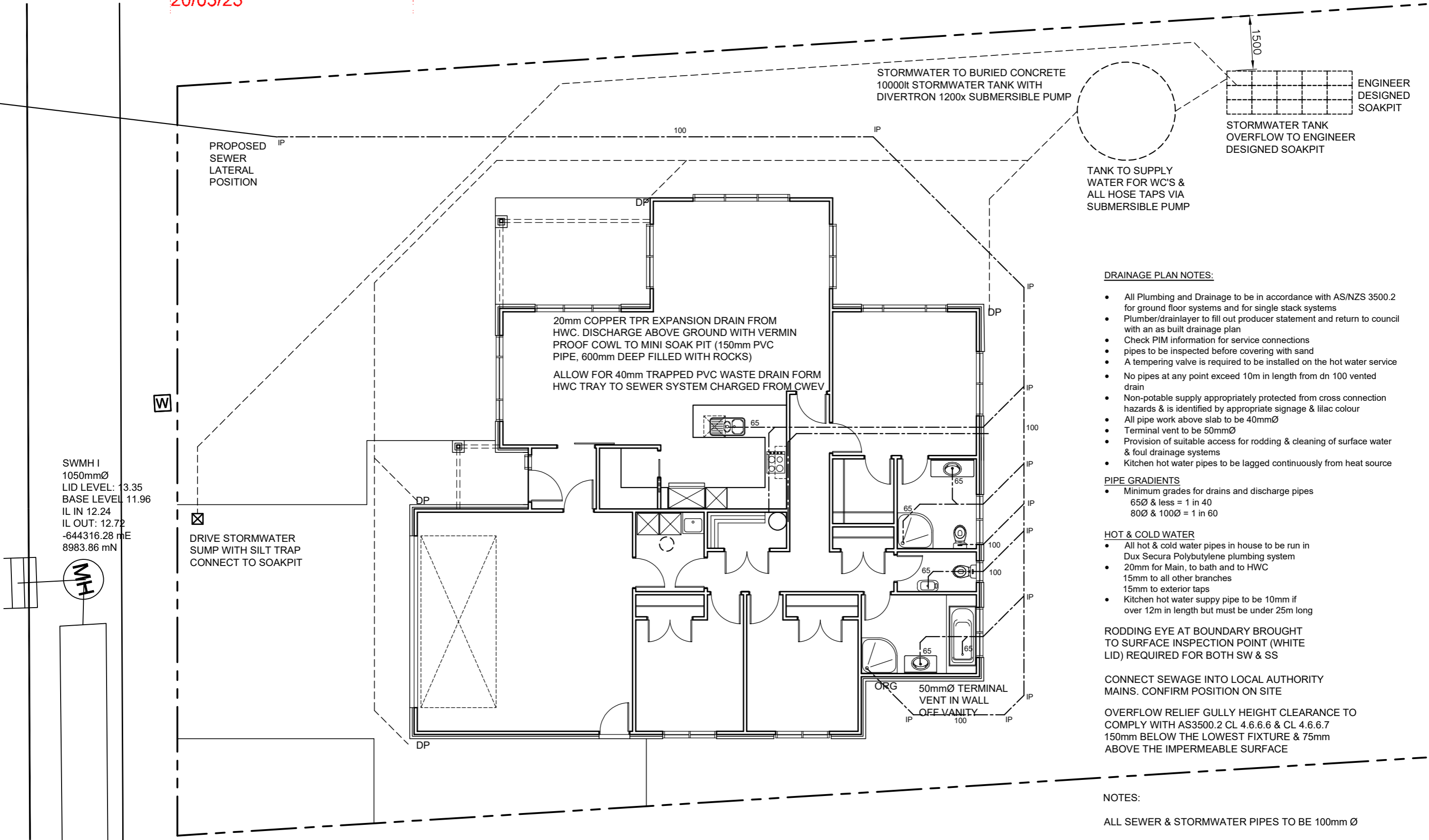
LOT 68
 DP
 SITE AREA = 781m²
 DWELLING = 190m²
 SITE COVERAGE = 24.3%

HIGH WIND ZONE
 CORROSION ZONE C

SITE PLAN SCALE 1:100

All work shall be in accordance with the NZBC. If in doubt ASK The Contractor must verify all dimensions on the job before commencing any work or shop drawings. Figured dimensions are to be used, scaled dimensions must be verified. This drawing and concept are copyright of Coastal Architecture Ltd. The recipient of this document is prohibited from disclosing its content for any purpose without the prior written consent of Coastal Architecture Ltd

<p>Revisions: DECEMBER 2022 rev A</p>	<p>Project: NEW DWELLING</p>	<p>Drawing Title: PARSONS</p> <p>LOT 68 STAGE 2 MANU PARK, WAIKANA E</p>	<p>Drawing Title: SITE PLAN</p>	<p>Designer: COASTAL ARCHITECTURE LTD.</p> <p>11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com</p>	<p>Design: BF</p> <p>Drawn: BF</p> <p>Scale: as shown</p> <p>Job: 334 Page of: 1 Rev: A</p> 
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- DRAINAGE PLAN NOTES:**
- All Plumbing and Drainage to be in accordance with AS/NZS 3500.2 for ground floor systems and for single stack systems
 - Plumber/drainlayer to fill out producer statement and return to council with an as built drainage plan
 - Check PIM information for service connections
 - pipes to be inspected before covering with sand
 - A tempering valve is required to be installed on the hot water service
 - No pipes at any point exceed 10m in length from dn 100 vented drain
 - Non-potable supply appropriately protected from cross connection hazards & is identified by appropriate signage & lilac colour
 - All pipe work above slab to be 40mmØ
 - Terminal vent to be 50mmØ
 - Provision of suitable access for rodding & cleaning of surface water & foul drainage systems
 - Kitchen hot water pipes to be lagged continuously from heat source

- PIPE GRADIENTS**
- Minimum grades for drains and discharge pipes
 - 65Ø & less = 1 in 40
 - 80Ø & 100Ø = 1 in 60

- HOT & COLD WATER**
- All hot & cold water pipes in house to be run in Dux Secura Polybutylene plumbing system
 - 20mm for Main, to bath and to HWC
 - 15mm to all other branches
 - 15mm to exterior taps
 - Kitchen hot water supply pipe to be 10mm if over 12m in length but must be under 25m long

RODDING EYE AT BOUNDARY BROUGHT TO SURFACE INSPECTION POINT (WHITE LID) REQUIRED FOR BOTH SW & SS

CONNECT SEWAGE INTO LOCAL AUTHORITY MAINS. CONFIRM POSITION ON SITE

OVERFLOW RELIEF GULLY HEIGHT CLEARANCE TO COMPLY WITH AS3500.2 CL 4.6.6.6 & CL 4.6.6.7 150mm BELOW THE LOWEST FIXTURE & 75mm ABOVE THE IMPERMEABLE SURFACE

- NOTES:**
- ALL SEWER & STORMWATER PIPES TO BE 100mm Ø
 - ALL EXPOSED HOT & COLD WATER PIPES TO BE LAGGED IF IN FROST PRONE AREA

SWMH I
1050mmØ
LID LEVEL: 13.35
BASE LEVEL 11.96
IL IN 12.24
IL OUT: 12.72
-644316.28 mE
8983.86 mN

DRAINAGE PLAN SCALE 1:100

All work shall be in accordance with the NZBC. If in doubt ASK. The Contractor must verify all dimensions on the job before commencing any work or shop drawings. Figured dimensions are to be used, scaled dimensions must be verified. This drawing and concept are copyright of Coastal Architecture Ltd. The recipient of this document is prohibited from disclosing its content for any purpose without the prior written consent of Coastal Architecture Ltd

<p>Revisions:</p> <p>DECEMBER 2022 rev A</p> <p>MARCH 2023 rev B</p> <p>MARCH 2023 rev C</p>	<p>Project:</p> <p>NEW DWELLING</p>	<p>Drawing Title:</p> <p>PARSONS</p>	<p>Drawing Title:</p> <p>DRAINAGE PLAN</p>	<p>Designer:</p> <p>COASTAL ARCHITECTURE LTD.</p> <p>11 Epiha Street Paraparaumu New Zealand</p> <p>Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com</p>	<p>Design: BF</p> <p>Drawn: BF</p> <p>Scale: as shown</p>	<p>Job: 334</p> <p>Page of: 2</p> <p>Rev: C</p>	
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GENERAL NOTES:

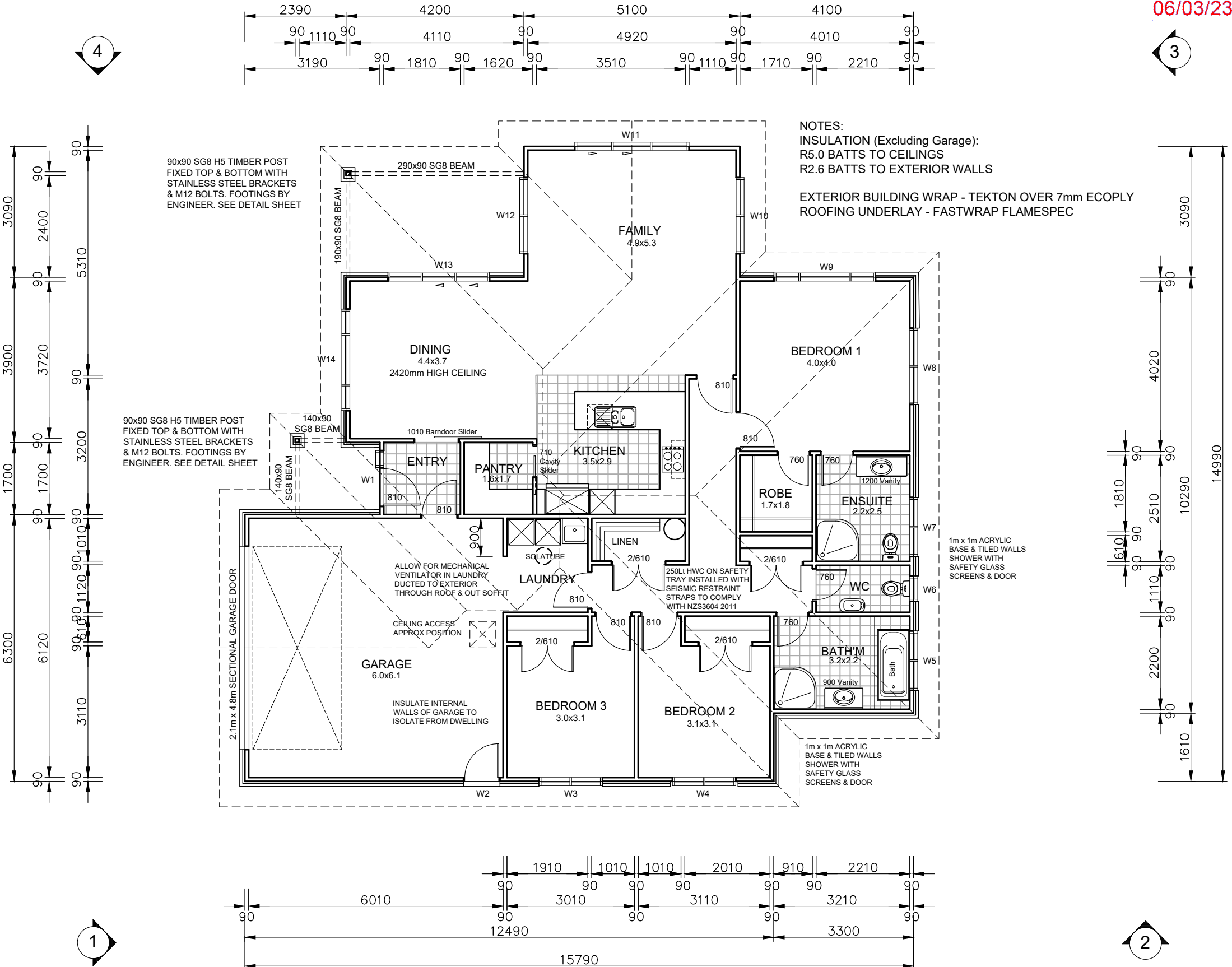
- All work must be carried out to conform to relevant sections of the New Zealand Building Code and New Zealand Standards - in particular NZS 3604, NZS 3602 & NZS 4218. All references to Standards shall be taken as reference to the latest revision including amendments.
 - Ground bearing must be reconfirmed on site following excavation but prior to placing concrete and reinforcing.
 - Confirm site boundaries with licenced surveyor. Fences may not necessarily be on the legal boundary.
 - All work to be carried out to best trade practice
 - All habitable rooms have at least 5% of their floor area as opening windows or approved alternative to achieve ventilation requirements
 - All habitable rooms have windows providing at least 10% of their floor area as natural light. At least 50% of the glazed area providing natural light is clear glazing falling within the visual awareness zone providing natural light is clear glazing falling within the visual awareness zone
 - Garage spaces within or attached to the building envelope shall have
 - A - Openings provided with a 50mm min total level change between the interior & exterior paving
 - B - Provision to drain water away from the threshold of the opening.
 - refer to E2 fig 65 & table 18 for overall level change requirements
 - Do Not Scale off Building Consent Documentation issued from TA's as the plans may have been scanned and the scale distorted.
 - Prenail framing and truss manufacturer to provide lintel sizes and provide a producer statement for framing, window lintels and trusses.
 - Window openings to be 20mm larger than window sizes (10mm tolerance each side)
 - All bottom plates and framing to shower areas to be H3.1. All framing in other at risk areas such as parapets and enclosed balconys to comply with NZS 3602 for particular situation.
 - Allow for dwangs to fix fittings as required by owner.
 - Wall junctions shall be framed up with not less than 2 studs blocked and nailed.
 - Maximum diameter hole in 90mm stud to be 25mm or 35mm diameter where not more than 3 consecutive studs are drilled.
 - Lintels supporting rafters or trusses shall be secured against uplift as per clause 8.6.1.8 & figure 8.12, NZS 3604:2011. 25x1mm strap with 6/30x2.5mm nails into both lintel & stud & 25x1mm strap taken under plate & up 150mm each side of stud fixed with 6/30x2.5mm nails into each side of stud
 - Confirm building wrap is able to be used with timber treatment.
 - Builders on site to comply with F5 of the building code (Health & Safety)
- Benchtops & Vanities**
- To be selected at owners discretion. To be continuously smooth and easily maintained in a hygenic condition e.g. stainless steel, high pressure laminate, acrylic, granite, or engineered stone surface. Must be sealed to adjoining impervious, easily cleaned walls e.g. aquaenamell paint, tiles, or glass

INTERNAL LININGS

- WALLS:**
- Generally - 10mm Standard Gib Board
 - Bathrooms - 10mm Gib Aqualine
- CEILINGS:**
- Generally - 13mm Standard Gib
 - Bathrooms - 13mm Gib Aqualine
 - Back block sheet joints and allow for control joints as required by manufacturer

FRAMING

- Exterior Walls & Internal Load Bearing Walls:
- Up to 2.4m - 90x45 SG8 at 600 crs H1.2
- Interior Non Load Bearing Walls:
- Up to 2.4m - 90x45 SG8 at 600 crs H1.2



FLOOR PLAN

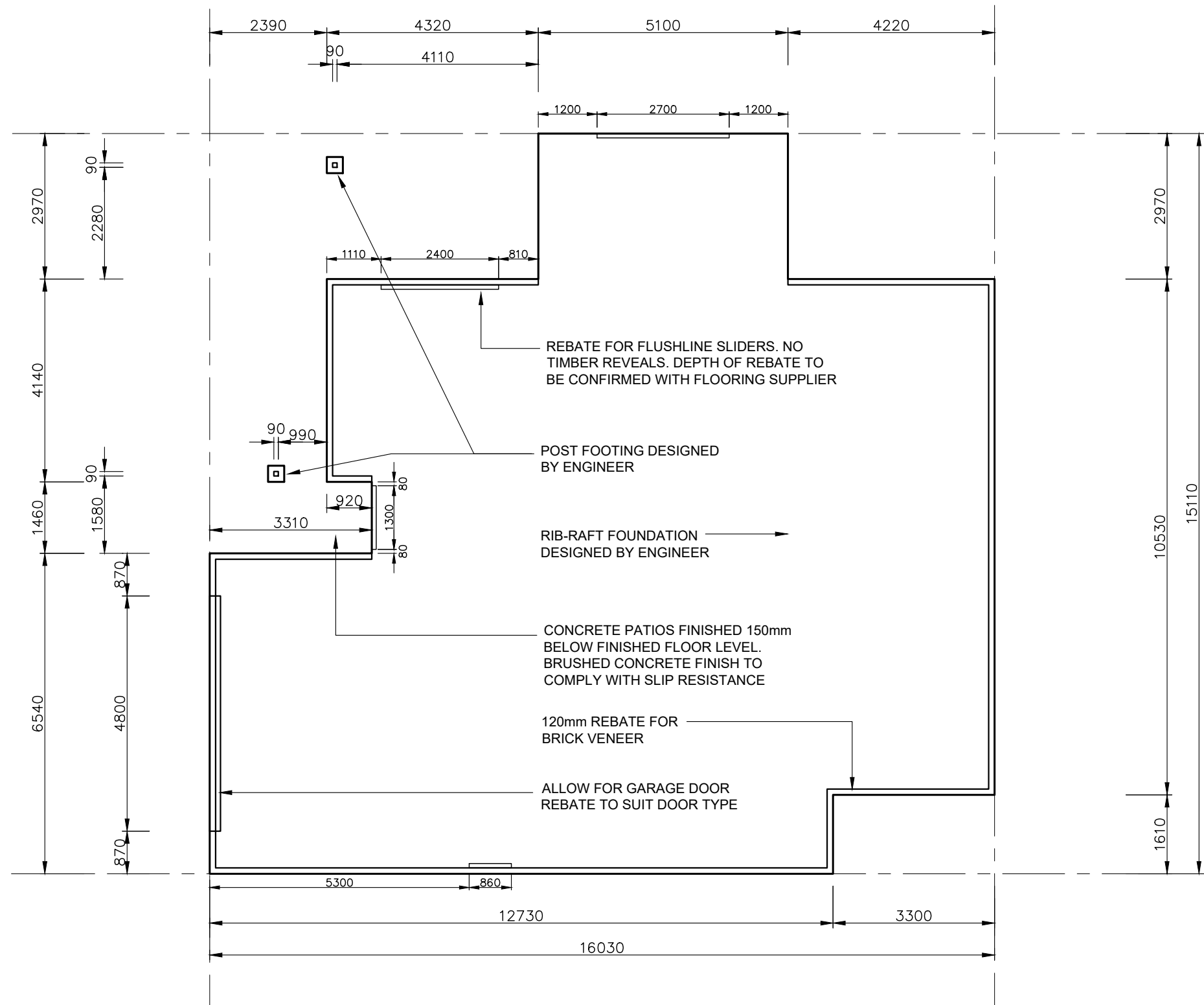
SCALE 1:100

AREA = 184m²

AREA OVER FOUNDATION = 190m²

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Revisions: DECEMBER 2022 rev A	Project: NEW DWELLING	Drawing Title: PARSONS LOT 68 STAGE 2 MANU PARK, WAIKANAE	Drawing Title: FLOOR PLAN	Designer: COASTAL ARCHITECTURE LTD. 11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com	Design: BF	Drawn: BF Scale: as shown	
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MINIMUM FLOOR HEIGHT
 PROTECTED GROUND
 100MM BRICK VENEER
 150MM OTHER CLADDINGS
 UNPROTECTED GROUND
 150MM BRICK VENEER
 225MM OTHER CLADDINGS
 HEIGHTS AS PER NZS3604 2011 SECTION 7

PROPRIETARY ANCHORS SHALL BE WITHIN 150mm OF EACH END & SPACED AT A MAX OF 900mm CRS OR 600mm CRS WHEN USED ON SLAB EDGES FORMED BY MASONRY HEADER BLOCKS

FOUNDATION PLAN SCALE 1:100

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NOTES

TRUSSES
 DO NOT SUPPORT BOTTOM CHORD OF TRUSS
 AT POINTS OTHER THAN THOSE DESIGNATED
 BY THE TRUSS MANUFACTURER

ALL ROOF FRAMING TO BE H1.2

ROOF FRAMING FIXINGS

TRUSSES
 FIXINGS FOR A ROOF TRUSS AT ITS
 SUPPORT SHALL BE AS GIVEN BY
 THE TRUSS MANUFACTURERS
 DESIGN BUT **SHALL BE NOT LESS**
THAN: 2/90x3.15 SKEWED NAILS &
 STRAP FIXING (see figure 10.6 NZS
 3604 2011)

TILE BATTEN FIXING:
 2 / 90x3.15 GUN NAILS (0.8kN FIXING
 CAPACITY)

SUPPLY COPY OF RELEVANT
 WARRANTIES FOR ROOFING,
 MEMBRANE SYSTEMS & FASCIA /
 GUTTER SYSTEMS AS
 APPROPRIATE TO COUNCIL

ROOFING MATERIAL TO BE
 INSTALLED TO MANUFACTURERS
 REQUIREMENTS IN PARTICULAR,
 FIXING & MINIMUM PITCH
 (REFERENCE ALSO SECT 8 OF E2
 NZ BUILDING CODE)

SOFFITS

UNFINISHED HARDIES SOFFITS MUST
 BE PAINTED TO COMPLY WITH NZBC
 DURABILITY REQUIREMENTS

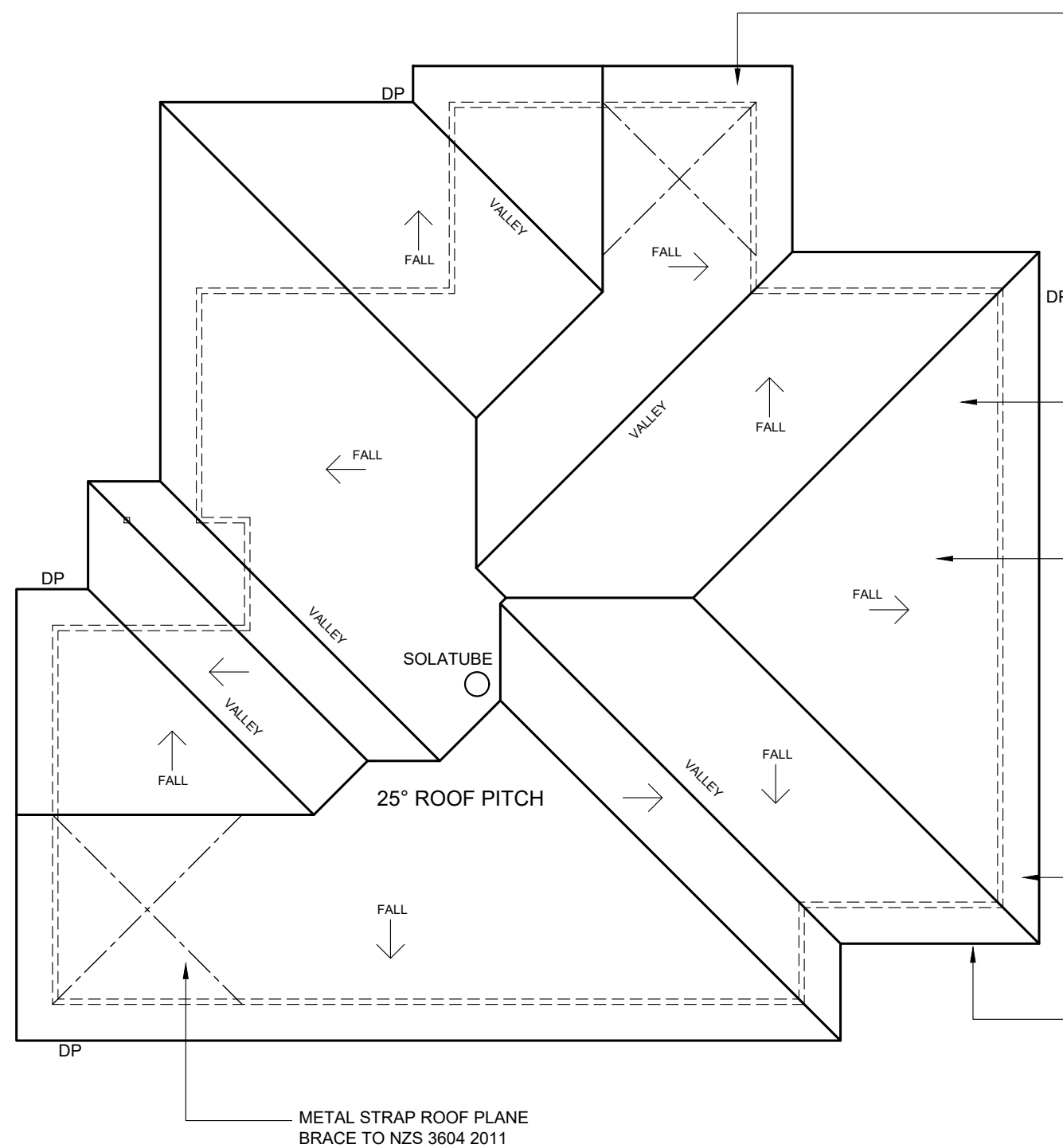
SPOUTING

FRONT EDGE OF SPOUTING TO BE
 20mm BELOW TOP EDGE OF FASCIA

RAINWATER CALCULATION

- Roof Catchment Area = 240m² / 25° x 1.23 = 295
- Colorsteel gutter = Catchment capacity = 6300mm²
- Downpipe Size = 80Ø Marley
- Downpipe Catchment Area = 100m²

Roof Catchment/Downpipe Catchment = 295/100 = 3 DP's



90x45 SG8 OUTRIGGERS
 FIXED BACK TO LAST TRUSS
 OVER TOP OF GABLE TRUSS .
 FIX WITH 1/14g SELF DRILLING
 SCREW, 100mm LONG (5.5kN
 FIXING CAPACITY) TO
 COMPLY WITH TABLE 10.10
 NZS 3604 2011

ALL DOWNPIPES 80mm Ø

GANGNAIL TRUSSES @ 900mm
 CRS FIXED EACH END TO TRUSS
 MANUFACTURERS DESIGN

GERARD METAL ROOF TILES WITH
 OVER TILE BATTENS TO
 MANUFACTURERS SPECIFICATION
 TILE BATTEN FIXING:
 2 / 90x3.15 GUN NAILS (0.8kN
 FIXING CAPACITY)
 BATTEN SPACING 370mm

600mm SOFFIT OVERHANG
 LINED WITH 4.5mm HARDIFLEX
 & PVC JOINTERS. 450mm
 OVERHANG TO GABLE ENDS

COLOURSTEEL SPOUTING
 & FASCIA SYSTEM

ROOF PLAN SCALE 1:100

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SOUTH ELEVATION 1
 SCALE 1:100



PRESSED METAL TILE ROOF
 OVER TILE BATTENS

600mm SOFFIT OVERHANG LINED WITH
 4.5mm HARDIFLEX & PVC JOINTERS.

POWDER COATED
 ALUMINIUM JOINERY WITH
 SUITABLE HEAD FLASHINGS

EAST ELEVATION 2
 SCALE 1:100



COLOURSTEEL SPOUTING
 & FASCIA SYSTEM

70 SERIES BRICK VENEER
 EXTERIOR CLADDING

NORTH ELEVATION 3
 SCALE 1:100



EXTERIOR BUILDING WRAP - TEKTON OVER
 7mm ECOPLY
 ROOFING UNDERLAY - FASTWRAP FLAMESPEC

INSULATION: (EXCLUDING GARAGE)
 R5.0 BATTS TO CEILINGS
 R2.6 BATTS TO EXTERIOR WALLS

BEVELBACK WEATHERBOARD
 CLADDING TO FEATURE
 WALLS & OVER JOINERY

WEST ELEVATION 4
 SCALE 1:100



NOTE:
 ALL CLADDINGS, ROOFING & SPOUTING
 SYSTEMS TO BE MAINTAINED BY
 OWNER IN ACCORDANCE TO
 MANUFACTURERS RECOMMENDATIONS
 & WARRANTEE REQUIREMENTS

CLADDING TO BE INSTALLED TO
 MANUFACTURERS REQUIREMENTS IN
 PARTICULAR FIXING & GROUND
 CLEARANCE.
 ALSO REFER TO NZBC, CLAUSE E2/AS1,
 EXTERNAL MOISTURE FOR CLARITY

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					Job: 334	Page of: 6	

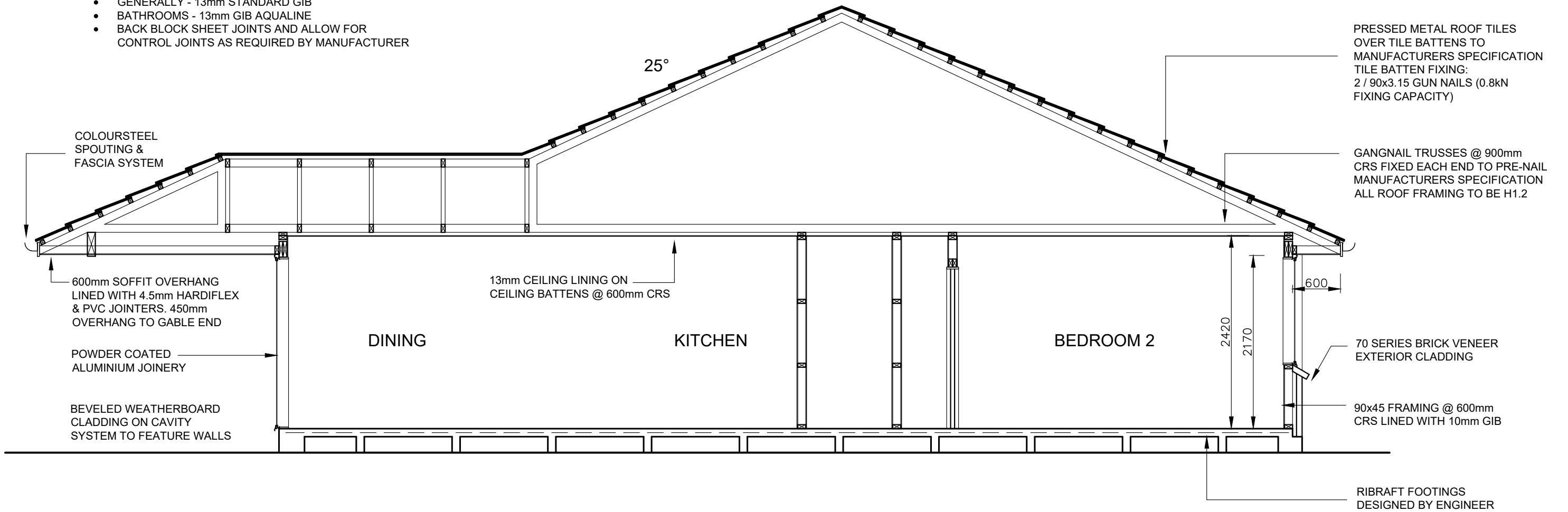
INTERNAL LININGS

WALLS:

- GENERALLY - 10mm STANDARD GIB BOARD
- BATHROOMS - 10mm GIB AQUALINE

CEILING:

- GENERALLY - 13mm STANDARD GIB
- BATHROOMS - 13mm GIB AQUALINE
- BACK BLOCK SHEET JOINTS AND ALLOW FOR CONTROL JOINTS AS REQUIRED BY MANUFACTURER



EXTERIOR BUILDING WRAP - TEKTON OVER 7mm ECOPLY
 ROOFING UNDERLAY - FASTWRAP FLAMESPEC

INSULATION (Excluding garage)
 R5.0 BATTs TO CEILINGS
 R2.6 BATTs TO EXTERIOR WALLS

ALLOW FOR 140x45 DOUBLE TOP PLATE

ALL CONSTRUCTION TO COMPLY WITH THE NZBC, NZS 3604:2011, NZS 3602:2003 AND BEST TRADE PRACTICE.

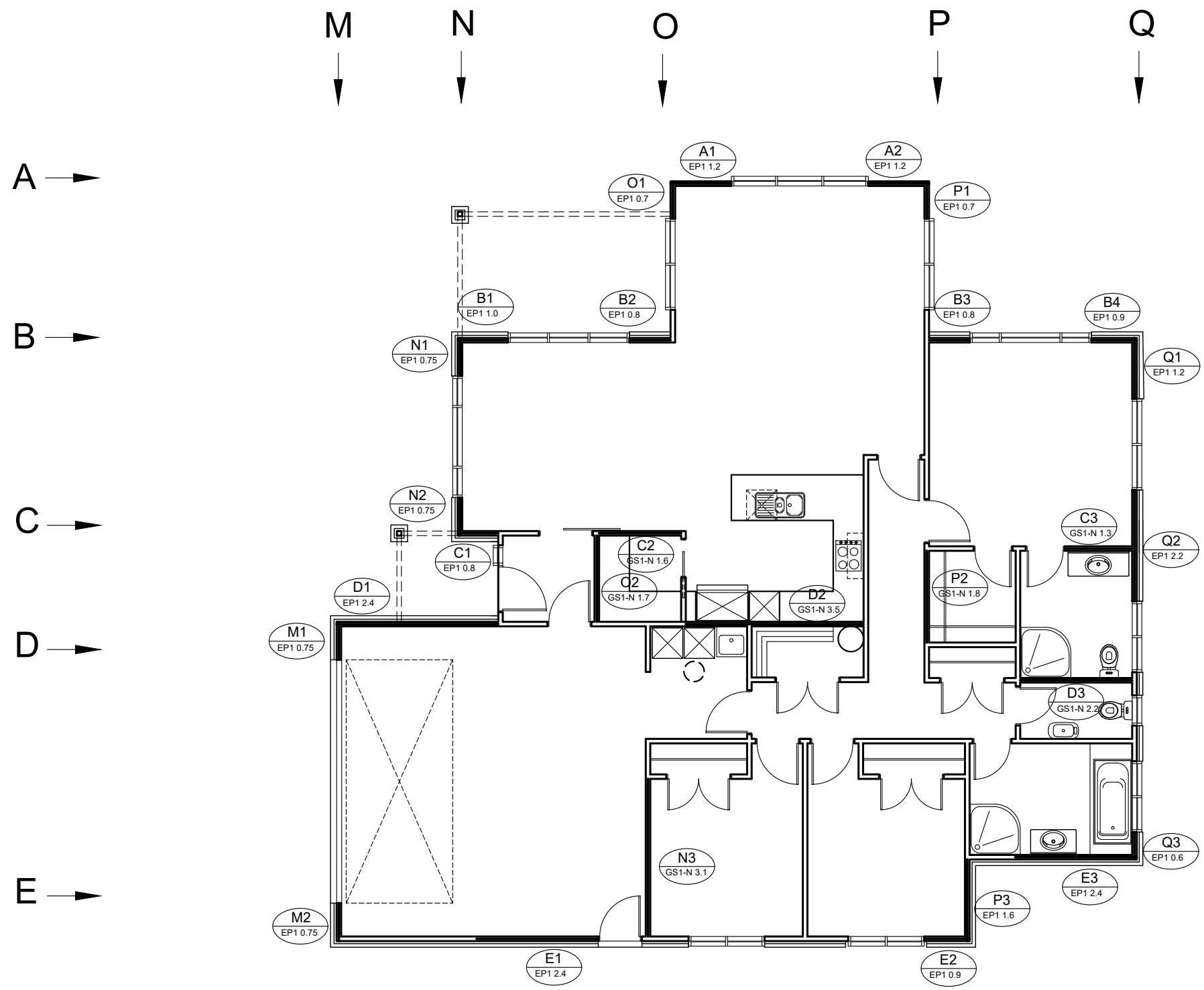
SECTION AA SCALE 1:50

CROSS SECTION NOTES

- CLADDING TO BE INSTALLED TO MANUFACTURERS REQUIREMENTS IN PARTICULAR FIXING AND GROUND CLEARANCE
- ALSO REFER TO NZBC, CLAUSE E2/AS1, EXTERNAL MOISTURE: THIRD EDITION FOR CLARITY
- ALL JUNCTIONS TO CLADDINGS AND OTHER EXTERNAL MOISTURE PROTECTION AREAS, TO HAVE CAPILLARY GAPS/BREAKS AND INSEAL WHERE RELEVANT, STOPPING WIND DRIVEN OR SURFACE TENSION WATER

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					Job: 334	Page of: 7	



NOTES:

- THIS SITE IS A HIGH WIND ZONE
- BRACING TO BE INSTALLED TO MANUFACTURERS SPECIFICATIONS - WINSTONES GIB EZYBRACE SYSTEMS 2016
- BRACING DISTRIBUTION TO NZS 3604 CLAUSE 5.5.3
- TIMBER TOP PLATE CONNECTION FOR INTERNAL BRACED WALLS TO EXTERNAL WALL SHALL COMPLY WITH NZS 3604:2011 SECTION 8.7.3.4

BRACING PLAN SCALE 1:100

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<p>Revisions: DECEMBER 2022 rev A</p>	<p>Project: NEW DWELLING</p>	<p>Drawing Title: PARSONS LOT 68 STAGE 2 MANU PARK, WAIKANA E</p>	<p>Drawing Title: BRACING PLAN</p>	<p>Designer: COASTAL ARCHITECTURE LTD. 11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com</p>	<p>Design: BF Drawn: BF Scale: as shown</p> <p>Job: 334 Page of: 8 Rev: A</p>	
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ELECTRICAL NOTES:

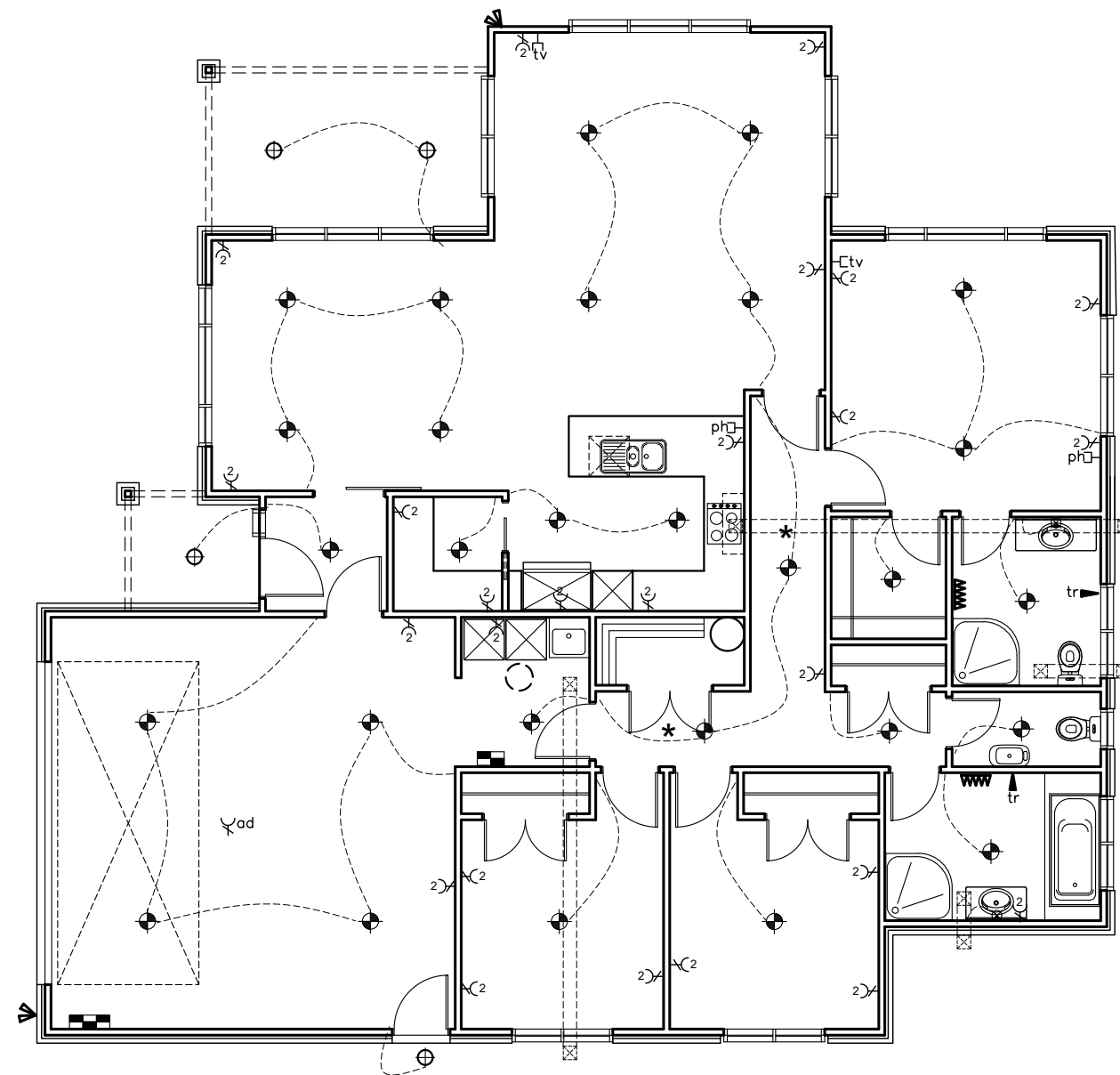
RECESSED DOWNLIGHTS (IF USED) SHALL BE INSTALLED TO PREVENT TRANSFER OF MOISTURE INTO CEILING SPACE & MAINTAIN MIN CLEARANCE FROM INSULATION AS REQUIRED BY NZECP 54:2001

PROVIDE ELECTRICAL CERTIFICATE AFTER COMPLETION & PRIOR TO CODE COMPLIANCE CERTIFICATE BEING ISSUED

ALLOW FOR SMOKE DETECTORS TO BE INSTALLED IN ENTRY & MIN 3m FROM ANY BEDROOM DOOR & HAVE DECIBEL RATING TO COMPLY WITH BUILDING CODE REQUIREMENTS

ALL EXTRACTOR FANS TO COMPLY WITH REQUIRED AIR FLOW RATE

ELECTRICAL LEGEND			
	Recessed Downlight		Smoke detector
	External lighting point		Power Point (2 denotes double)
	Feature Halogen		Television Point
	Meter Board		Phone Point
	Switch Board		Heated Towel Rail
	Extractor Fan		Wall Heater
	Spotlight with sensor		Auto Garage Door Opener

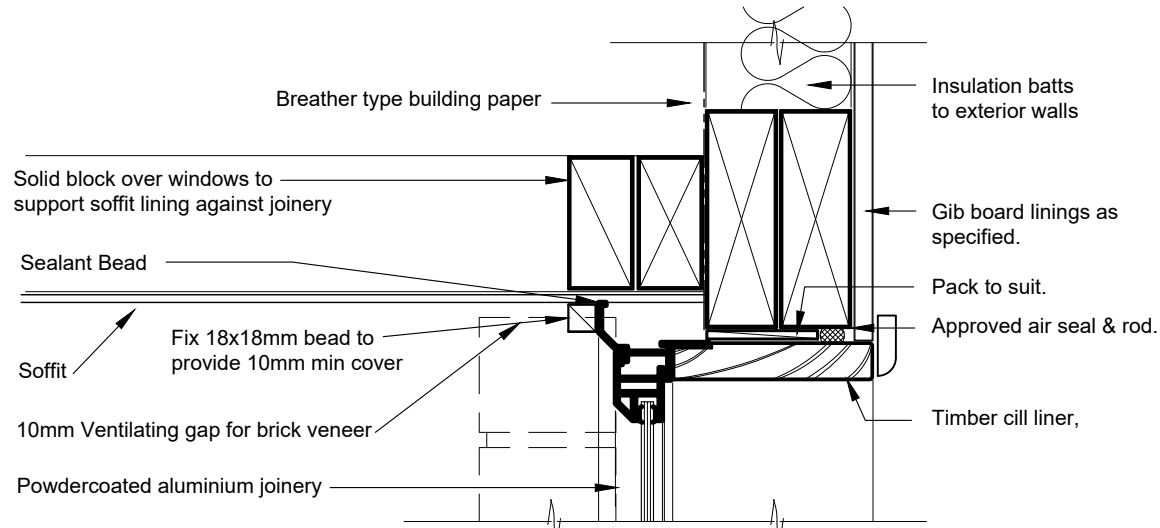


ELECTRICAL PLAN

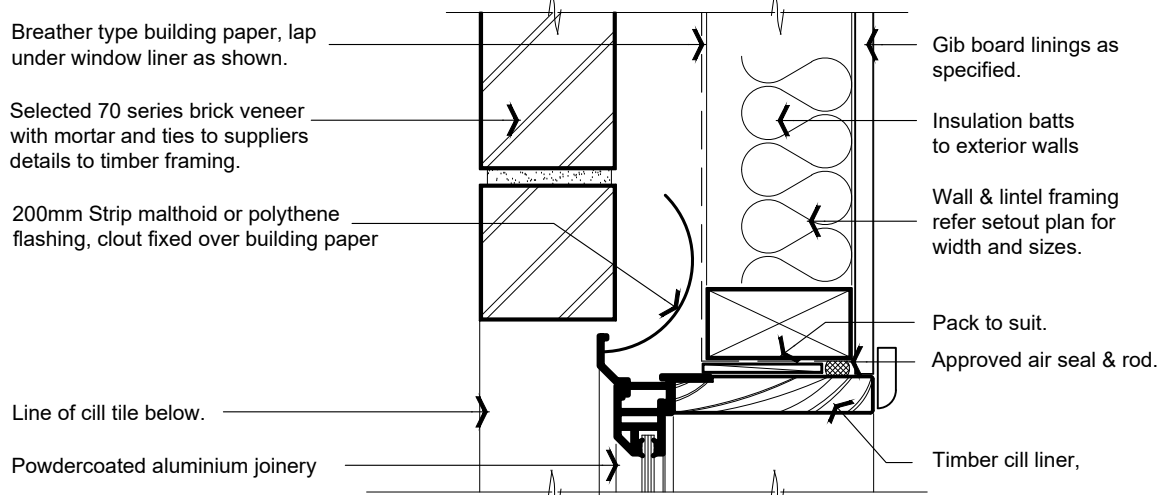
SCALE 1:100

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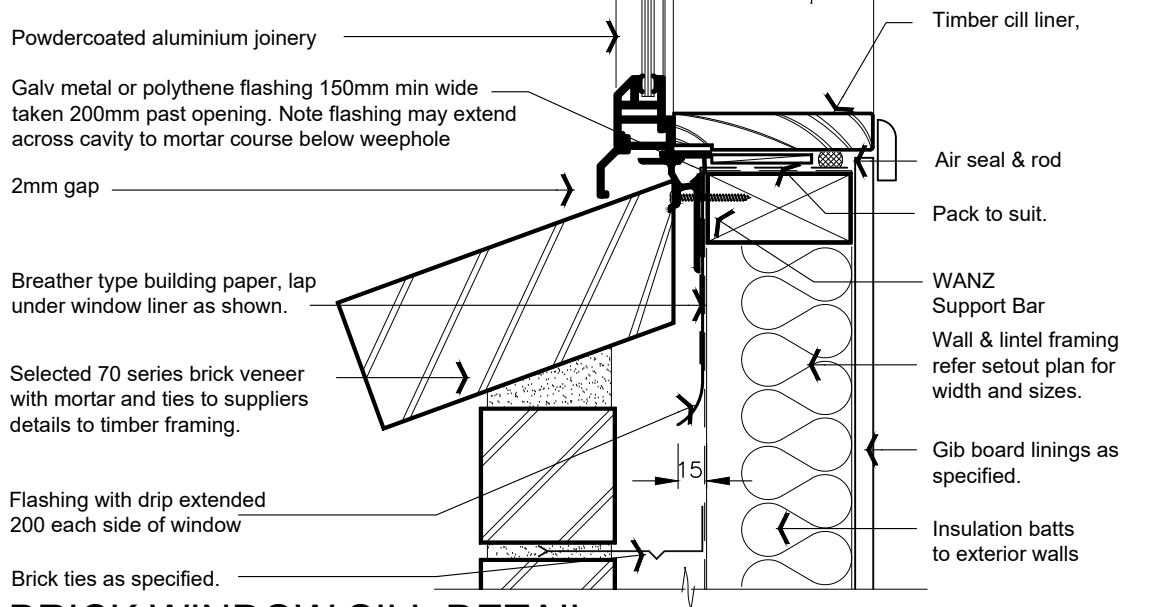
Revisions: DECEMBER 2022 rev A	Project: NEW DWELLING	Drawing Title: PARSONS LOT 68 STAGE 2 MANU PARK, WAIKANAЕ	Drawing Title: ELECTRICAL PLAN	Designer: COASTAL ARCHITECTURE LTD. 11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com	Design: BF	Drawn: BF Scale: as shown	
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BRICK WINDOW HEAD DETAIL
 SCALE 1:5



BRICK WINDOW JAMB DETAIL
 SCALE 1:5



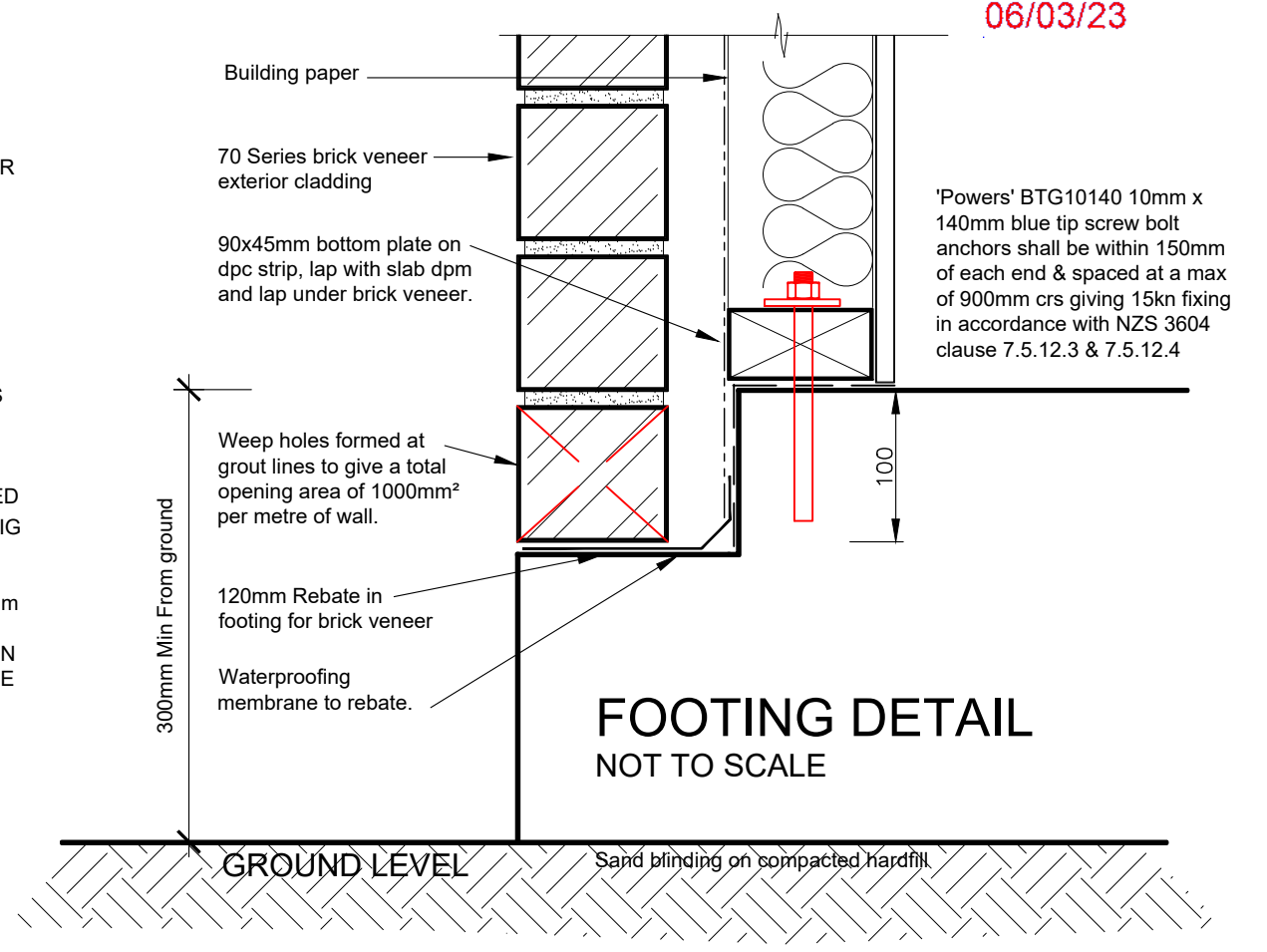
BRICK WINDOW SILL DETAIL
 SCALE 1:5

MASONRY NOTES:

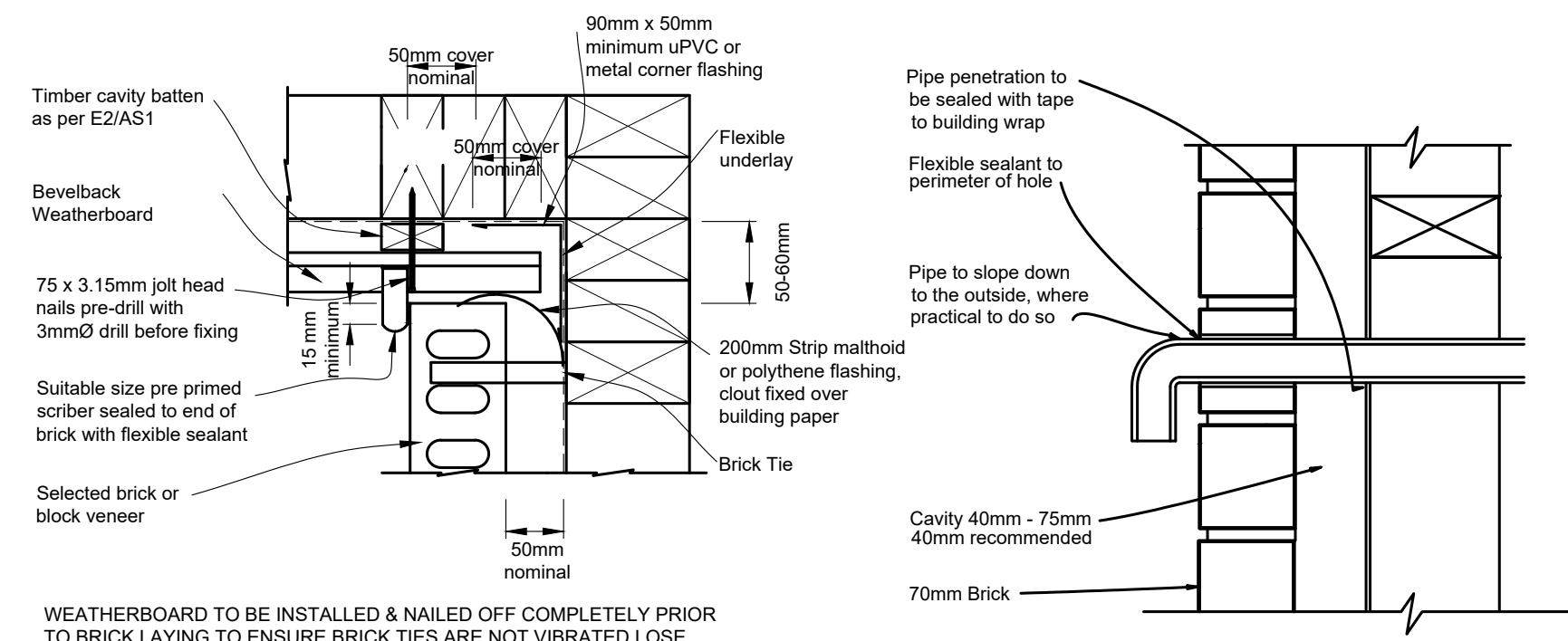
THE CAVITY BETWEEN THE MASONRY VENEER & THE EXTERIOR FACE OF TIMBER STUD WALL SHALL BE NOT LESS THAN 40mm NOR MORE THAN 75mm. PIPES & SERVICES SHALL NOT BE PLACED IN THE CAVITY.

THE BRICK VENEER CAVITY SHALL BE VENTILATED TO THE OUTSIDE AIR WITH TOP & BOTTOM OPENINGS. THE BOTTOM OPENINGS SHALL SERVE AS WEEP HOLES TO DRAIN MOISTURE TO THE OUTSIDE THE CAVITY SHALL BE VENTED UNDER OPENINGS EXCEEDING 2.4m WIDE THROUGH GAPS IN PERPENDS POSITIONED AT 1/3 POINTS ALONG THE OPENING - SEE FIG 73C E2/AS1

85mm GALV BRICK TIES POSITIONED 600mm HORIZONTALLY & 400mm VERTICALLY, WITHIN 300mm AROUND OPENINGS, WITHIN THE TOP 2 MORTAR COURSES, WITHIN THE BOTTOM 400mm OF VENEER & IN THE 2 COURSES WHERE A BOND BREAKER HAS BEEN USED



FOOTING DETAIL
 NOT TO SCALE



WEATHERBOARD TO BE INSTALLED & NAILED OFF COMPLETELY PRIOR TO BRICK LAYING TO ENSURE BRICK TIES ARE NOT VIBRATED LOSE

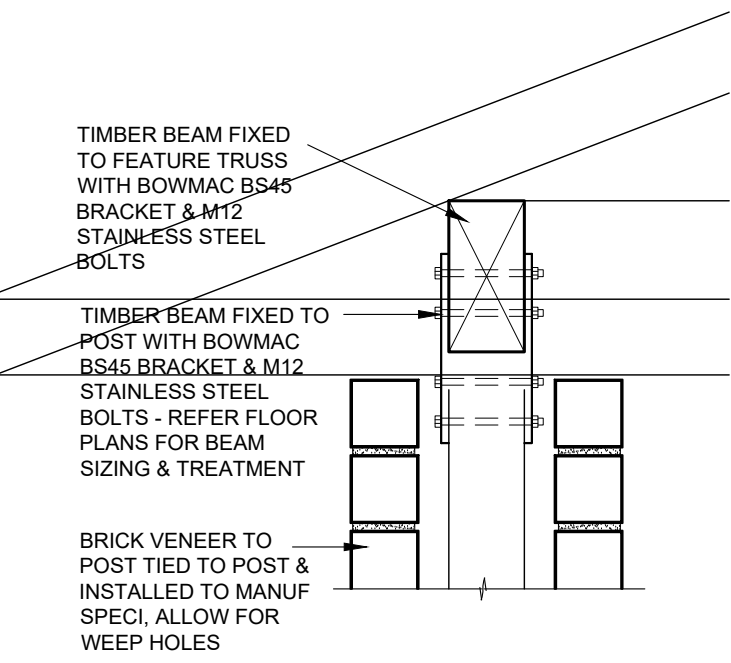
INTERNAL BRICK TO WEATHERBOARD DETAIL

Pipe Penetration
 Scale 1:5

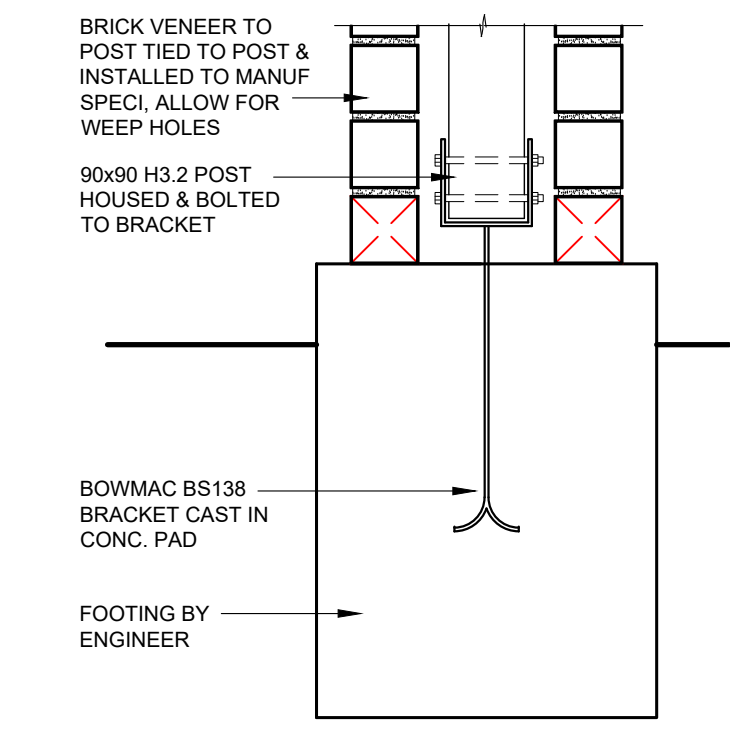
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					Job: 334	Page of: 10	

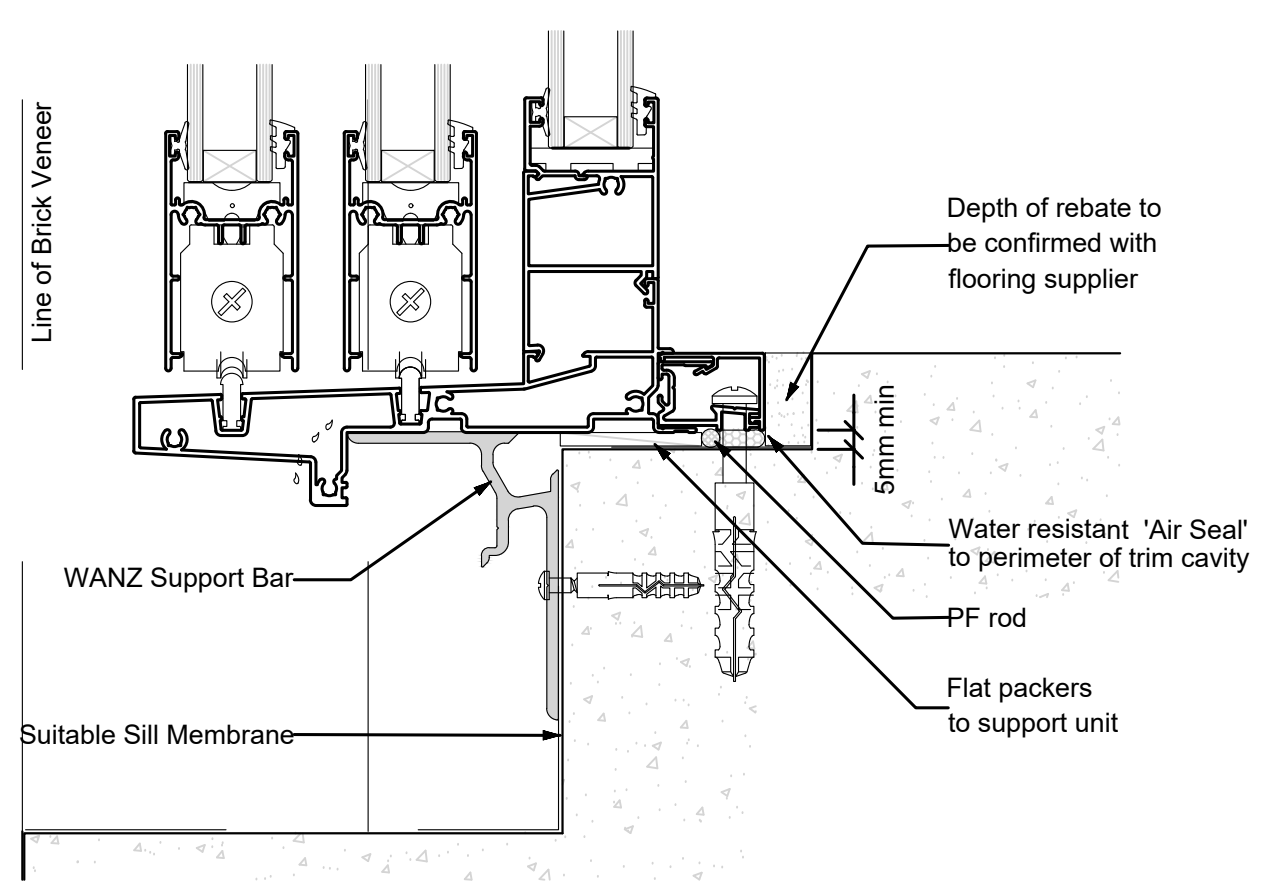
230147
 Received by
 Kapiti Coast District Council
 06/03/23



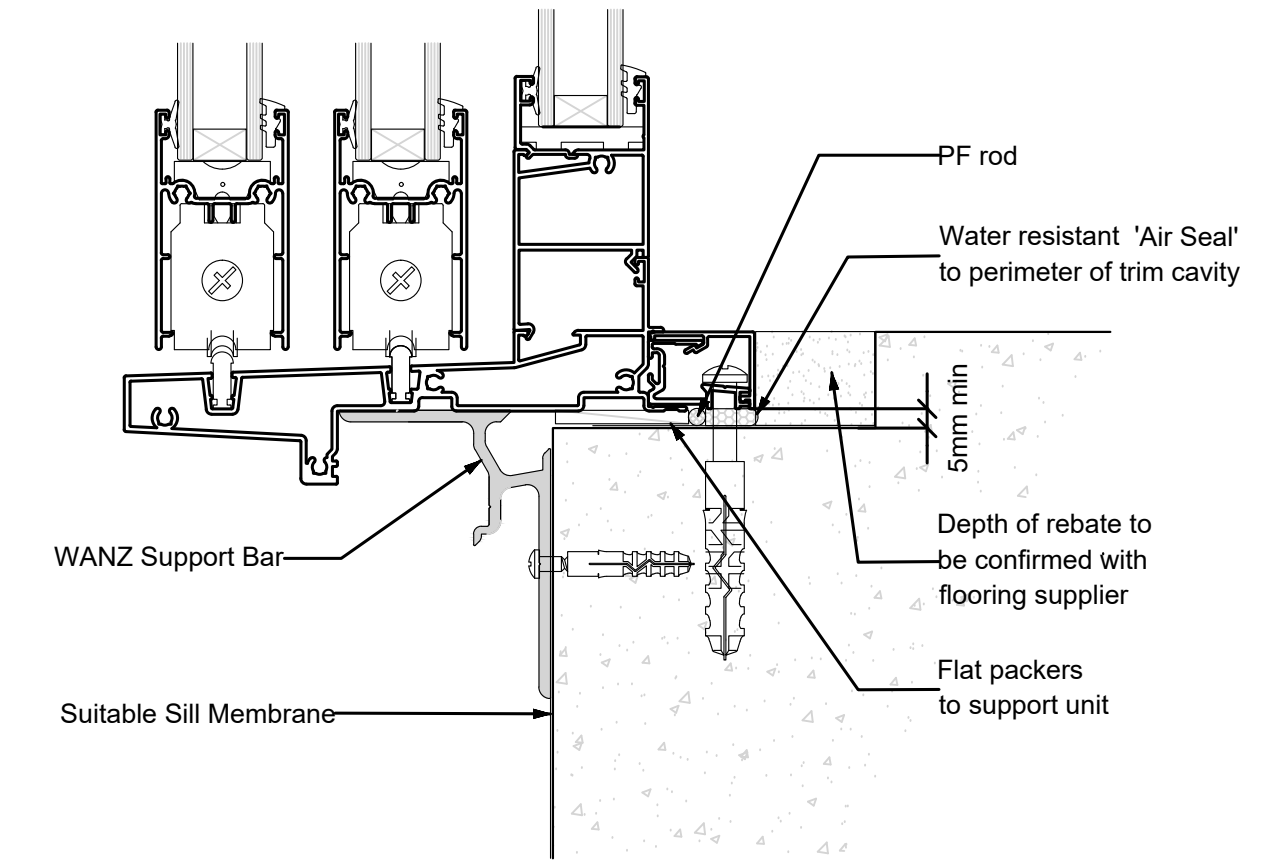
POST FIXING DETAIL
 SCALE 1:10



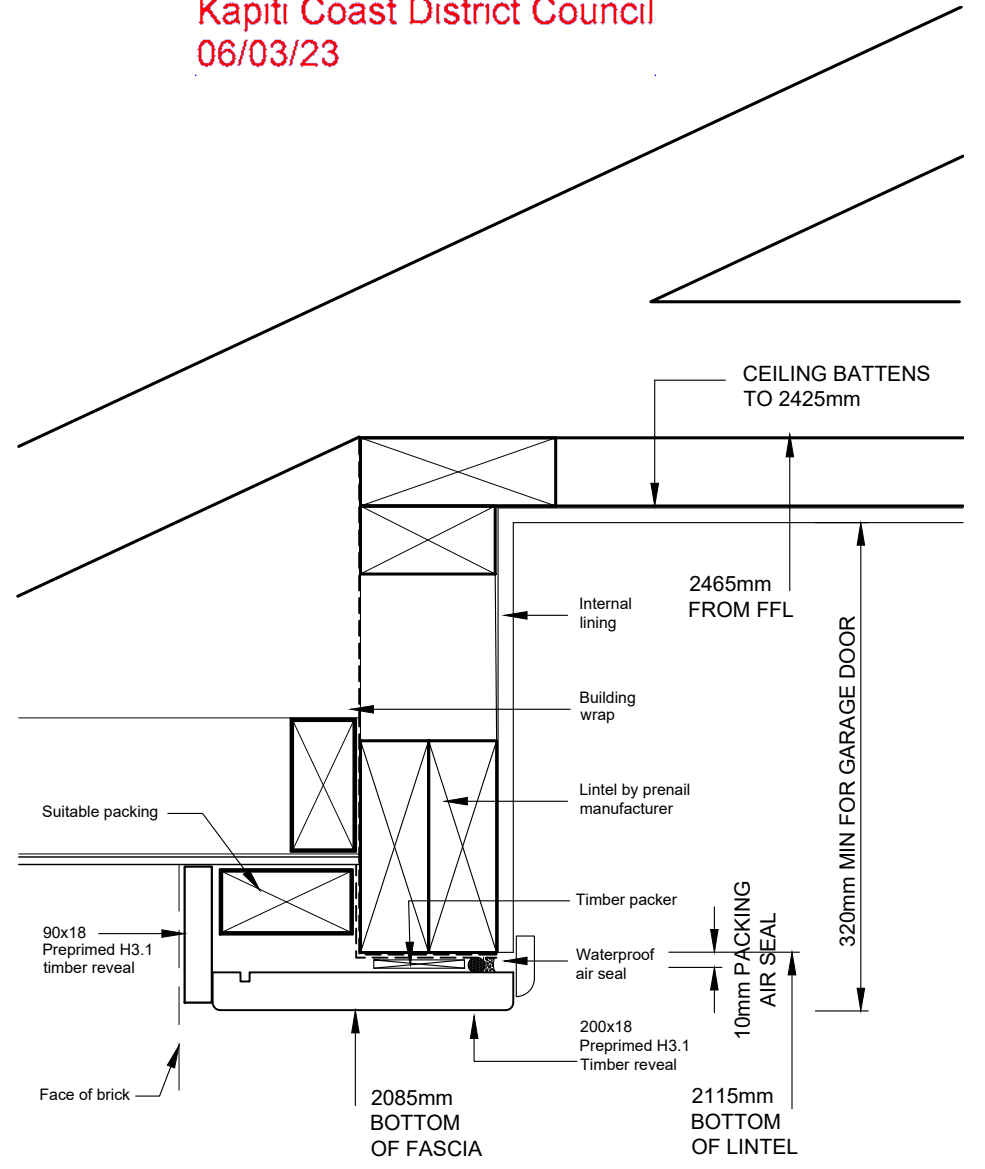
POST FIXING DETAIL
 SCALE 1:10



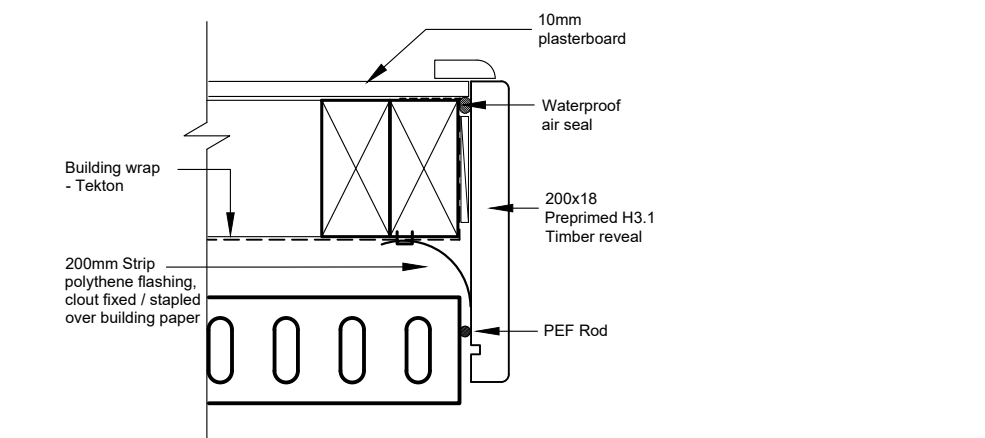
SILL DETAIL - BRICK VENEER REBATED CONCRETE



SILL DETAIL - LINEA WEATHERBOARD REBATED CONCRETE




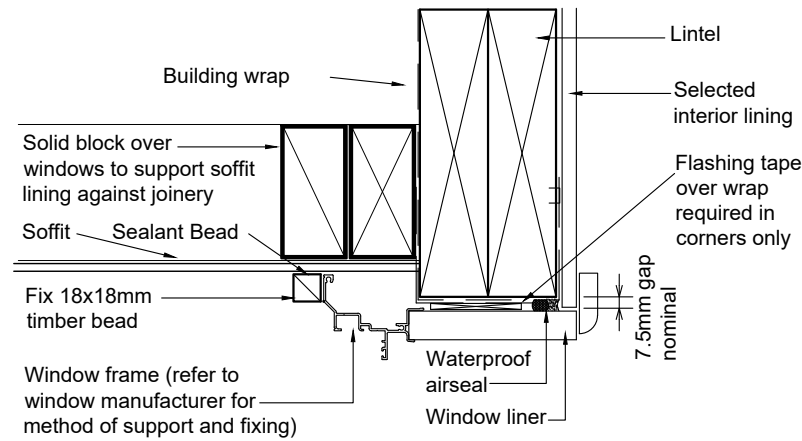
GARAGE DOOR HEAD DETAIL



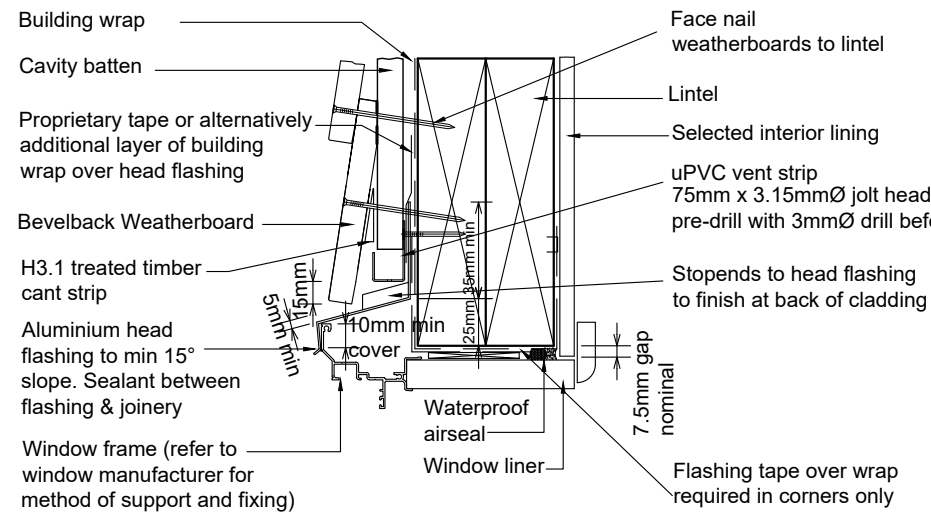
GARAGE DOOR JAMB DETAIL

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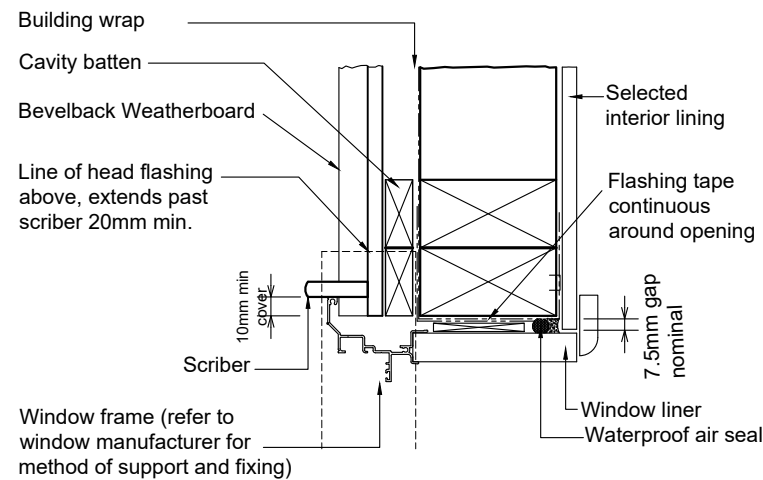
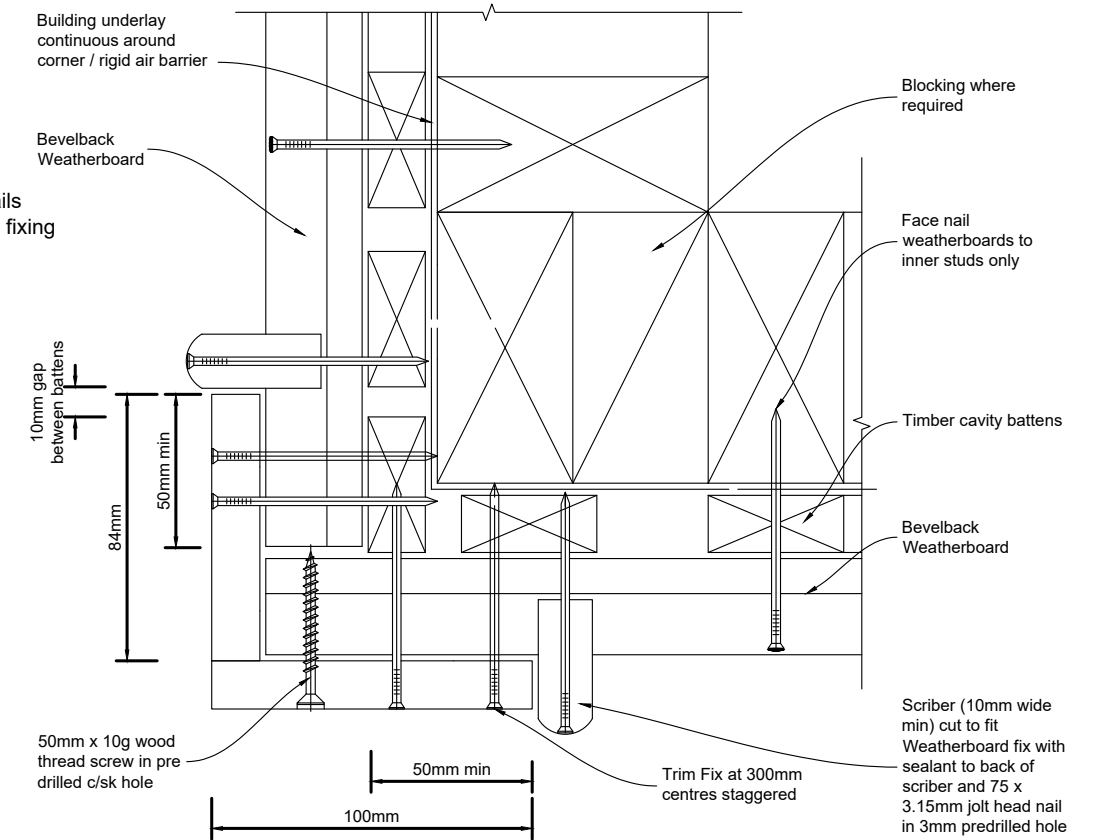
Revisions: DECEMBER 2022 rev A	Project: NEW DWELLING	Drawing Title: PARSONS	Drawing Title: DETAILS	Designer: COASTAL ARCHITECTURE LTD. 11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com	Design: BF	Drawn: BF	
					Job: 334	Page of: 11	



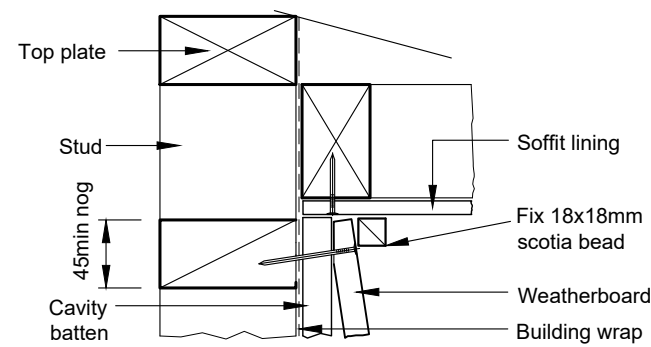
WINDOW HEAD DETAIL Scale 1:5



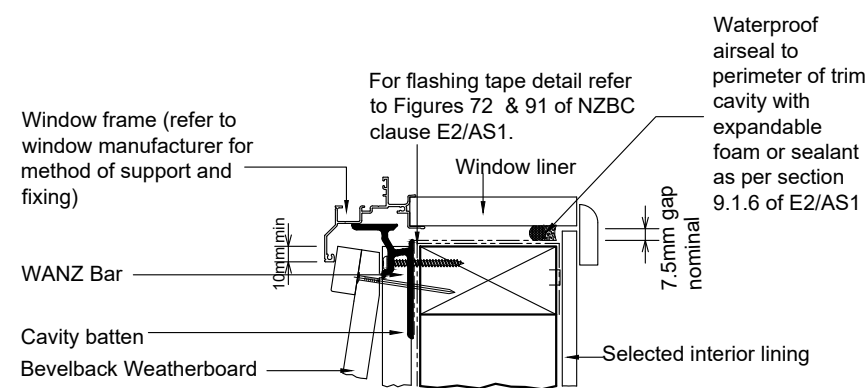
GABLE WINDOW HEAD DETAIL Scale 1:5



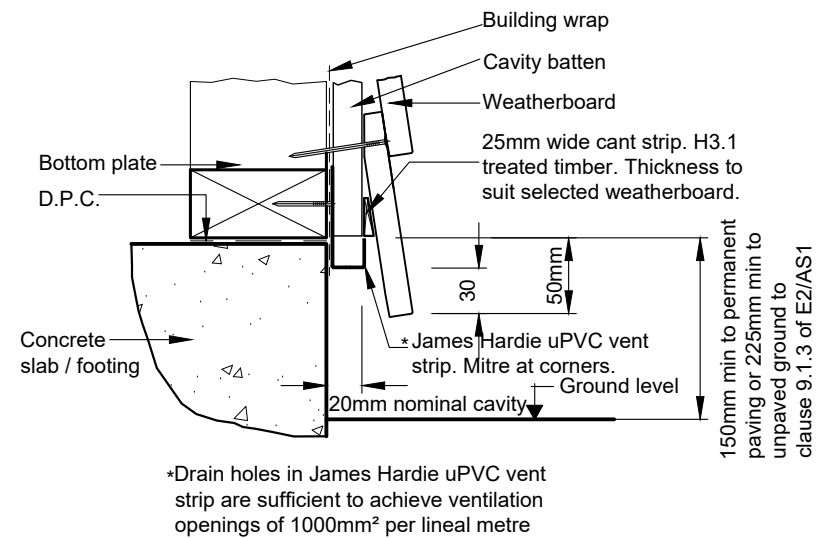
WINDOW JAMB DETAIL Scale 1:5



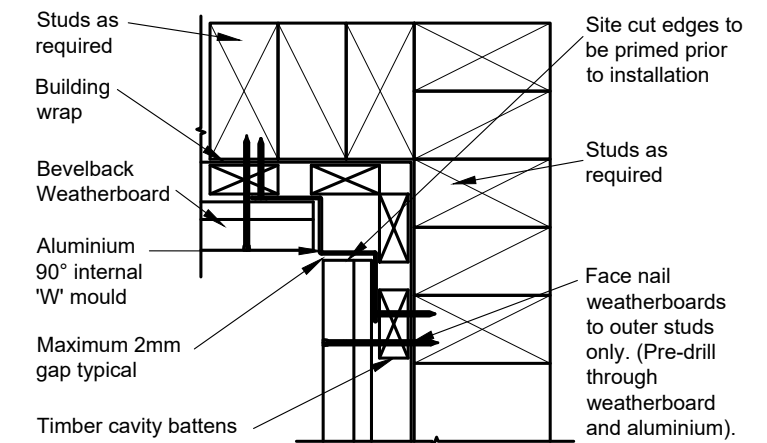
CAVITY SOFFIT DETAIL



WINDOW SILL DETAIL Scale 1:5



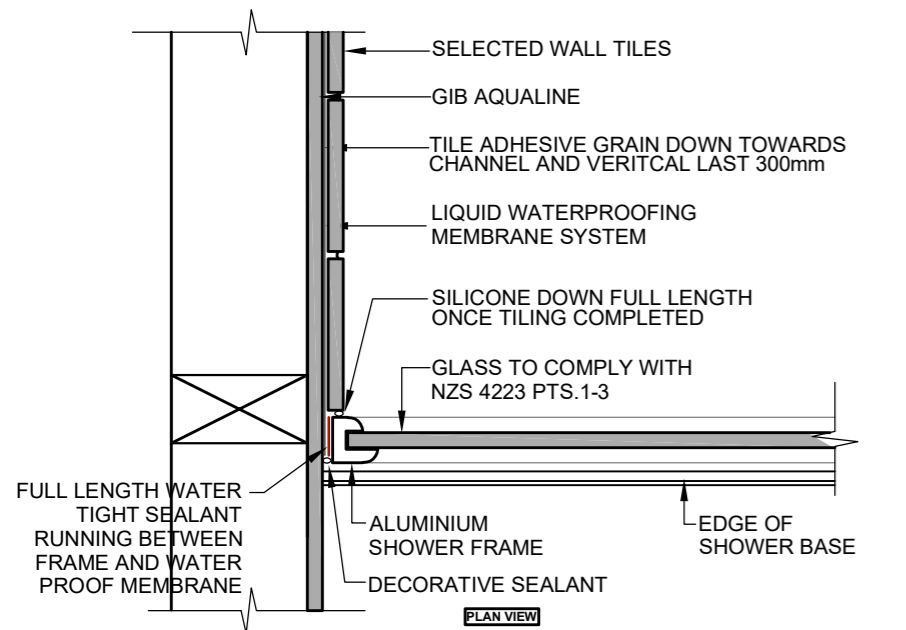
CAVITY FOUNDATION DETAIL



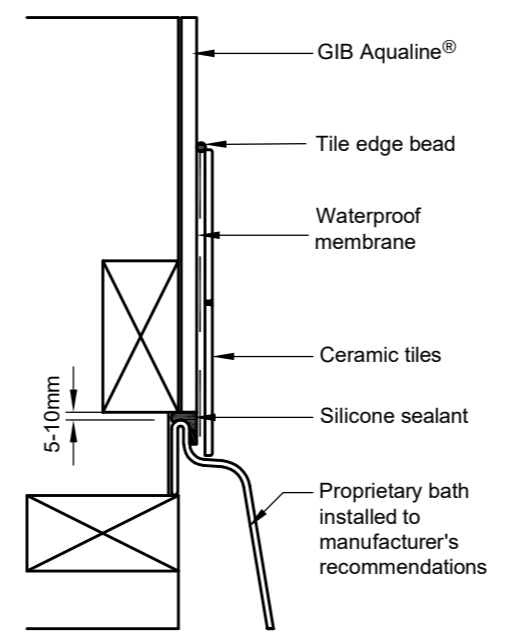
TIMBER CAVITY INTERNAL CORNER

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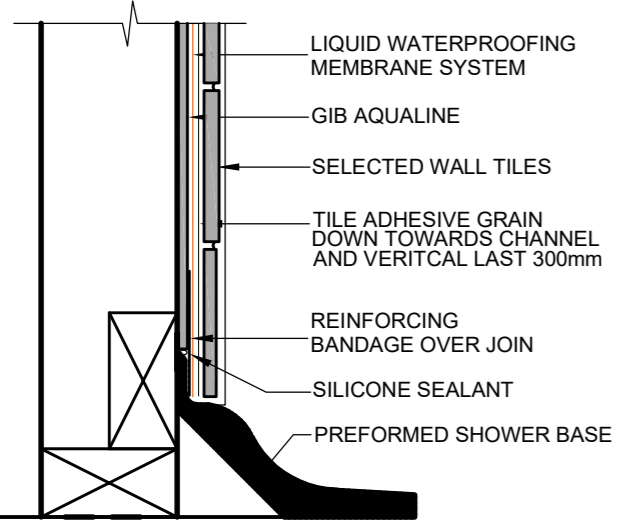
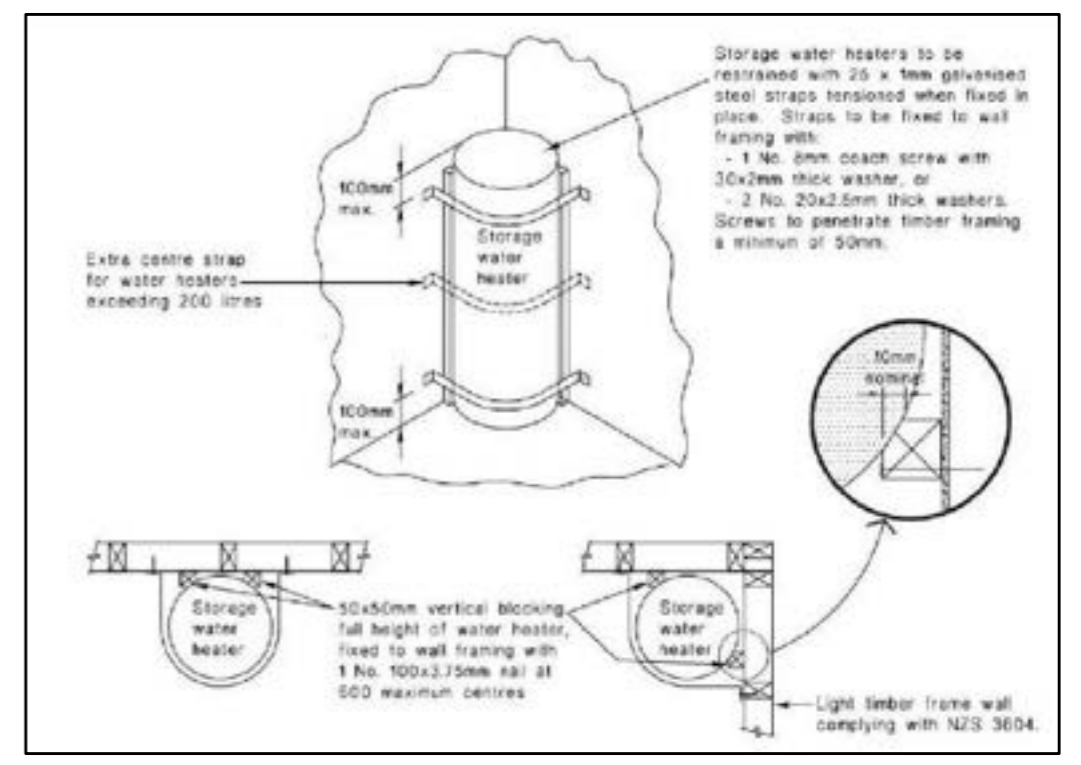
Revisions: DECEMBER 2022 rev A	Project: NEW DWELLING	Drawing Title: PARSONS	Drawing Title: DETAILS	Designer: COASTAL ARCHITECTURE LTD. 11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com	Design: BF	Drawn: BF Scale: as shown	
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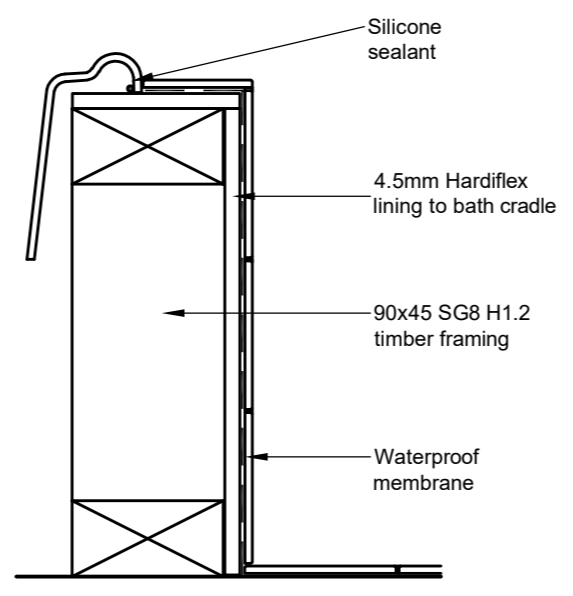
ACRYLIC SHOWER BASE/TILED WALL EDGE DETAIL



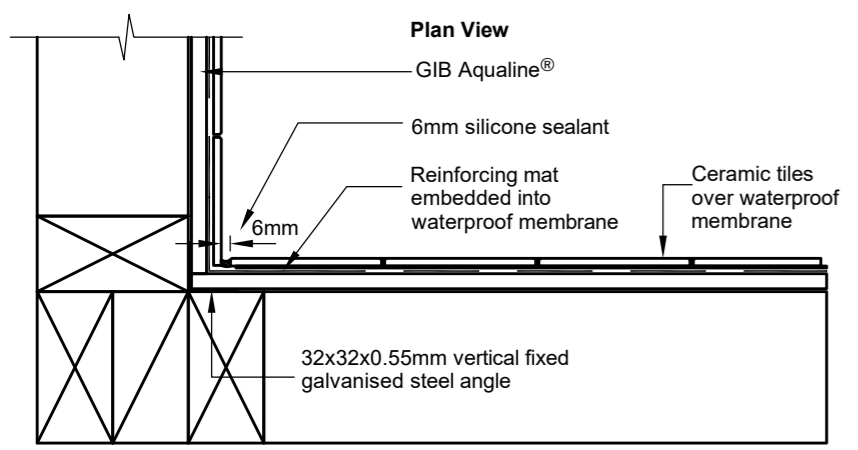
BATH/WALL DETAIL



ACRYLIC SHOWER BASE/TILED WALL, CONC FLOOR DETAIL



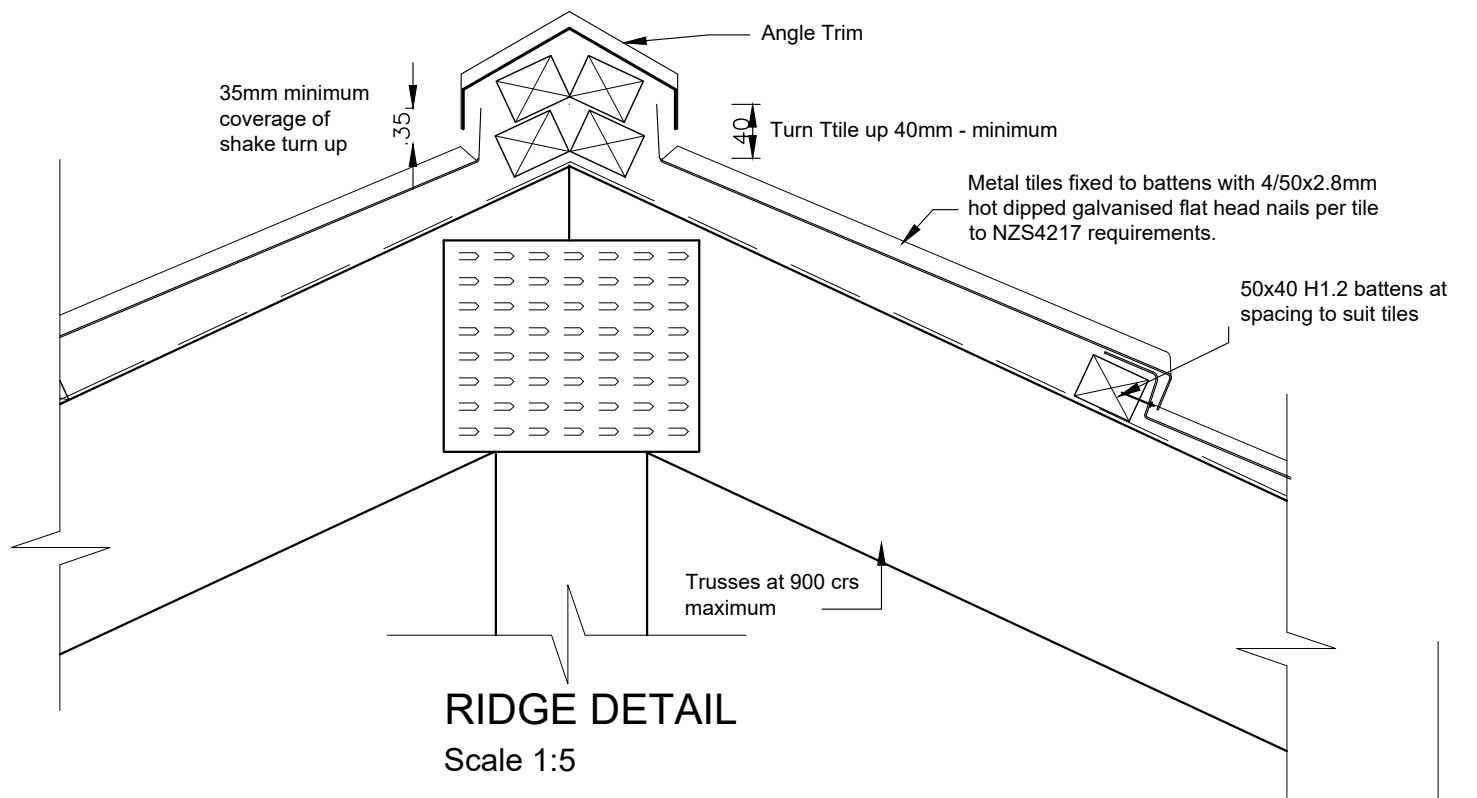
BATH PLINTH DETAIL



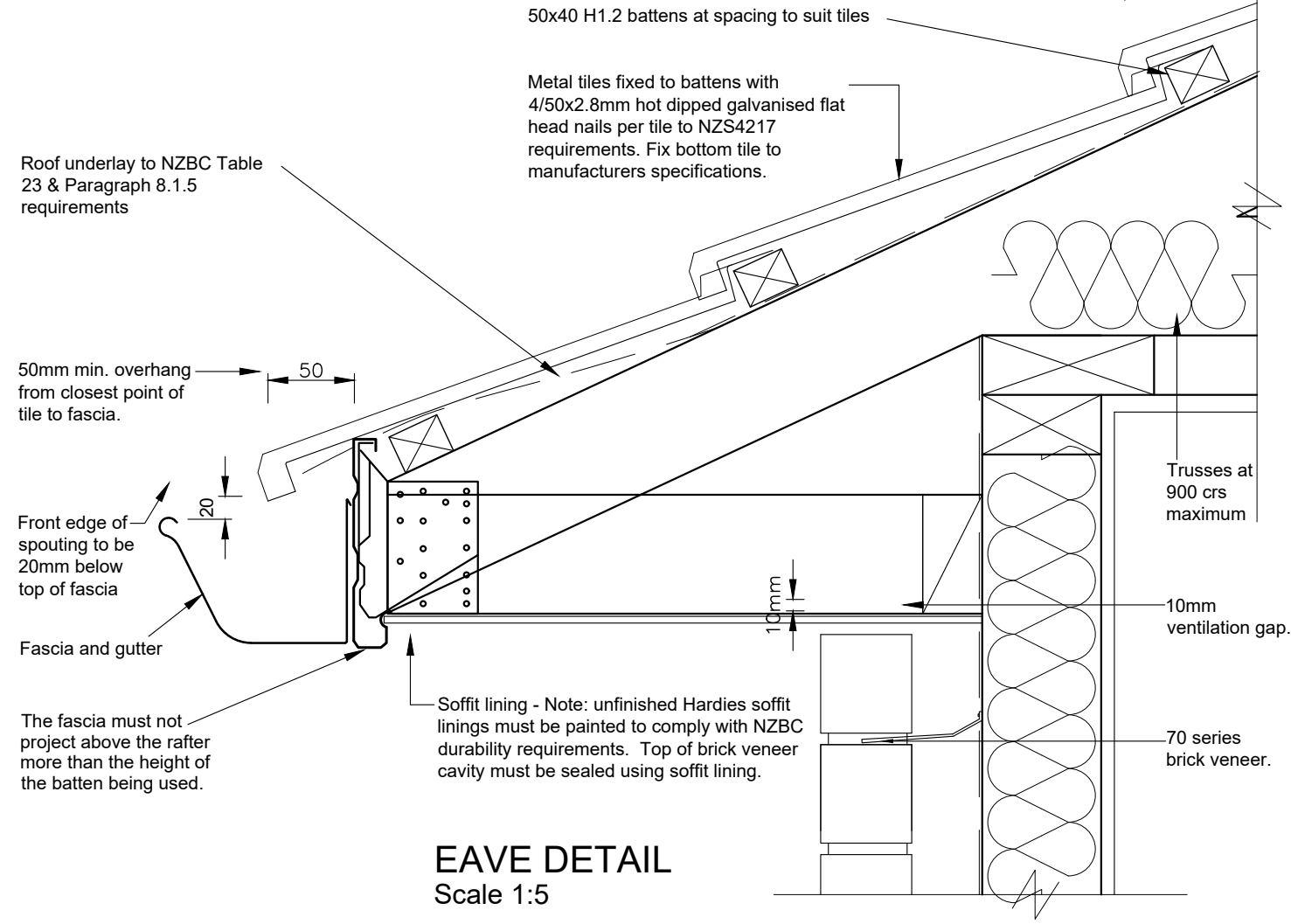
ACRYLIC SHOWER BASE/TILED WALL, INTERNAL CORNER DETAIL

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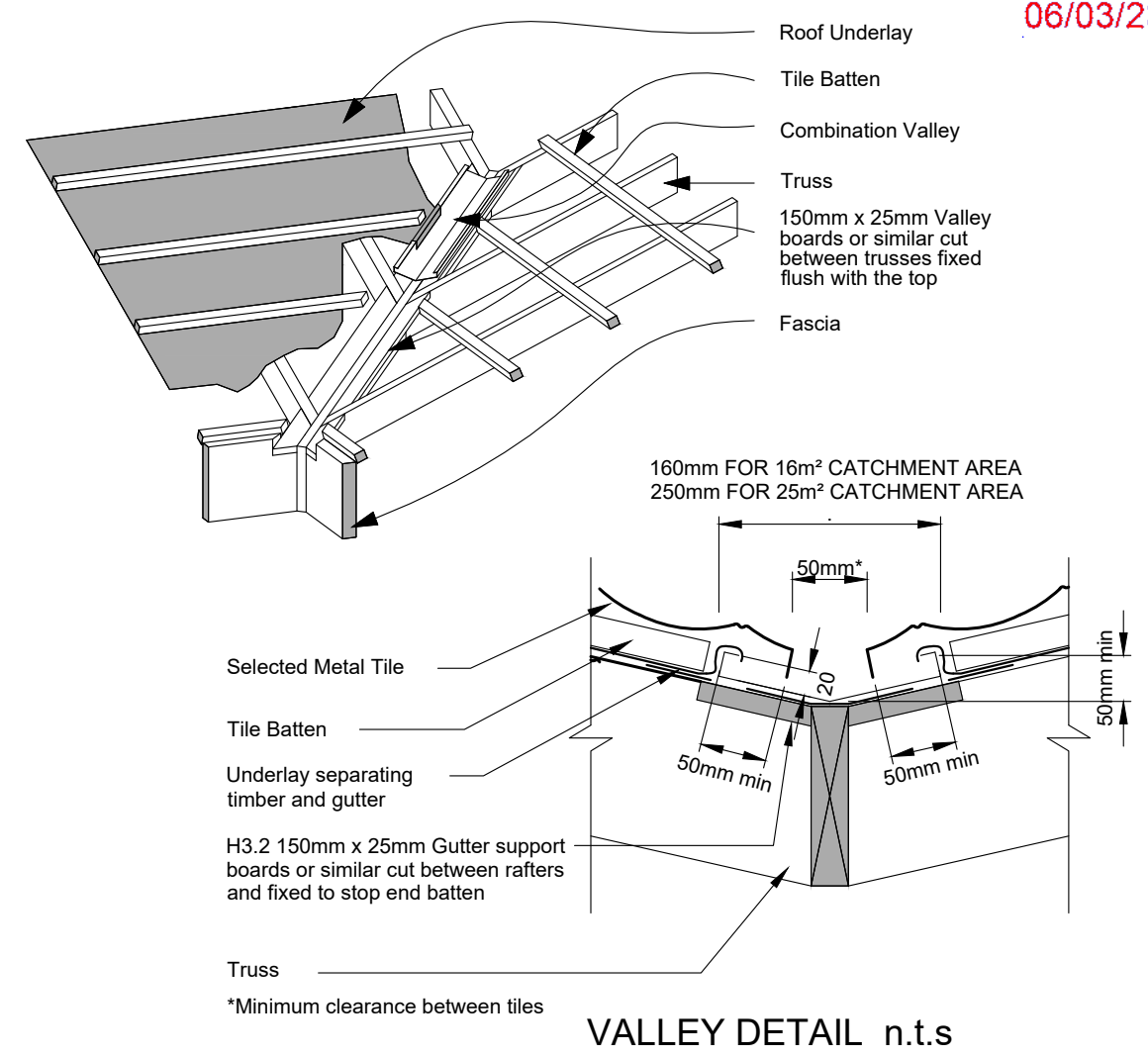
<p>Revisions:</p> <p>DECEMBER 2022 rev A MARCH 2023 rev B</p>	<p>Project:</p> <p>NEW DWELLING</p>	<p>Drawing Title:</p> <p>PARSONS</p> <p>LOT 68 STAGE 2 MANU PARK, WAIKANAЕ</p>	<p>Drawing Title:</p> <p>DETAILS</p>	<p>Designer:</p> <p>COASTAL ARCHITECTURE LTD.</p> <p>11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com</p>	<p>Design: BF</p> <p>Drawn: BF</p> <p>Scale: as shown</p> <p>Job: 334</p> <p>Page of: 13</p> <p>Rev: B</p>	
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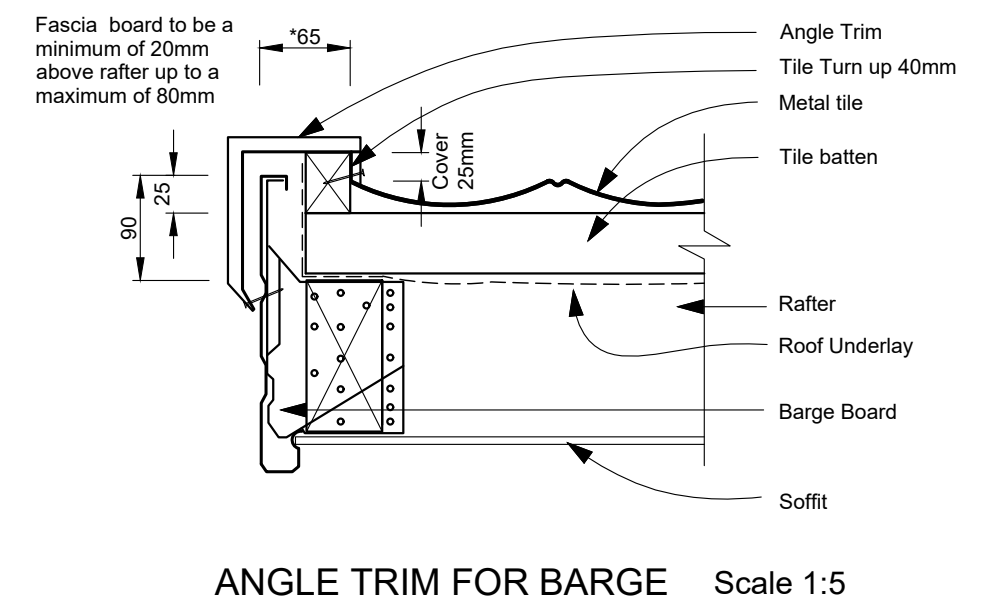
RIDGE DETAIL
 Scale 1:5



EAVE DETAIL
 Scale 1:5



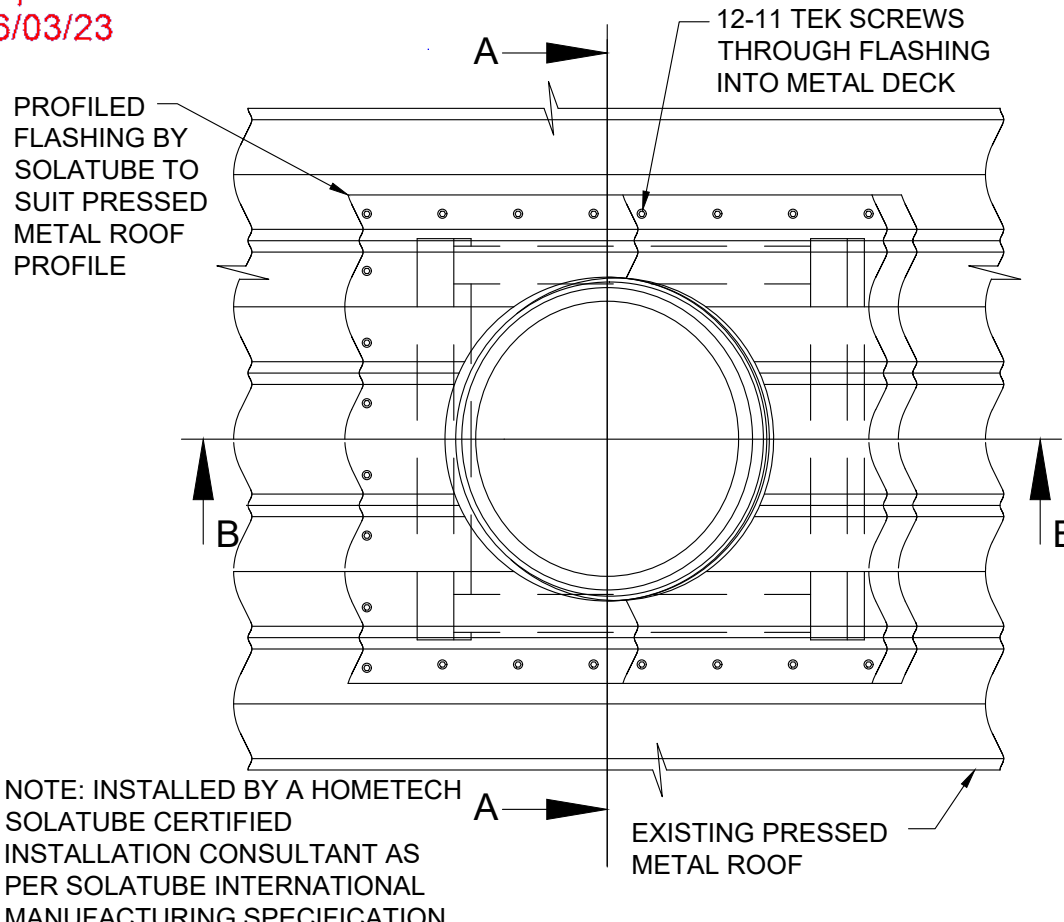
VALLEY DETAIL n.t.s



ANGLE TRIM FOR BARGE Scale 1:5

All work shall be in accordance with the NZBC. If in doubt ASK The Contractor must verify all dimensions on the job before commencing any work or shop drawings. Figured dimensions are to be used, scaled dimensions must be verified. This drawing and concept are copyright of Coastal Architecture Ltd. The recipient of this document is prohibited from disclosing its content for any purpose without the prior written consent of Coastal Architecture Ltd

<p>Revisions: DECEMBER 2022 rev A</p>	<p>Project: NEW DWELLING</p>	<p>Drawing Title: PARSONS</p> <p>LOT 68 STAGE 2 MANU PARK, WAIKANAЕ</p>	<p>Drawing Title: DETAILS</p>	<p>Designer: COASTAL ARCHITECTURE LTD. 11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com</p>	<p>Design: BF</p> <p>Drawn: BF</p> <p>Scale: as shown</p> <p>Job: 334 Page of: 14 Rev: A</p>	
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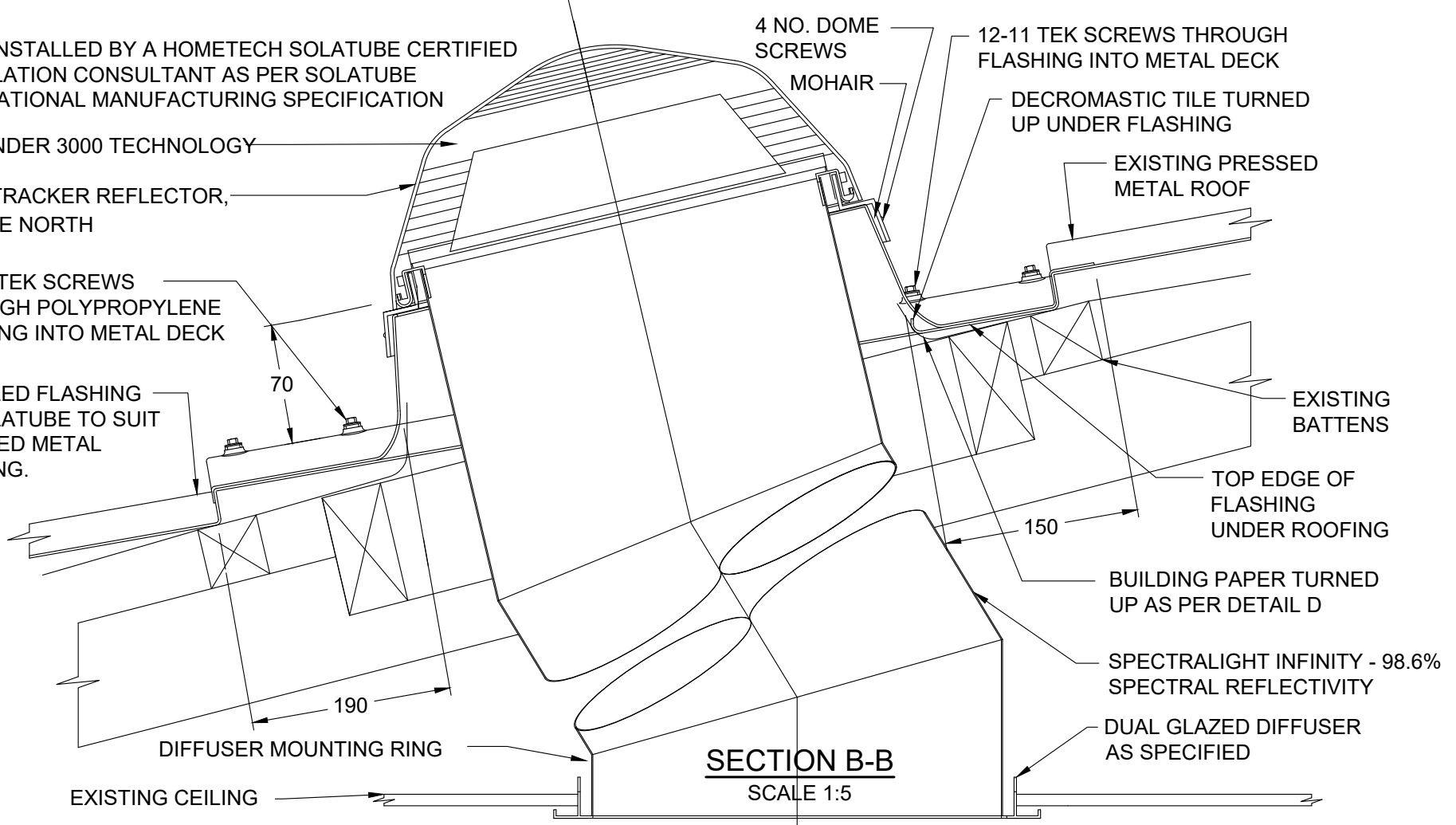


NOTE: INSTALLED BY A HOMETECH SOLATUBE CERTIFIED INSTALLATION CONSULTANT AS PER SOLATUBE INTERNATIONAL MANUFACTURING SPECIFICATION

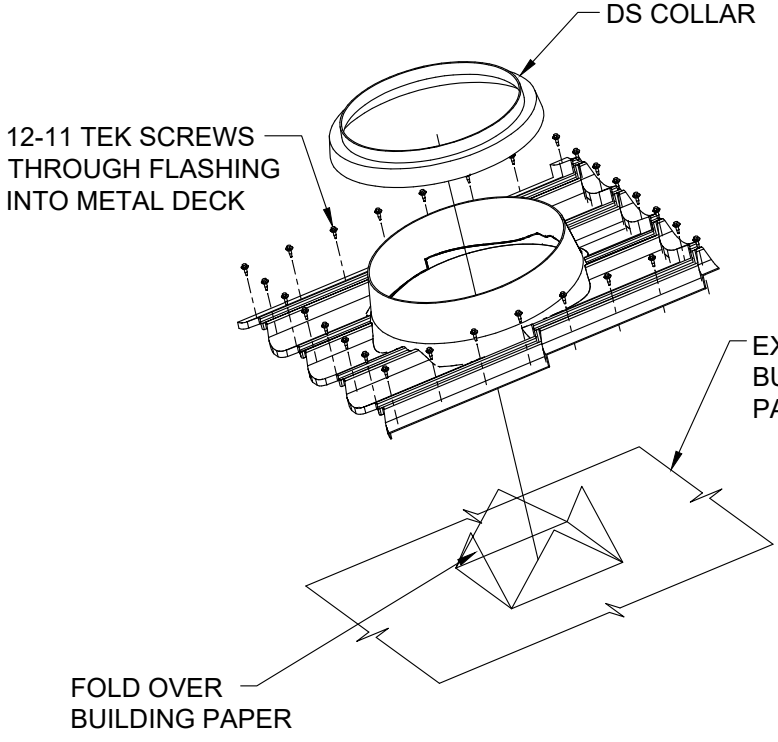
PLAN
 SCALE 1:10

NOTE: INSTALLED BY A HOMETECH SOLATUBE CERTIFIED INSTALLATION CONSULTANT AS PER SOLATUBE INTERNATIONAL MANUFACTURING SPECIFICATION

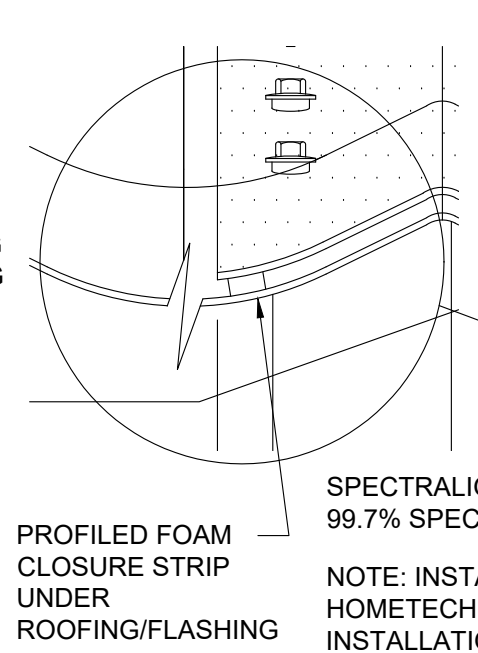
RAYBENDER 3000 TECHNOLOGY
 LIGHT TRACKER REFLECTOR, TO FACE NORTH
 NO. 12 TEK SCREWS THROUGH POLYPROPYLENE FLASHING INTO METAL DECK
 PROFILED FLASHING BY SOLATUBE TO SUIT PRESSED METAL ROOFING.



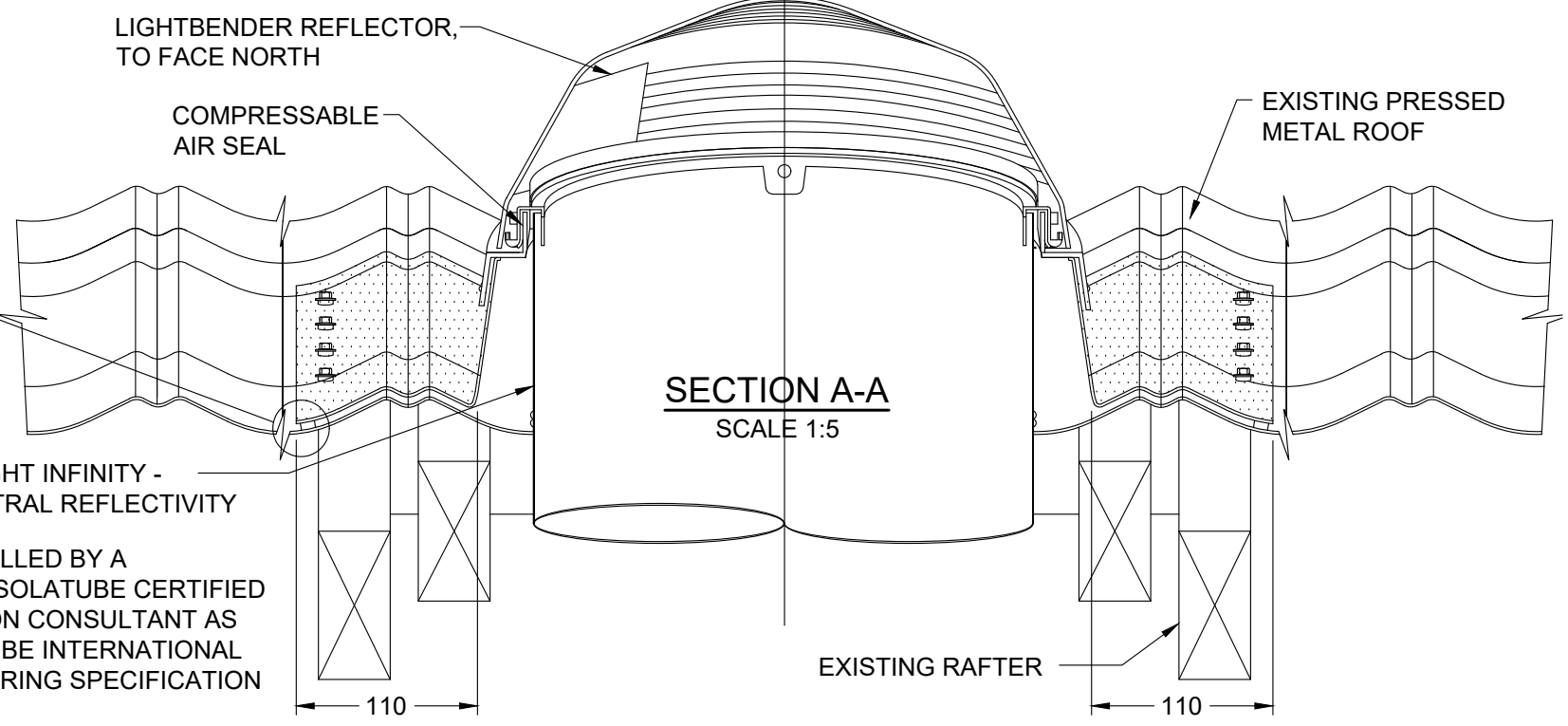
SECTION B-B
 SCALE 1:5



DETAIL D - 3D EXPLODED VIEW
 N.T.S.




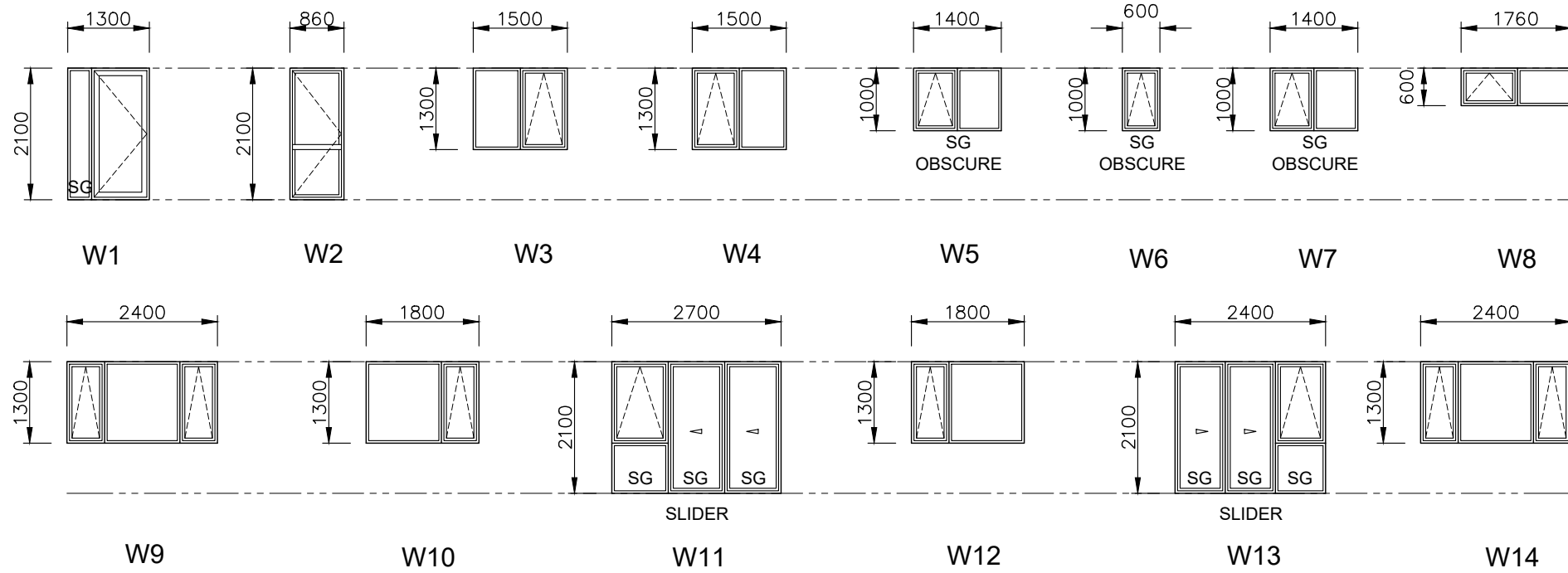
NOTE: INSTALLED BY A HOMETECH SOLATUBE CERTIFIED INSTALLATION CONSULTANT AS PER SOLATUBE INTERNATIONAL MANUFACTURING SPECIFICATION



SECTION A-A
 SCALE 1:5

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Revisions: DECEMBER 2022 rev A	Project: NEW DWELLING	Drawing Title: PARSONS LOT 68 STAGE 2 MANU PARK, WAIKANAЕ	Drawing Title: DETAILS	Designer: COASTAL ARCHITECTURE LTD. 11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com	Design: BF	Drawn: BF	
					Job: 334	Page of: 15	



RESTRICTOR STAYS TO LIMIT SASH OPENING TO MAX 100mm MUST BE FITTED WHERE EVER SILL HEIGHT IS LESS THAN 760mm & THE DIFFERENCE IN LEVELS ARE 1m OR GREATER. REFER F4 NZBC

SAFETY GLASS AS REQUIRED BY NZS 4223 PT 3 2016 VERSION TO BE PROVIDED TO ALL WET AREA JOINERY, GLAZED DOORS, SIDE PANELS, FULL HEIGHT WINDOWS & WINDOWS WITH SILLS LESS THAN 500mm FROM FFL.

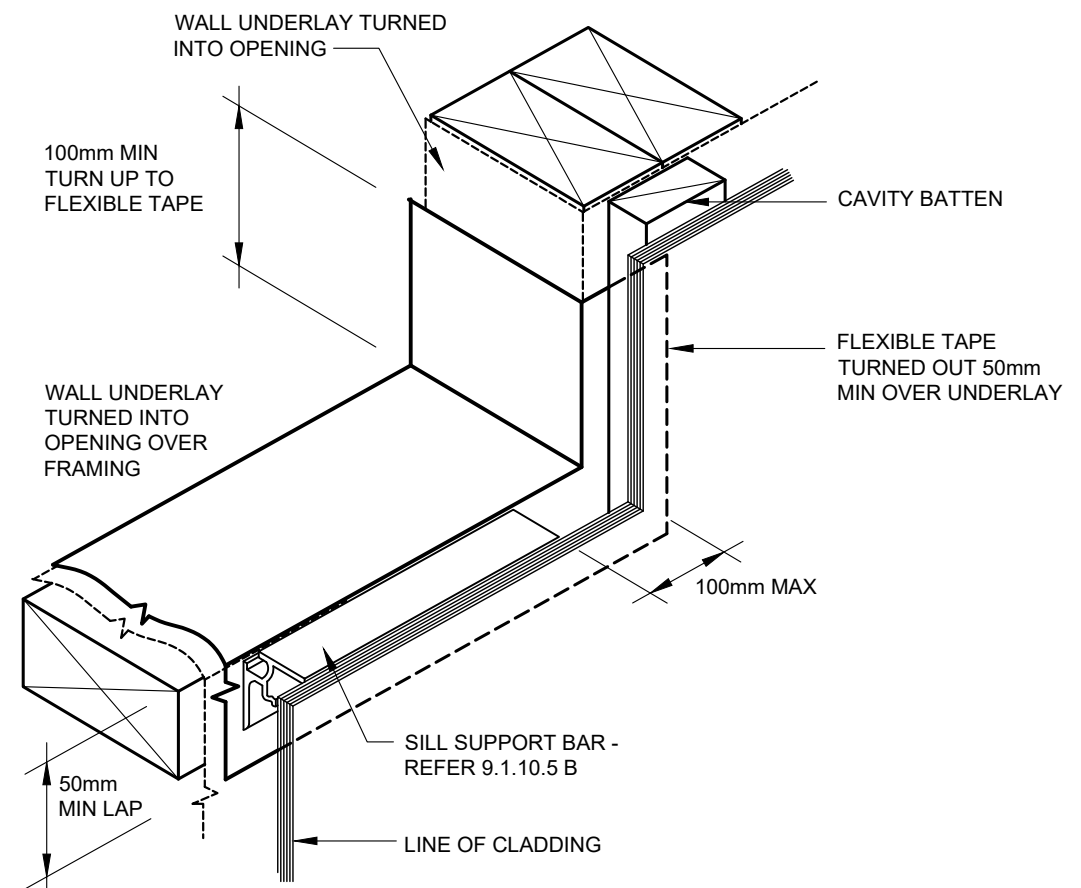
SILL SUPPORTS TO MANUFACTURERS SPECIFICATIONS & DETAILS

THE SUPPLIER AND THE MAIN CONTRACTOR SHALL CHECK ALL DIMENSIONS ON SITE AND CONFIRM PRIOR TO MANUFACTURE.

EXTERIOR JOINERY TO COMPLY WITH NZS 4211, DESIGN TO VERY HIGH WIND PRESSURE AND SUITABLE HEAD FLASHINGS TO BE FITTED TO ALL UNITS.

GLAZING TO CONFORM NZS 4223 PT 1, 2 & 3 2016 VERSION
 HIGH WIND 1100pa DWP
 VERY HIGH WIND 1550pa DWP

WINDOW SCHEDULE SCALE 1:100 ALL WINDOWS HAVE DOUBLE GLAZING



- NOTE:
1. DETAILED CLADDING OMITTED FOR CLARITY, REFER TO SPECIFIC CLADDINGS.
 2. HEAD TO BE TREATED SIMILARLY WITH CONTINUOUS WALL UNDERLAY & FLEXIBLE TAPE AT CORNERS
 3. REFER INDIVIDUAL CLADDING DETAILS FOR JAMB FLASHINGS

BUILDING WRAP OPENING DETAIL n.t.s

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Revisions: DECEMBER 2022 rev A	Project: NEW DWELLING	Drawing Title: PARSONS LOT 68 STAGE 2 MANU PARK, WAIKANAE	Drawing Title: JOINERY SCHEDULE	Designer: COASTAL ARCHITECTURE LTD. 11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com	Design: BF Drawn: BF Scale: as shown Job: 334 Page of: 16 Rev: A	
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E2/AS1 : Building Envelope Risk Matrix.

Project Details.

Name NAME LITTLE & PARSONS
 Street/No. STREET STAGE 2 MANU PARK
 Lot/DP/No. LOT LOT 68
 City/Town/District. CITY WAIKANAE

Definition of Risk [table 1 from E2/AS1]

Factor	Risk	Detail
A Wind Zone	LOW	LOW wind zone as described by NZS 3604
	MEDIUM	MEDIUM wind zone as described by NZS 3604
	HIGH	HIGH wind zone as described by NZS 3604
	V.HIGH	VERY HIGH wind zone as described by NZS 3604
B No. of storeys	LOW	One storey
	MEDIUM	Two storey in part
	HIGH	Two storey's
	V.HIGH	More than two storey's
C Roof / Wall intersection Design.	LOW	Roof / wall intersection - Fully protected. [eg. hip / gable roof with eaves.]
	MEDIUM	Roof / wall intersection - Partly exposed. [eg. hip / gable roof with NO eaves.]
	HIGH	Roof / wall intersection - Fully exposed. [eg. Parapets or eaves greater than 90° vertical with soffit linings.]
	V.HIGH	Roof elements finished within the boundaries formed by exterior walls [eg. lower ends of aprons, chimney's etc.]
D Eaves width (1.)	LOW	Greater than 600mm at first floor level.
	MEDIUM	450 - 600mm at first floor level, or 600mm at second floor level
	HIGH	100-450mm at first floor level, or 450-600mm at second floor level
	V.HIGH	0 -100mm at first floor level, or 100-450mm at second floor level or 450 - 600mm at third floor level
E Envelope Complexity	LOW	Simple rectangular, L, T, or boomerang shape with single cladding type
	MEDIUM	Complex angular or curved shape [eg. Y or arrow head] with single cladding type.
	HIGH	More complex angular or curved shape [eg. Y or arrow head] with multiple cladding type.
	V.HIGH	As for high risk, but with junctions not covered in C or F on this Table [eg. box windows, pergola's, multi storey re - entrant shapes etc.]
F Deck design.	LOW	None or timber slat deck or porch at ground level
	MEDIUM	Fully covered in plan by roof, or timber slat deck attached at first or second floor level.
	HIGH	Enclosed deck exposed in plan or cantilevered at first floor level
	V.HIGH	Enclosed deck exposed in plan or cantilevered at second floor level or above.

NOTES
 1. Eaves width measured from external face of the wall cladding to outer edge of overhang including gutters and fascias
 2. Balustrades and parapets count as 0 mm eaves.

Risk Severity by Face

North Elevation.									
RISK FACTOR	LOW	Score	MED	Score	HIGH	Score	V.HIGH	Score	Sub totals for each risk factor.
Wind Zone as NZS 3604	0		0		1	✓	2		1
No. of storey's	0	✓	1		2		4		0
Roof / Wall intersection	0	✓	1		3		5		0
Eaves width.	0		1	✓	2		5		1
Envelope Complexity	0		1		3	✓	6		3
Deck design.	0	✓	2		4		6		0
Total Risk Score for this Elevation									5

South Elevation.									
RISK FACTOR	LOW	Score	MED	Score	HIGH	Score	V.HIGH	Score	Sub totals for each risk factor.
Wind Zone as NZS 3604	0		0		1	✓	2		1
No. of storey's	0	✓	1		2		4		0
Roof / Wall intersection	0	✓	1		3		5		0
Eaves width.	0		1	✓	2		5		1
Envelope Complexity	0		1		3	✓	6		3
Deck design.	0	✓	2		4		6		0
Total Risk Score for this Elevation									5


East Elevation.									
RISK FACTOR	LOW	Score	MED	Score	HIGH	Score	V.HIGH	Score	Sub totals for each risk factor.
Wind Zone as NZS 3604	0		0		1	✓	2		1
No. of storey's	0	✓	1		2		4		0
Roof / Wall intersection	0	✓	1		3		5		0
Eaves width.	0		1	✓	2		5		1
Envelope Complexity	0	✓			3		6		0
Deck design.	0	✓	2		4		6		0
Total Risk Score for this Elevation									2

West Elevation.									
RISK FACTOR	LOW	Score	MED	Score	HIGH	Score	V.HIGH	Score	Sub totals for each risk factor.
Wind Zone as NZS 3604	0		0		1	✓	2		1
No. of storey's	0	✓	1		2		4		0
Roof / Wall intersection	0	✓	1		3		5		0
Eaves width.	0		1	✓	2		5		1
Envelope Complexity	0		1		3	✓	6		3
Deck design.	0	✓	2		4		6		0
Total Risk Score for this Elevation									5

Selected Cladding Resulting from Risk Assessment

	Risk score from tables above.	Cladding Selected from table 3 [from tables on page 30 E2/AS1]	TICK SELECTED OPTION	
			DIRECT FIXED	DRAINED CAVITY
North Elevation.	5	Brick Veneer		✓
		Bevelback Weatherboard		
South Elevation.	5	Brick Veneer		✓
		Bevelback Weatherboard		
East Elevation.	2	Brick Veneer		✓
West Elevation.	5	Brick Veneer		✓
		Bevelback Weatherboard		

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Revisions: DECEMBER 2022 rev A	Project: NEW DWELLING	Drawing Title: PARSONS LOT 68 STAGE 2 MANU PARK, WAIKANAE	Drawing Title: E2 MATRIX	Designer: COASTAL ARCHITECTURE LTD. 11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com	Design: BF Job: 334 Page of: 17	Drawn: BF Scale: as shown Rev: A	
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Structural Calculations for



Lot 68 Stage 2 Manu Park Waikanae

These calculations are in accordance with:

AS/NZS 1170:2004 Structural Design Actions
NZS 3101:2006 Concrete Structures Standard
NZS 3604:2011 Timber Framed Buildings

Engineer:
Stuart Preston
Hugh Falkner
Mason Gao

Initials:
SRNP
HAF
MG

Preamble:

The project comprises proposed residence.

These calculations pertain to the design of:

- SED Waffle Slab Foundations,
- SED Canopy Post Pad Foundation
- SED Storm Water Dispersal System

The ultimate limit state site wind speed has been determined as High or 44m/s

Geotechnical report (by Miyamoto International NZ Limited dated 28 September 2022) indicated the liquefaction potential level is LOW or NONE and that consequently the effects of liquefaction need not be considered in the design.

Scala penetrometer soil tests results by geotechnical engineers indicate that an ultimate bearing capacity of 200 kPa is achieved at an approximate depth of 0.3m below existing ground level. This meets the definition of 'good ground' defined in NZS 3604:2011 and consequently a specifically designed waffle slab foundation has been specified.

Date:
01/2023

Job No.
44071



SCHEDULE OF INSPECTIONS for

Lot 68 Stage 2 Manu Park Waikanae

We confirm that CERTA Engineering Ltd have been engaged to undertake construction monitoring of the specific engineering design items to an EngNZ/ACENZ CM3 level and propose to undertake the following site inspections:

No.	Item of inspection	Timeframe
1	Foundation beams, pads and slabs	Pre-pour
2	Roof Canopy Posts Pads	Pre-pour
3	Soak-pit	Pre-fill

Notes:

- a) The above items of inspections are the minimum required to enable CERTA Engineering Ltd to issue a PS4 – Producer Statement Construction Review for the specific engineering design items.
- b) The above items of inspection do not cover work constructed in accordance with NZS 3604:2011, for which inspections are to be undertaken by the Building Consent Authority.
- c) The Contractor/Builder is to provide CERTA Engineering Ltd at least 24 hours' notice of the requirement for an inspection. The above timeframes are indicative, the Engineer and Contractor are to agree the timing of inspection prior to work commencing on site.
- d) The Contractor /Builder is to provide reasonable and safe access to enable works to be inspected.
- e) The above schedule does not necessarily represent the actual number of inspections to be undertaken. The number of inspections will depend on the construction method, sequence of the works and whether or not unforeseen conditions or difficulties are encountered on site.

Date:
01/2023

Job No.
44071



Building Code Clause(s) B1

J44071

**PRODUCER STATEMENT - PS1 - DESIGN**

(Guidance notes on the use of this form are printed on page 2)

ISSUED: CERTA Engineering Ltd

TO: **Glen Parsons**
(Owner / Developer)

TO BE SUPPLIED TO: Kapiti Coast District Council
(Building Consent Authority)

IN RESPECT OF: **Proposed Residence**
(Description of Building Work)

AT: **Lot 68 Stage 2 Manu Park Waikanae**
(Address)
LOT 68 DP

230147

Received by

Kapiti Coast District Council

06/03/23

We have been engaged by the owner/developer referred to above to provide **structural design services and construction monitoring of specifically designed elements** in respect of the requirements of Clause B1 (B2 of specifically designed elements) of the building code for

All **Part only as specified of building work:**

- Specifically designed foundations outside the scope of NZS3604:2011 only
- Specifically designed post foundation
- Specifically designed storm water dispersal system

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 and B2/AS1

The proposed building work covered by this producer statement is described on the drawings titled **Lot 68 Stage 2 Manu Park Waikanae** and numbered **S0 to S3**

On behalf of the Design Firm, and subject to:

- (i) Site verification of the following design assumptions: Bearing capacity of excavated foundations to satisfy the requirements of NZS3604:2011 and to be confirmed on site by the Engineer;
- (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 will comply with the relevant provisions of the Building Code and b), the persons who have undertaken this design work have the necessary competency to do so. I also recommend the following level of construction monitoring:

CM1 CM2 CM3 CM4 CM5 observation services.
(Engineering Categories)

I, Stuart Preston am CPEng # 138744

I am a member of: Engineering New Zealand and hold the following qualifications: BE(Civil), CMEngNZ, CPEng

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 Stuart Preston ON BEHALF OF CERTA Engineering Ltd

Date 3/2/2023 (Signature).....

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 provide 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.

GUIDANCE ON USE OF PRODUCER STATEMENTS

Producer statements were first introduced with the Building Act 1992. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects, Engineering New Zealand, Association of Consulting Engineers New Zealand in consultation with the Building Officials Institute of New Zealand. The original suite of producer statements has been revised as at the date of this form as a result of enactment of the Building Act (2004) by these organisations to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate, without having to duplicate design or construction checking undertaken by others.

PS1 Design	Intended for the use by a suitably qualified independent design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;
PS2 Design Review	Intended for use by a suitably qualified independent design professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;
PS3 Construction	Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013; or Schedules E1/E2 of NZIA's SCC 2007 2
PS4 Construction Review	Intended for use by a suitably qualified independent design professional who undertakes construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate. This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACENZ, EngNZ and NZIA to interpret the Producer Statement.

Competence of Design Professional

This statement is made by a Design Firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its designers.

A competent design professional will have a professional qualification and proven current competence through registration on a national competence-based register, either as a Chartered Professional Engineer (CPEng) or a Registered Architect.

Membership of a professional body, such as the Engineering New Zealand (EngNZ) or the New Zealand Institute of Architects (NZIA) provides additional assurance of the designer's standing within the profession. If the design firm is a member of the Association of Consulting Engineers New Zealand (ACENZ), this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent design professional".

Professional Indemnity Insurance

As part of membership requirements, ACENZ requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI insurance minimum stated on the front of this form reflects standard, small projects. If the parties deem this inappropriate for large projects the minimum may be up to \$500,000.

Professional Services during Construction Phase

There are several levels of service which a Design Firm may provide during the construction phase of a project (CM1-5)3 (OL1-OL4)2. The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design Firm's engagement.

Attached Particulars

Attached particulars referred to in this producer statement refer to supplementary information appended to the producer statement.

Refer Also:

- 1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013
- 2 NZIA Standard Conditions of Contract SCC 2007 (1st edition)
- 3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACENZ, 2004)

www.acenz.org.nz
www.engineeringnz.org
www.nzia.co.nz

230147
 Received by
 Kapiti Coast District Council
 06/03/23



Building Code Clause(s) E1

J44071

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TO: **Glen Parsons**
(Owner / Developer)

TO BE SUPPLIED TO: Kapiti Coast Reginal Council
(Building Consent Authority)

IN RESPECT OF: **Proposed Residence**
(Description of Building Work)

AT: **Lot 68 Manu Park Stage 2**
(Address)
LOT 68 DP

230147
Received by
Kapiti Coast District Council
06/03/23

We have been engaged by the owner/developer referred to above to provide **civil engineering design services** in respect of the requirements of Clause E1 of the building code for

All **Part only as specified of building work:**
- Soakpit

The design carried out by us has been prepared in accordance with Compliance Documents issued by the Ministry of Business, Innovation & Employment E1/VM1

The design calculations covered by this producer statement is deccribed on the calculations titled:
Lot 68 Manu Park Stage 2 and numbered S0 to S3

On behalf of the Design Firm, and subject to:

- (i) Site verification of the following design assumptions: Ground conditions and layout as per the design, to be confirmed on site by Engineer;
- (ii) All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that a) the system, if constructed in accordance with the drawings, specifications, and other documents provided will comply with the relevant provisions of the Building Code and b), the persons who have undertaken this design work have the necessary competency to do so. I also recommend the following level of construction monitoring:
 CM1 CM2 CM3 CM4 CM5 observation services.

I, Stuart Preston am CPEng # 138744.

I am a member of: Engineering New Zealand and hold the following qualifications: BE(Civil), CMEngNZ, CPEng.

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SIGNED BY Stuart Preston ON BEHALF OF CERTA Engineering Ltd

Date 3/2/2023 (Signature).....

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- 3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACENZ, 2004)

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www.nzia.co.nz



**Memorandum from licensed building practitioner:
Certificate of design work
Section 45 and Section 30C, Building Act 2004**

J44071

THE BUILDING

Street address: Lot 68 Stage 2 Manu park

230147

Suburb: Waikanae

Received by

Town/City: Kapiti

Postcode:

Kapiti Coast District Council

06/03/23

THE OWNER

Name(s): Glen Parsons

BASIS FOR PROVIDING THIS MEMORANDUM

I am providing this memorandum in my role as the **Specialist** designer who supervised 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, Stuart Preston, supervised the following design work that is restricted building work

PRIMARY STRUCTURE: B1

Design work that is restricted building work	Description (as required)
Foundations (✓)	SED ⁽¹⁾
Retaining Walls (✗)	
Beams (✗)	
Soak-pit (✓)	SED ⁽¹⁾
Bracing (✗)	
Other (primary) (✗)	

WAIVERS AND MODIFICATIONS

No waivers or modifications of the building code are required.

ISSUED BYName: **Stuart Preston**CPEng number: **138744**

Design Entity/Company: Certa Engineering Limited

DECLARATION

I, **Stuart Preston**, LBP, state that I have applied the skill and care reasonably required of a competent design professional in 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:

3/2/2023

(1) SED = Elements subject to **Specific Engineering Design** outside of the scope of NZS 3604:2011, unless noted otherwise.

GENERAL:

- REFER ARCHITECT'S DRAWINGS FOR DIMENSIONS, UNLESS NOTED OTHERWISE. DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO STEEL FABRICATION. DO NOT SCALE OFF THIS DRAWING.
- IF MAXIMUM HEIGHT DIMENSIONS VARY FROM THAT SHOWN CONTACT ENGINEER IMMEDIATELY. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE SET OUT ON SITE AND DETERMINING ACTUAL WALL HEIGHTS AS THESE MAY VARY FROM THAT SHOWN
- STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATIONS, ARCHITECTURAL, CIVIL AND ENGINEERING SERVICES DOCUMENTS.
- UNLESS OTHERWISE NOTED ALL LEVELS ARE IN METERS, AND ALL DIMENSIONS ARE IN MILLIMETERS, AND SHALL BE CHECKED BY CONTRACTOR PRIOR TO CONSTRUCTION.
- DIMENSION SHALL NOT BE OBTAINED BY SCALING FROM DRAWINGS.
- ALL DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT OR ENGINEER FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
- ALL MATERIAL AND WORKMANSHIP SHALL BE ON ACCORDANCE WITH THE CURRENT CODES OF PRACTICE EXCEPT WHERE VARIED BY THE SPECIFICATION AND/OR DRAWINGS.
- WHERE PROPRIETY PRODUCTS ARE SPECIFIED IN THE DOCUMENTS THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE PRODUCT FOR APPROVAL.
- ENGINEER REQUIRES 24 HOURS NOTICE BEFORE ANY INSPECTION (REFER TO STRUCTURAL CALCULATIONS FOR SCHEDULE OF INSPECTIONS).

FILL SPECIFICATION:

- SITE TO BE CLEARED OF ALL TOPSOIL AND ANY ORGANIC MATERIAL THEN CUT TO A SERIES OF LEVEL BENCHES.
- ENGINEER TO INSPECT PRIOR TO ANY FILL PLACEMENT.
- FILL MATERIAL TO BE CRUSHED ROCK TOPCOURSE MATERIAL FREE OF ORGANIC MATERIAL FULLY COMPACTED TO 90% OF MAXIMUM DENSITY TO BS1377 TEST 9.
- COMPACT IN MAXIMUM LAYERS OF 150mm THICK WITH A 2 TONNE ROLLER - TRACK ROLLING WITH A DIGGER IS NOT ACCEPTABLE
- ENGINEER TO INSPECT AND TEST EVERY 2nd LAYER PLACED (300mm INTERVALS)

PILING:

- PILE DEPTH ESTIMATIONS ARE HIGHLY APPROXIMATE AND MAY BE SUBJECT TO SIGNIFICANT VARIATION ON SITE. IF GREATER CONFIDENCE IS REQUIRED WE RECOMMEND INSTALLATION OF TEST PILES.
- DRIVEN TIMBER PILES TO HAVE A DEPENDABLE ULTIMATE CAPACITY OF 65KN U.N.O. (REFER DRAWING FOR ESTIMATED LENGTH)
- PILING CONTRACTOR TO PROVIDE RECORD OF PILE SETS AND PILE DRIVING EQUIPMENT DETAILS. TOP OF PILES TO BE PAINTED WITH METALEX AND HAVE A GAP BETWEEN PILE AND FOOTING STEEL OR A LAYER OF DPM
- FOR LARGE POLE HOLES IT IS RECOMMENDED TO DRILL & POUR INTERMEDIATE HOLES, THEN COMPLETE REMAINDER IN A SEPARATE POUR TO MINIMISE HOLE COLLAPSE.
- ENSURE BOTTOM OF PILE HOLES ARE FREE OF WATER AND LOOSE MATERIAL. TAMP AS NECESSARY

WAFFLE SLAB NOTES:

- SLAB AND FOOTINGS - USE 25MPa CONCRETE, 100mm SLUMP
- REFER POD SUPPLIER SPECIFICATIONS AND DRAWINGS FOR SAWCUTS AND SHRINKAGE CONTROL JOINTS
- BASECOURSE AS REQUIRED TO BRING SITE LEVEL. ANY SOFT SPOTS ARE TO BE EXCAVATED AND REPLACED WITH BASECOURSE.
- IF HEATING COILS ARE TO BE INSTALLED, INCREASE SLAB TO 125mm THICK AND ADD 2nd LAYER OF SE62 MESH OVER COILS. REFER TO ENGINEER FOR DETAILS.
- POLISHED FLOOR - USE 30MPa CONCRETE WITH 13mm AGGREGATE (DO NOT USE A PUMP MIX), 100mm SLUMP, ENSURE WET CURING FOR AT LEAST 7 DAYS. 2 LAYERS OF DPC ON 20mm SAND BLINDING. ENSURE SAWCUTS ARE MADE AT THE EARLIEST POSSIBLE TIME (WITHIN 48 HRS)

STRUCTURAL MAINTENANCE SCHEDULE:

- YEARLY:** WASH DOWN ALL EXPOSED STEELWORK THAT IS NOT IN A FULLY INTERIOR ENVIRONMENT.
- 10 YEARLY:** INSPECT AND REPAIR SEALANT THAT ENCLOSES STRUCTURAL MILD-STEEL COMPONENTS AND/OR TIMBER WITH MILD-STEEL FIXINGS.
- CHECK EXPOSED TIMBER FIXINGS FOR CORROSION, REPAIR AS REQUIRED.
- 25 YEARLY:** INSPECT SAMPLES OF STRUCTURAL STEEL THAT IS HIDDEN FROM VIEW BUT NOT ENCLOSED WITHIN A VAPOUR BARRIER, AND REPAIR PROTECTIVE COATINGS AS NECESSARY. INSPECTION MAY TYPICALLY REQUIRE REMOVAL OF CLADDING AND/OR THE DRILLING OF HOLES FOR BORESCOPE ACCESS. REPAIR AS REQUIRED.
- INSPECT ALL EXPOSED, EXTERNAL TIMBER. REPAIR AS REQUIRED
- INSPECT ALL EXPOSED, EXTERNAL REINFORCED CONCRETE FOR SIGNS OF SPALLING OR CRACKING. REPAIR AS REQUIRED.

STEEL:

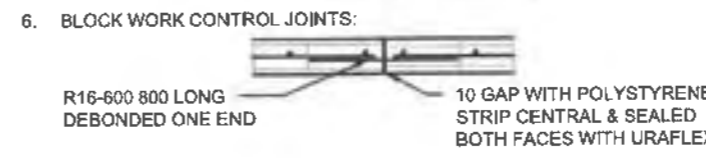
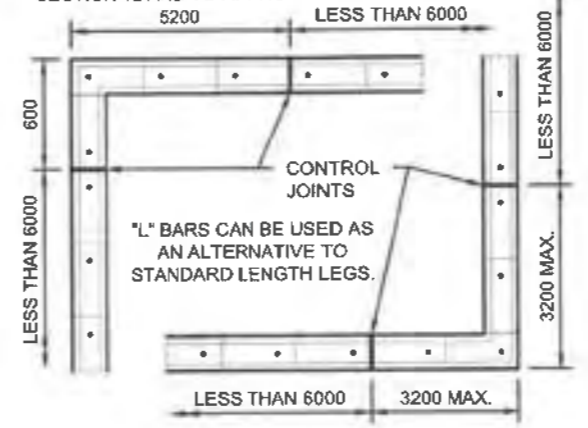
- ALL STEEL WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3404:2009
- ALL WELDS TO BE 6 FILLET WELDS ALL ROUND UNLESS NOTED OTHERWISE.
- ALL M12 BOLTS TO BE GRADE 4.6. ALL M16 BOLTS TO BE GRADE 8.8 UNLESS NOTED OTHERWISE.
- ALL PLATES TO BE 10 THICK UNLESS NOTED OTHERWISE.
- STEEL GRADES:
 - PLATES 250MPa
 - HOT ROLLED SECTIONS 300MPa
 - HOLLOW SECTIONS 350MPa
- ALL WELD ELECTRODES ARE E48XX OR W50X.
- ALL INTERNAL STRUCTURAL STEEL TO BE PAINTED IN ACCORDANCE WITH SYSTEM DESIGNATION AS/NZS2312/AKL1 BEFORE DELIVERY TO SITE. ANY AREAS DAMAGED TO BE MADE GOOD UPON INSTALLATION.
- ALL EXTERNAL STRUCTURAL STEEL TREATMENT SHALL BE ONE OF THE FOLLOWING: (NZS TS 3404-2018)
 - TSZ150S - 150µm THERMAL SPRAY ZINC + 75µm ACRYLIC PAINT (EXTERIOR OVER 1KM FROM COAST).
 - HDG900 - 900gm/m² GALVANISED COATING.

CONCRETE:

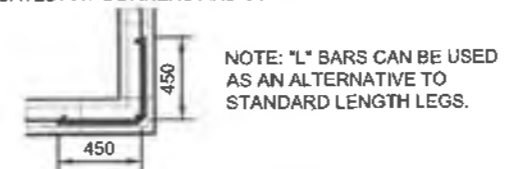
- ALL CONCRETE WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3109:1997
- CONCRETE SHALL HAVE A 28 DAY STRENGTH OF:
 - SLABS & FOOTINGS 25MPa
 - PILES 17.5MPa
 - TIDY SLABS 10MPa
- MAXIMUM SLUMP TO BE 100mm UNLESS NOTED OTHERWISE
- CONCRETE FINISHES SHALL BE:
 - SLABS U3
 - EXPOSED FOOTINGS F4
- ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671:2001 (HD BARS SHALL NOT BE REBENT)
- THE CONCRETE SHALL BE KEPT CONTINUOUSLY WET FOR A PERIOD OF A LEAST 4 DAYS. FROM 4-10 DAYS AFTER POURING IT SHALL BE KEPT DAMP BY OCCASIONAL HOSING..
- ALL CHEMICAL ANCHOR HOLES TO BE CLEANED OUT AND EMBEDDED TO DEPTHS IN ACCORDANCE WITH MANUFACTURES INSTRUCTIONS.

MASONRY:

- ALL MASONRY IS LAID IN RUNNING BOND CONFIGURATION UNLESS NOTED OTHERWISE.
- ALL MASONRY WITHIN THE BUILDING STRUCTURE IS GRADE B AS DEFINED IN NZS 4230.
- ALL CONCRETE MASONRY BLOCKS SHALL CONFORM TO NZS 3102 UNLESS NOTED OTHERWISE. DENSITY SHALL BE > 1750 kg/m³.
- ALL MASONRY WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS4210:2001 & NZS4229:2013. LINTELS WHERE NOT SPECIFICALLY DETAILED SHALL COMPLY WITH THE PROVISIONS OF NZS4229:2013. USE 800g/m³ OF SIKA 'CAVEX' EXPANSION AGENT, OR APPROVED ALTERNATIVE, FOR MASONRY BLOCK INFILL.
- VERTICAL CONTROL JOINTS IN MASONRY TO BE PROVIDED AT 6m MAX. CENTRES. WHERE NOT SHOWN ON DRAWINGS THE JOINTS SHOULD BE LOCATED IN ACCORDANCE WITH NZS4229:2013 SECTION 12 AND TO APPROVAL OF THE ENGINEER.



- ALL BLOCK WORK HORIZONTAL REINFORCING MUST LAP ADEQUATELY AT CORNERS AND JUNCTIONS AS INDICATED BELOW:



- IF MAXIMUM HEIGHT DIMENSIONS VARY FROM THAT SHOWN CONTACT ENGINEER IMMEDIATELY. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE SET OUT ON SITE AND DETERMINING ACTUAL WALL HEIGHTS AS THESE MAY VARY FROM THAT SHOWN
- CONCRETE SHALL BE:
 - BLOCK FILL B1 17.5MPa
- ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS4671:2001 AND SHALL BE PLACED CENTRAL IN MASONRY BLOCK U.N.O. (HD BARS SHALL NOT BE REBENT)
- CHASING OF LOAD BEARING MASONRY UNITS IS NOT PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.

BAR SIZE	REINFORCING LAP LENGTHS			
	MASONRY(17.5MPa)		CONCRETE (25MPa)	
10	300	500	300	500
12	400	700	-	-
16	480	840	360	600
20	640	1120	480	800
25	800	1400	600	1000
	-	-	750	1250

REINFORCEMENT COVER	MASONRY	CONCRETE
EXPOSURE CLASSIFICATION	17.5MPa	25MPa
INTERIOR	A1	35
EXTERIOR - MOD	B1	50
AGAINST GROUND	-	75

TIMBER:

- ALL TIMBER WORK SHALL COMPLY WITH THE REQUIREMENTS OF NZS3602:2003
- ALL BOLTED TIMBER CONNECTIONS TO HAVE 50x50x3 WASHERS.
- ALL TIMBER TO BE MSG8 UNLESS SPECIFIED OTHERWISE.
- TIMBER CONNECTIONS NOT SHOWN TO BE IN ACCORDANCE WITH NZS3604. TIMBER SIZES NOT SHOWN REFER ARCHITECT.
- EXTERNAL BOLTS, WASHERS & BRACKETS TO BE STAINLESS STEEL.

TIMBER HAZARD CLASSIFICATIONS		
HAZARD CLASS	SERVICE CONDITIONS	TYPICAL USES
H1.2	PROTECTED FROM WEATHER, BUT WITH A RISK OF MOISTURE CONTENT CONDUCTIVE TO DECAY	WALL FRAMING - SEE NZS3604
H3.2	PERIODIC WETTING, NOT IN CONTACT WITH THE GROUND, MORE CRITICAL END USES	DECKS, PERGOLAS, EXTERNAL BEAMS, POST NOT IN GROUND
H4	GROUND CONTACT, OR CONDITIONS OF SEVERE OR CONTINUOUS WETTING	FENCE POSTS, LANDSCAPING TIMBER NOT REQUIRING A BUILDING CONSENT
H5	GROUND CONTACT, OR CONDITIONS OF SEVERE OF CONTINUOUS WETTING, WHERE USES ARE CRITICAL AND WHERE A HIGHER LEVEL OF PROTECTION THAN H4 IS REQUIRED	HOUSE PILES AND POLES, CRIB WALLING, POSTS IN GROUND FOR DECKS, VERANDAS, PERGOLAS

SAFETY STATEMENT:

- PROPPING:
 - EXISTING LOAD BEARING STRUCTURAL ELEMENTS SHALL BE ADEQUATELY PROPPED PRIOR TO REMOVING ANY SUPPORTING STRUCTURE. PROPPING SHALL REMAIN UNTIL NEW SUPPORTING STRUCTURE IS INSTALLED AS PER THE ENGINEER'S DRAWINGS AND REQUIREMENTS.
 - THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE BUILDER.
 - TEMPORARY WORK AND PROPPING IS THE RESPONSIBILITY OF THE BUILDER.
- PRECAST WALL
 - THE PRE-CAST PANEL MANUFACTURER AND BUILDER SHALL FOLLOW THE: *Approved Code of Practice for The Safe Handling, Transportation and Erection of Precast Concrete*, AND
 - ANY REQUIREMENTS SPECIFIED BY THE HEALTH AND SAFETY AT WORK REGULATIONS.

REFER TO www.business.govt.nz/worksafe/information_guidance/all_guidance_items/scaffolding_best_practice_guideline_for_scaffolding_in_new_zealand/section_6_particular_scaffolds_and_scaffolding_structures/6.13_falsework_or_propping

PROJECT
PROPOSED RESIDENCE

ADDRESS
LOT 68, STAGE 2, MANU PARK WAIKANAE

CERTA ENGINEERING
Lower Hutt Office
Tel: 04 566 8004
Level 1, 70 Bloomfield Tce
P.O. Box 30 535
Lower Hutt 5040
email: certa@certa.co.nz

DATE: 27 January 2023 DESIGNED: MG
DRAWN: BK APPROVED: SRNP
JOB No: **44071** SHT No: **S0** REV: **A**

230147 Received by Kapiti Coast District Council 06/03/23

230147
Received
by Kapiti
Coast
District
Council
06/03/23

800x800x750dp
CANOPY POST FOOTING
(REFER S2)

450x450x450dp
CANOPY POST FOOTING
(REFER S2)

BRICK REBATE
(REFER ARCH)

DOOR REBATES
(REFER ARCH)

SETOUT POINT

300x305dp FOOTING (TYPICAL)

2-D12 1200 LONG
(TYPICAL)

FOUNDATION PLAN SCALE 1:100

SOAKPIT LOCATION BY ARCH
MIN 2m FROM BOUNDARY
(REFER S3)

SC SAWCUT (REFER S2)

REFER STRUCTURAL CALCULATIONS
FOR INSPECTION SCHEDULE

TRUSS MANUFACTURER TO ENSURE ALL TRUSS
LOADS ARE TO INTERNAL THICKENINGS OR
EXTERNAL PERIMETER

PROJECT
PROPOSED RESIDENCE

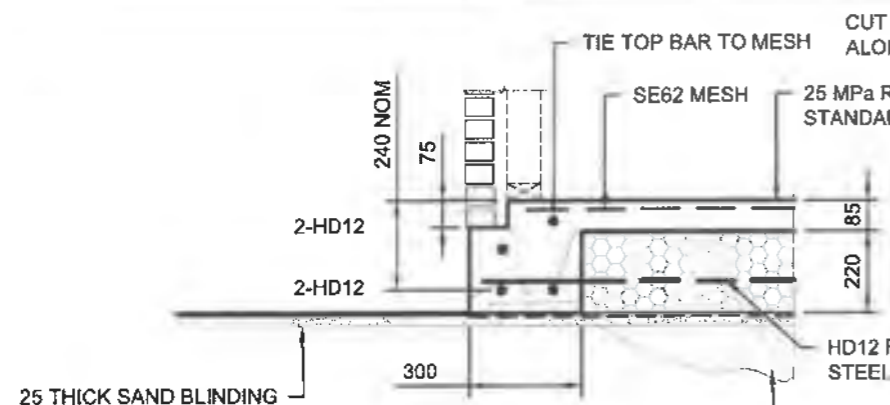
ADDRESS
**LOT 68, STAGE 2, MANU PARK
WAIKANAЕ**



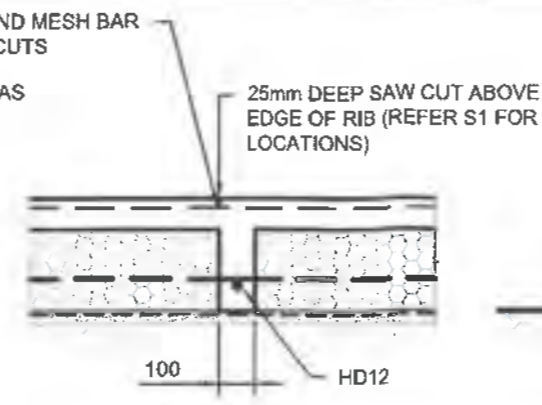
Lower Hutt Office
Tel: 04 566 8014
Level 1, 70 Bloomfield Tce
P.O. Box 30 535
Lower Hutt 5040
email@certa.nz

DATE: 27 January 2023	DESIGNED: MG
DRAWN: BK	APPROVED: SRNP
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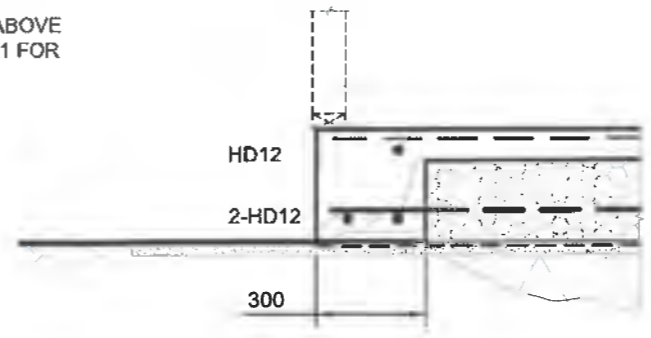
230147
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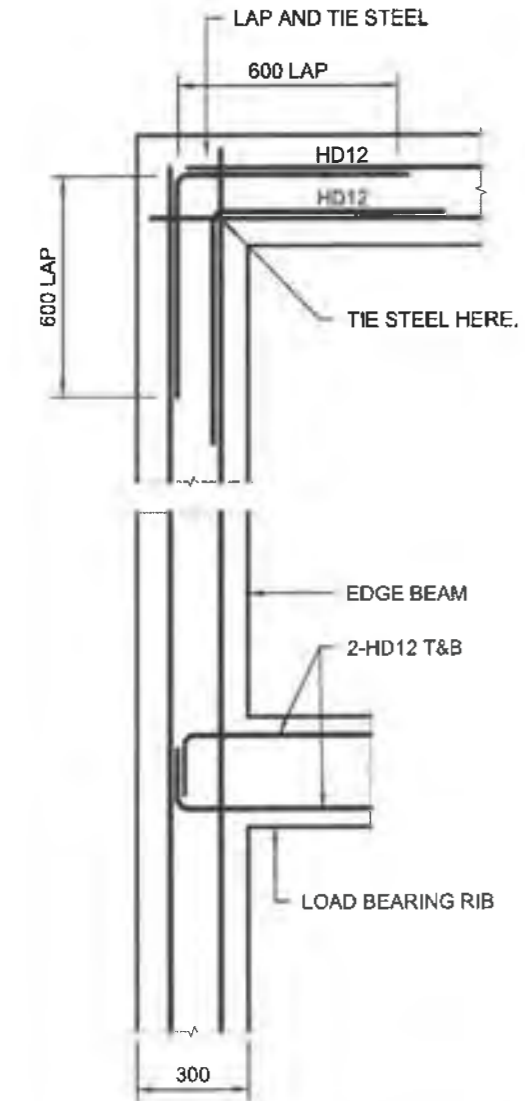
**EDGE BEAM DETAIL
(BRICK REBATE)**
SCALE 1:20



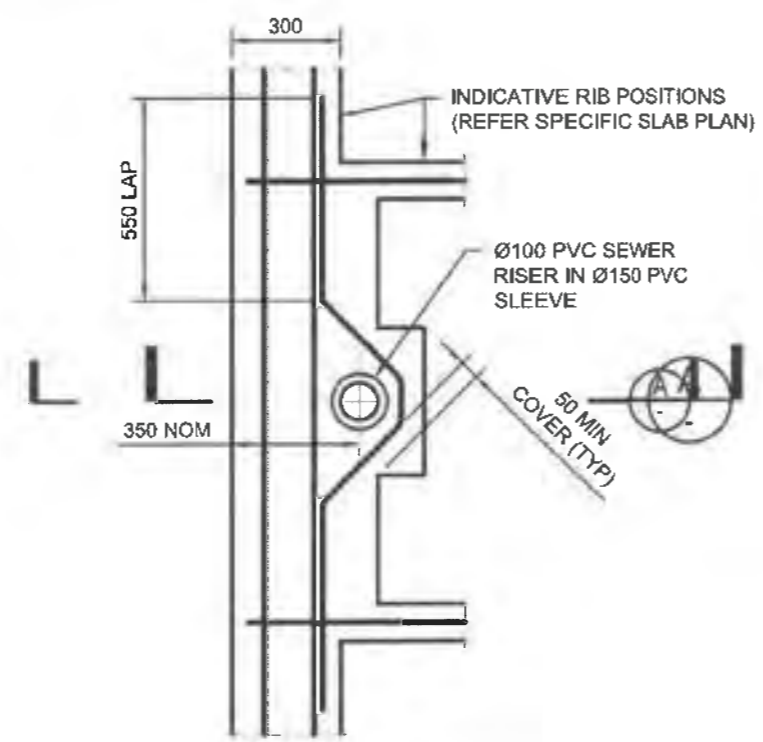
TYPICAL RIB DETAIL
SCALE 1:20



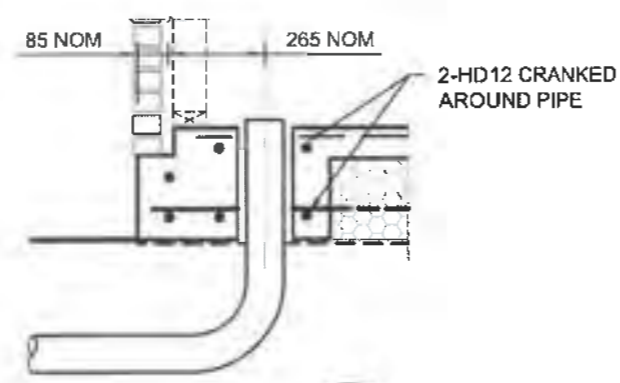
**EDGE BEAM DETAIL
(NO REBATE)**
SCALE 1:20



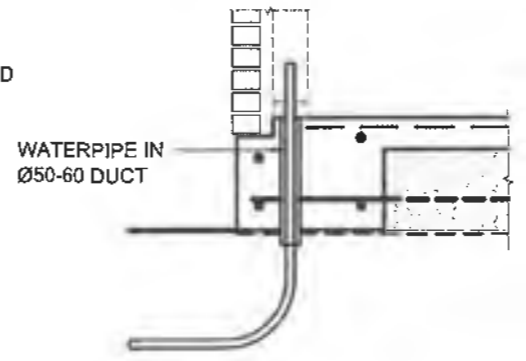
**CORNER
LOAD BEARING RIB STEEL**
SCALE 1:20



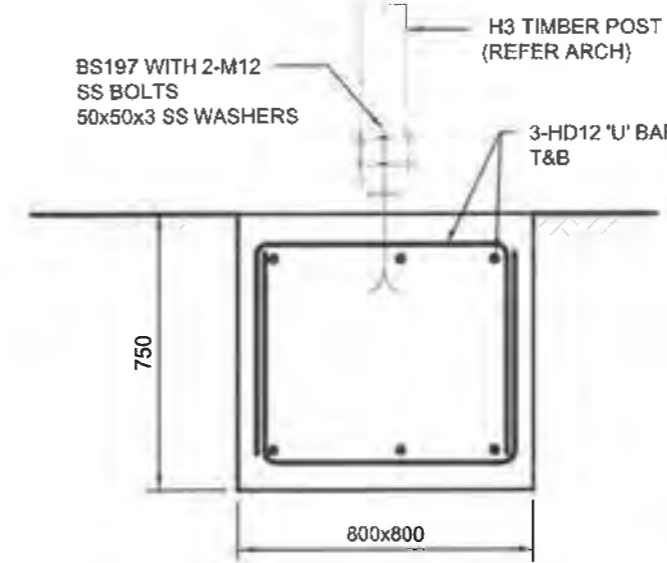
**RIB RAFT SLAB
SEWER PENETRATION DETAIL**
SCALE 1:20



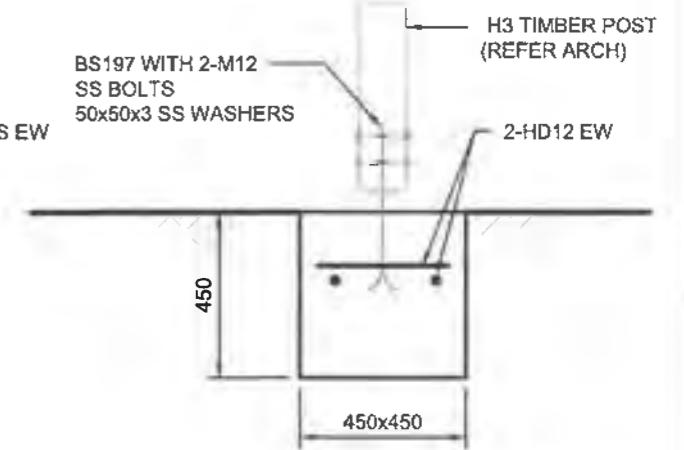
SECTION A
SCALE 1:20



PENETRATION DETAIL
SCALE 1:20



**800x800x750dp CANOPY POST
PAD DETAIL**
SCALE 1:20



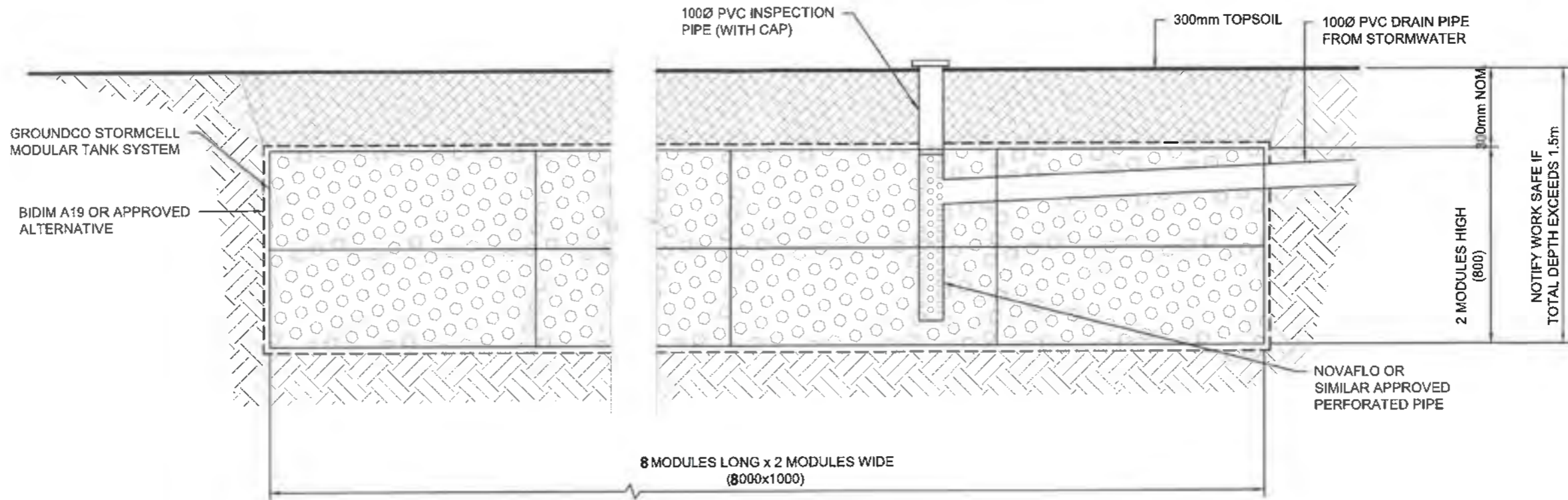
**450x450x450dp CANOPY POST
PAD DETAIL**
SCALE 1:20

PROJECT
PROPOSED RESIDENCE

ADDRESS
**LOT 68, STAGE 2, MANU PARK
WAIKANAЕ**

CERTA ENGINEERING
Lower Hutt Office
Tel: 04 566 8004
Level 1, 70 Bloomfield Tce
P.O. Box 30 535
Lower Hutt 5040
email@certa.nz

DATE: 27 January 2023	DESIGNED: MG
DRAWN: BK	APPROVED: SRNP
JOB No: 44071	SHT No: S2 REV: A



SOAK PIT DETAIL
SCALE 1:20


LOCATION BY ARCH
MIN 2m FROM BOUNDARY


PROJECT
PROPOSED RESIDENCE

ADDRESS
**LOT 68, STAGE 2, MANU PARK
WAIKANAЕ**

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 Lower Hutt Office
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 Level 1, 70 Bloomfield Tce
 P.O. Box 30 535
 Lower Hutt 5040
email@certa.nz

DATE: 27 January 2023	DESIGNED: MG
DRAWN: BK	APPROVED: SRNP
JOB No: 44071	SHT No: S3 REV: A

Job Name: Lo6 68 Stage 2 Manu Park Location:	Job Num: 44071 Date: Engineer: MG																																									
<h3 style="margin: 0;">Roof canopy post foundation</h3> <p>Determine loads from roof</p> <p>Area = 1.50 m² G = 0.35 kPa Q = 0.25 kPa Vz = 44 m/s Cpn = <table style="display: inline-table; vertical-align: middle;"><tr><td>Up</td><td>Down</td></tr><tr><td>-1.5</td><td>0.3</td></tr></table></p> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <tr> <th>G</th> <th>Q</th> <th>Wup</th> <th>Wdn</th> <th>1.2G+1.5Q</th> <th>1.2G + Wdn</th> <th>0.9G+Wup</th> </tr> <tr> <td>0.53</td> <td>0.38</td> <td>-2.61</td> <td>0.52</td> <td>1.19</td> <td>1.15</td> <td>-2.14</td> </tr> </table> <p>Max 1.19 kN Min -2.14 kN</p>			Up	Down	-1.5	0.3	G	Q	Wup	Wdn	1.2G+1.5Q	1.2G + Wdn	0.9G+Wup	0.53	0.38	-2.61	0.52	1.19	1.15	-2.14																						
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<p>Determine Critical Timber fixing Load Max = 2.14 kN (k₁ = 1)</p> <p>Type of fixing - M12 Bolt</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Φ</td> <td style="width: 15%;">k1, k12</td> <td style="width: 15%;">Qn</td> <td style="width: 15%;">n</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td>0.7x1x0.7</td> <td>6.97</td> <td>2</td> <td>=</td> <td>6.83 kN</td> <td>OKAY</td> </tr> </table>			Φ	k1, k12	Qn	n			0.7x1x0.7	6.97	2	=	6.83 kN	OKAY																												
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<p>Determine Pad & Plinth Capacity</p> <p>Φ Q_b = 150 kPa near surface</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Plinth</td> <td style="width: 15%;">b = 225 mm</td> <td style="width: 15%;">depth = 225 mm</td> <td style="width: 15%;"></td> <td style="width: 15%;">225mm Min Plinth</td> </tr> <tr> <td>Pad</td> <td>b = 450 mm</td> <td>depth = 450 mm</td> <td></td> <td></td> </tr> <tr> <td></td> <td>min b = 89 mm</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Q_b = 6 kPa</td> <td>OKAY</td> <td>Φ Wt = 2.21 kN</td> <td>OKAY</td> </tr> </table>			Plinth	b = 225 mm	depth = 225 mm		225mm Min Plinth	Pad	b = 450 mm	depth = 450 mm				min b = 89 mm					Q _b = 6 kPa	OKAY	Φ Wt = 2.21 kN	OKAY																				
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<p style="text-align: right; font-size: small;">(Skin friction formula - Kulhawy 1979)</p> <p>Determine Augered Pile & Plinth Capacity Pile skin friction = $\Phi \cdot \pi \cdot d \cdot L^2 \cdot 0.5 \cdot K_a \cdot \gamma \cdot \tan \Phi$</p> <p style="font-size: small;">NOTE: Assume loose sand friction properties Ø=0.5, K_a=0.33, γ = 16kN/m³, Ø = 30 deg</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Plinth</td> <td style="width: 15%;">Φ Q_b = 150 kPa</td> <td style="width: 15%;">at depth</td> <td style="width: 15%;">depth = 225 mm</td> <td style="width: 15%;">225mm Min Plinth</td> </tr> <tr> <td>Pile</td> <td>b = 300 mm</td> <td></td> <td>depth = 1500 mm</td> <td></td> </tr> <tr> <td></td> <td>Dia = 400 mm</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>min dia = 50 mm</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Q_b = 9 kPa</td> <td>OKAY</td> <td>Φ Wt = 5.57 kN</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>Φ Ft = 2.15 kN</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>Φ Total uplift resistance = 7.72 kN</td> <td>OKAY</td> </tr> </table> <p style="font-size: small;">(Due to soil creep, soil friction capacity is should be use to resist brief loads only)</p>			Plinth	Φ Q _b = 150 kPa	at depth	depth = 225 mm	225mm Min Plinth	Pile	b = 300 mm		depth = 1500 mm			Dia = 400 mm					min dia = 50 mm					Q _b = 9 kPa	OKAY	Φ Wt = 5.57 kN					Φ Ft = 2.15 kN					Φ Total uplift resistance = 7.72 kN	OKAY					
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<p>Determine Driven Pile & Plinth Capacity Pile skin friction = $\Phi \cdot \pi \cdot d \cdot L^2 \cdot 0.5 \cdot \sqrt{K_p} \cdot \gamma \cdot \tan \Phi$</p> <p style="font-size: small;">NOTE: Assume dense sand friction properties Ø=0.5, K_p = 3, γ = 16kN/m³, Ø = 30 deg</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Plinth</td> <td style="width: 15%;">Φ N_c = 65 kN</td> <td style="width: 15%;">depth = 225 mm</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td>Pile cap</td> <td>b = 300 mm</td> <td></td> <td>depth = 350</td> <td></td> </tr> <tr> <td>Pile</td> <td>b = 500 mm</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Dia = 150 mm</td> <td>Total depth = 2000 mm</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Skin friction ignored to depth = 350 mm</td> <td></td> <td>(ignore skin friction in loose soils)</td> </tr> <tr> <td></td> <td>Φ N_c OKAY</td> <td></td> <td>Φ Wt = 3.07 kN</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>Φ Ft = 5.13 kN</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>Φ Total uplift resistance = 8.20 kN</td> <td>OKAY</td> </tr> </table> <p style="font-size: small;">(Due to soil creep, soil friction capacity is should be use to resist brief loads only)</p>			Plinth	Φ N _c = 65 kN	depth = 225 mm			Pile cap	b = 300 mm		depth = 350		Pile	b = 500 mm					Dia = 150 mm	Total depth = 2000 mm					Skin friction ignored to depth = 350 mm		(ignore skin friction in loose soils)		Φ N _c OKAY		Φ Wt = 3.07 kN					Φ Ft = 5.13 kN					Φ Total uplift resistance = 8.20 kN	OKAY
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			Φ Total uplift resistance = 8.20 kN	OKAY																																						

Job Name: Lo6 68 Stage 2 Manu Park Location:	Job Num: 44072 Date: Engineer: MG	
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Roof canopy post foundation

Determine loads from roof

Area = 6.00 m² G = 0.35 kPa Q = 0.25 kPa
 Vz = 44 m/s Cpn =

Up	Down
-1.5	0.3

G	Q	Wup	Wdn	1.2G+1.5Q	1.2G + Wdn	0.9G+Wup
2.10	1.50	-10.45	2.09	4.77	4.61	-8.56

Max 4.77 kN Min -8.56 kN

Determine Critical Timber fixing Load

Max = 8.56 kN ($k_1 = 1$)

Type of fixing - M12 Bolt

Φ k1, k12	Qn	n	=	6.83 kN	Need specific design
0.7x1x0.7	6.97	2			

Determine Pad & Plinth Capacity

Φ Q_b = 150 kPa near surface
 Plinth b = 0 mm depth = 0 mm 225mm Min Plinth
 Pad b = 800 mm depth = 750 mm
 min b = 178 mm
 Q_b = 7 kPa OKAY Φ Wt = 10.37 kN OKAY

Determine Augered Pile & Plinth Capacity

(Skin friction formulae - Kulhawy 1979)

Pile skin friction = $\Phi \cdot \pi \cdot d \cdot L^2 \cdot 0.5 \cdot K_a \cdot \gamma \cdot \tan \Phi$

NOTE: Assume loose sand friction properties

$\Phi = 0.5, K_a = 0.33, \gamma = 16 \text{ kN/m}^3, \Phi = 30 \text{ deg}$

Φ Q_b = 150 kPa at depth
 Plinth b = 300 mm depth = 225 mm 225mm Min Plinth
 Pile Dia = 400 mm depth = 1500 mm
 min dia = 101 mm
 Q_b = 38 kPa OKAY Φ Wt = 5.57 kN

Φ Ft = 2.15 kN

Φ Total uplift resistance = 7.72 kN

No Good

(Due to soil creep, soil friction capacity is should be use to resist brief loads only)

Determine Driven Pile & Plinth Capacity

Pile skin friction = $\Phi \cdot \pi \cdot d \cdot L^2 \cdot 0.5 \cdot \sqrt{K_p} \cdot \gamma \cdot \tan \Phi$

NOTE: Assume dense sand friction properties

$\Phi = 0.5, K_p = 3, \gamma = 16 \text{ kN/m}^3, \Phi = 30 \text{ deg}$

Φ N_c = 65 kN
 Plinth b = 300 mm depth = 225 mm
 Pile cap b = 500 mm 350
 Pile Dia = 150 mm Total depth = 2000 mm
 Skin friction ignored to depth = 350 mm *(ignore skin friction in loose soils)*
 Φ N_c OKAY Φ Wt = 3.07 kN
 Φ Ft = 5.13 kN
 Φ Total uplift resistance = 8.20 kN

No Good

(Due to soil creep, soil friction capacity is should be use to resist brief loads only)

Percolation Test

Job Number: J44071

Location: Lot 68, Stage 2 Manu Park, Waikanae

Client: Glen Parsons

Date: 26/01/2023

Depth: 500

Results

Time (Mins)	Drop (mm)
0	0
15	250
30	300
45	370
60	400
75	420
90	440
105	450
120	450
135	
150	

Project: Proposed Residence	Job No: 44071	
Location: Lot 68 Stage 2 Manu Park	Date:	
	Engineer: MG	
	Sheet No:	

Increase Flow Rate Demand

Basic Water Flow rate

ARI ⁽¹⁾ (Year)	60m Duration (mm/hr)
10	47.5

*Obtained from HIRDSV4
RCP6.0 for the period 2081-2100

	Site Cover Type	Collect area (m ²)	Runoff Coefficient (C) (⁽²⁾)	10 year flow rate (m ³ /hr)
Before	Natural area	781.0	0.3	11.1293
	RESULT			11.1293
After	Natural area	591.0	0.3	8.4218
	House	190	0.9	8.1225
	Driveway		0.9	0.0000
	RESULT			16.5443
		INCREASE VOLUME		5.4150

Soak-Pit Design

	10 Year Flow Rate (m ³ /hour)	ΦPercolation Rate ⁽³⁾ (m/hour)
V increase	5.42	0.40
	(R _c)	(S _r)

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06/03/23

Note:

⁽¹⁾ARI = Average Recurrence Interval. Based on Building code E1/VM1 9.0.3, use 60 mins 10 ARI

⁽²⁾Runoff coefficient obtained from Building Code Clause E1/VM1.

⁽³⁾Value from percolation test, Φ= 0.5

Using Rainsmart Modular Tank System (95% void ratio)

1. $V_{soak} = A_{sp} S_r$ where A_{sp} is determined from 0.715m x 0.4m modules (0.44m high)
 $A_{sp} = 0.286m^2/module$

2. $V_{stor} = (R_c - V_{soak}) / \text{Void Ratio}$

Plan area for **16** modules, $A_{sp} = 4.576 m^2$

Hence, $V_{soak} = 1.830 m^3/hour$

And, $V_{stor} = 3.773 m^3$

Finally, $\frac{3.773}{4.576} m^3$

$\frac{3.773}{4.576} m^2$

Required Height = $\frac{3.773}{4.576} m \approx 0.825 m$

2 modules high

Table 2: Estimated “Free-Field” Ground Surface Settlements & Performance Levels

Earthquake scenario	Total Estimated Ground Surface Settlements (full depth tested)	Performance Level (as per Table 5.1 of MBIE – NZGS Module 3)
Interim NZ Seismic Hazard Model		
1/25-year SLS event	-	Insignificant effects - L0
1/100-year IE	<40 mm	LSN 0 to 5 LPI 0 to 2 Mild to moderate effects - L1 / L2
1/500-year ULS event	<60 mm	LSN 0 to 8 LPI 0 to 11 Moderate effects - L2

* **LSN = Liquefaction Severity Number.** LSN (van Ballegooy et al., 2014) is a vulnerability indicator (damage index) quantifying liquefaction-induced damage developed to reflect more damaging effects of shallow liquefaction on residential land and foundations following the Canterbury Earthquakes (2010-11). LSN considers depth weighted calculated volumetric densification strain within soil layers as a proxy for the severity of liquefaction land damage likely at the ground surface.

The liquefaction assessment indicates that liquefaction is unlikely to be triggered under SLS loading conditions with moderate effects anticipated under ULS loading conditions. Furthermore, the presence of a thick non-liquefiable crust (2.5 m to 6.5 m in thickness) provides additional resilience and significantly reduces the severity of liquefaction induced damage (demonstrated by the low values of LSN).

5. Foundation Recommendations

With consideration of the assessment presented herein, NZS3604 foundation systems are considered feasible for NZS3604 compliant structures, with consideration of the available bearing capacity.

The following geotechnical ultimate bearing capacities (GUBC) may be assumed for typical foundations:

- Min. 300 mm wide strip footing / ground beam / slab thickening:
 - 200 kPa at 0.3 mbgl.
 - 300 kPa at 0.5 mbgl.
- Min. 400 mm square pad footing / pile base:
 - 300 kPa at 0.4 mbgl.

The subgrade should be inspected by a suitably experienced geo-professional during construction and compacted / proof rolled prior to foundation construction. Any material identified as being soft or unsuitable should be removed and replaced with compacted hardfill (or site materials suitable for backfill and compaction).

Garrison Technical Manual

Bevelback
Weatherboard

 **Garrison**[®]
by claymark

230147

Received by

Kapiti Coast District Council

06/03/23



Ingrained Precision
in everything we do

claymark.co.nz

Finger Jointed pine

- Eco Friendly
- Sustainable resource
- Strong
- Durable
- FSC Certified

2 New Generation Sealer

1 TRU-CORE[®] Treated

3 100% Acrylic Undercoat (Two Coats)

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New Zealand's most advanced weatherboard system.

Experience Claymark's Triple Protected Treatment. Unlike anything else in the market, three barriers of protection ensures your Garrison weatherboard lasts a lifetime*

1 Tru-core^{AE} Treated

- Unique carrier system penetrates microscopic channels in resins and glues
- 100% penetration of the Sapwood and Heartwood
- No damage to the wood structure
- No volatile organic solvents or harmful chemicals!
- 3 EPA registered and globally recognized fungicides
- 2 EPA registered and globally recognized termiticides
- 5 decay and termite actives

*In accordance with manufacturers warranty statement

2 New Generation Sealer

- Resists water uptake
- Resists resin/tannin bleed
- 100% Solids eco friendly technology
- UV cured seal coat

3 100% Acrylic Undercoat (Two Coats)

- Garrison primer system utilizes new generation Acrylic technology
- Waterborne technology
- 100% Acrylic composition
- Provides better adhesion, flexibility and weathering
- All 4 sides are evenly coated

Scope

Garrison® Rusticated Weatherboards are for use as a direct fixed external wall cladding for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- constructed with timber framing complying with the NZBC; and,
- with a risk score of 0-12 calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and
- situated in NZS 3604 Wind Zones up to, and including, Very High.

Garrison® Rusticated Weatherboards are for use as a cavity fixed external wall cladding for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- constructed with timber framing complying with the NZBC; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

Weatherboard Information



Over the course of the last century weatherboard has endured itself as New Zealand's No. 1 home cladding of choice. Perfectly suited for New Zealand's changeable weather conditions and a superior choice for environmentally conscious Kiwis, coming from renewable managed resources.

Next Generation Weatherboard

Garrison is the next generation of treated finger-jointed pine, precision manufactured from Claymark's premium radiata pine blocks. A next generation patented treatment, Tru-Core®, is used to preserve and extend the life of the wood.

This waterbased, eco-friendly treatment penetrates right to the core and has a proven history of performance.

This gives state-of-the-art protection, resists tannin and resin bleed and provides better adhesion and flexibility, while being safer and more environmentally friendly than traditional oil- or solvent-based coatings. Claymark backs Garrison with a 15 year Written Limited Warranty.

Garrison is the first choice for any job that requires a superior finish. But it has more than great looks in its favour. It is an environmentally sound product, sustainably grown and precision manufactured in New Zealand to Claymark's exacting standards.

Garrison Information

Garrison Weatherboard features:

- Perfect finish
- 100% acrylic coating for better adhesion, flexibility and to prevent tannin and resin bleed
- Primed weatherboard boron treated & factory primed, treated using the Tru-Core process to H3.1 standard
- Deep Tru-Core protection means no re-treatment required for any field cutting, drilling or nailing.
- Tru-Core meets and exceeds New Zealand Standard 3640:2003
- Garrison is manufactured from premium radiata finger-jointed pine
- Garrison is cut to standard lengths of 6.1m
- Kiln dried target moisture content between 10 – 14%

Installation

Prior to cladding

Prior to the installation of Garrison weatherboards it is important to ensure that:

- The framing complies with the requirements of NZS 3604 timber framed buildings.
- The framing is straight and is within tolerances allowed by table 2.1 Tolerances of NZS 3604.
- Timber framing moisture content is less than 20%.
- Wall underlay is compliant with the requirements set out in table 23 of E2/AS1.

Garrison weatherboard sizes

Rusticated weatherboard sizes

- 135x18mm
- 142x18mm
- 180x18mm
- 187x18mm

Care of product prior to installation

Correct handling and storage of Garrison weatherboards is critical for best performance, ease of use and warranty adherence.

Garrison weatherboards should be delivered when ready to be installed. Unnecessary storage time on site can increase the risk of accidental damage and exposure to adverse conditions. All boards should be inspected upon delivery and any damage reported to your supplier. All Garrison should be lifted off the truck by hoist or hand. They should never be tipped from the truck.

While storing Garrison it is important to keep it dry and off the ground by at least 150mm. If you are storing outside always use a waterproof cover as a secondary to the Claymark wrap, but always ensure that there is sufficient air flow to avoid condensation.

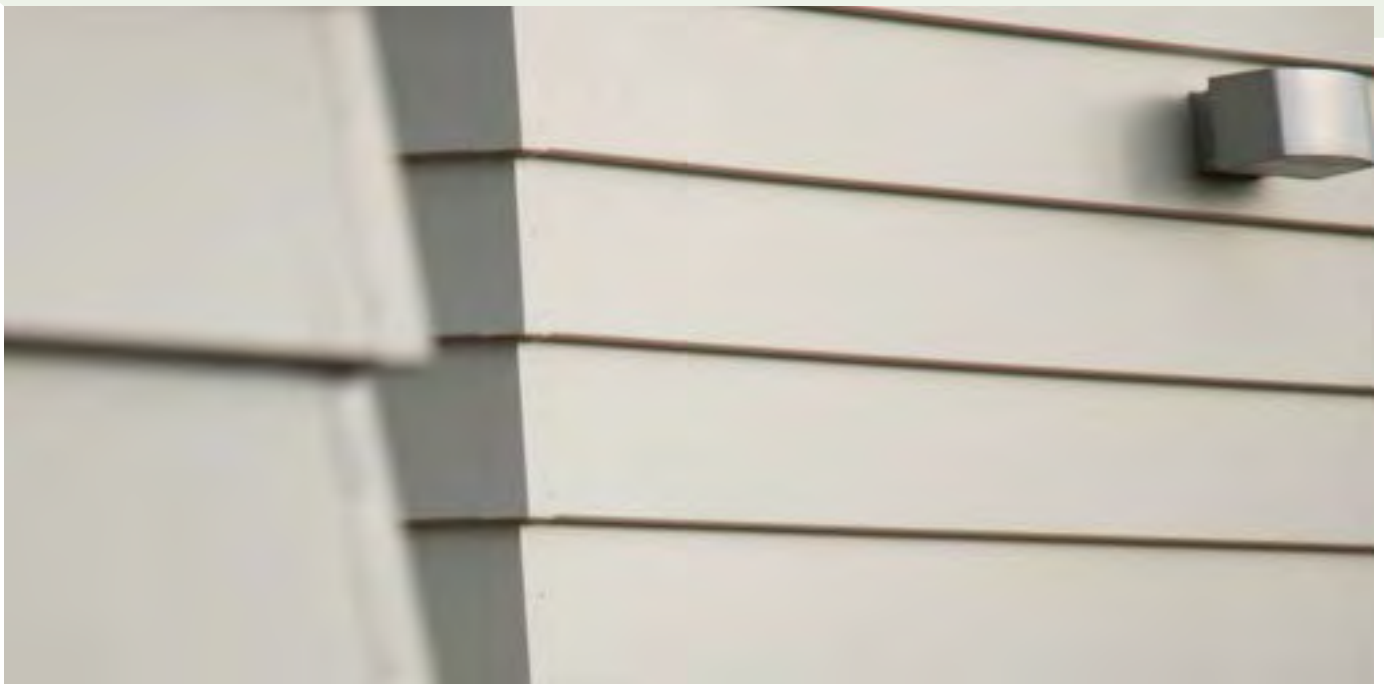
Also avoid storing over puddles, other standing water or vegetation.

Deliveries should be timed to allow minimum time sitting on site, especially when weatherboards are in unfinished damp buildings or in an uncovered building allowing the chance of moisture uptake.

Where possible always store weatherboards in a covered building.

All Garrison weatherboards must be stored on a flat, level and firm platform.

Note: All warranty will be void if the product has not been kept dry before installation, or that has not been painted according to the specifications outlined above.



Drained and ventilated cavities

A drained or vented cavity is required behind Garrison Rusticated weatherboards when the weather tightness risk score exceeds 12. For further information refer to Acceptable solution E2/AS1

Nailing Guide

Fixing cavity battens

Structural Battens

The use of approved structural cavity battens allows Garrison weatherboards to be fixed directly to the cavity batten eliminating the need for larger fixings (refer Table 1 below).

Structural cavity battens should be nailed over framing members and wall underlay to studs using 60 x 2.8mm hot dipped galv or stainless steel ring shank or jolt head hand driven nails. For gun driven use 64 x 2.8mm hot dipped galv or 65 x 2.87mm stainless steel ring shank nails at 300mm alternating either side of the batten centre line by 12mm.

Non Structural Battens

This batten is fixed by the Garrison fixing penetrating the wall framing. A temporary fixing can be used until Garrison is fixed to the framing.

Fixing Garrison Weatherboard

Direct fixing

For direct fixing of Garrison weatherboards consult E2/AS1. Including reference to table 21.

Cavity fixing

Using structural cavity batten

When nailing to a cavity batten that is structurally fixed, fix Garrison weatherboards using 75 x 3.15mm hot dipped galvanised jolt head nails. Single fixing 10mm above top of the lower board.

Note: when installing Garrison weatherboard over a vented cavity, should be constructed in conjunction with E2/AS1. A vented cavity must be used where the E2/AS1 risk score exceeds 12.

Using non structural cavity batten

When nailing to a cavity batten that is not structurally fixed, fix weatherboards using 90 x 4.0mm jolt head nail (35mm penetration to stud) or 75 x 3.15mm annular grooved nail (25mm penetration to stud) Single fixing 10mm above the top of the lower board. All Garrison products are manufactured with an active treatment that is nonreactive to all nails and fastenings, however, when used in combination with stainless steel fastenings, the long term durability of a project can be greatly increased.

We recommend hand nailing, a nail gun may be used as long as it does not bruise/damage the weatherboard and that the correct nail size is adhered to as per our nailing guide. Claymark endorses the use of the Paslode® JoltFast weatherboard nailing system with the appropriate nailing specification.

- Pre drill all boards 50mm from the end.
- All nails should be punched 2mm below the top surface of the board.
- Cavity battens to be 45 x 20mm H3.1 treated minimum.
- Ensure nogs to wall are spaced at 800mm centres.
- Stud spacings to NZS 3604 by designer.
- Run polypropylene tape horizontally over wall wrap at 300mm centres, if battens are at more than 450 centres.

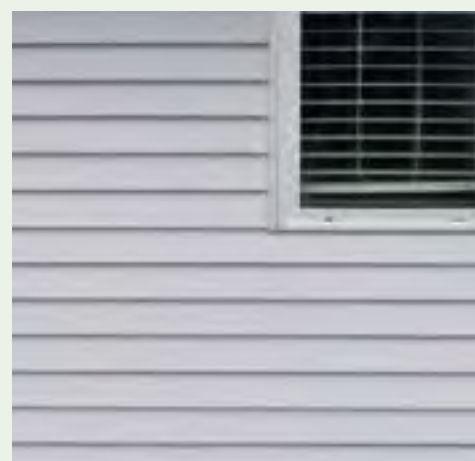
There must be a minimum of a 50mm overlap below the bottom plate or bearer, as required by E2/AS1.

We recommend that you use a complete board with no cuts in above all windows when possible. To allow for normal seasonal movement, nailing should not restrict movement, and always avoid nailing through overlapping boards. Garrison should always be nailed to studs with maximum centres of 600mm. Nailing patterns should comply with E2/AS1, industry standards and best practice. The minimum lap for the weatherboards is 32mm, and weather-grooves should line up.

Note: It is recommended that type 304 stainless steel fixings and flashings are used in seaspray and geothermal zones, it is the building designers responsibility to ensure all specified fastenings, fixings and flashings comply with NZBC Acceptable Solution E2/AS1.

Table 1:

Weatherboard Type	Framing Set-Out	Nails (Direct Fixing)	Nails (Cavity Fixing)	Nailing Requirements	Wind Zone	Air Barrier
Horizontal Bevel Back to stud or batten	Studs @ 600mm centres max.	75 x 3.15 Jolt Head (JH), Hot Dipped (HD), Galv. Nails or Stainless steel	See option 2 above Jolt Head (JH), Hot Dipped (HD), Galv. Nails or Stainless steel	Single nail located, immediately above, but within 10mm of the lap	Low, Medium, High & Very High & Extra High	Lightweight Building Paper Heavyweight Building Paper or Rigid Sheathing



Joining Garrison Weatherboard

Garrison should be fixed in full wall lengths where possible. If joints are unavoidable joint over a stud or batten. Scarf joint at 45° and use one fixing through the overlapping board. Prime cut ends twice. Best practice is to cover with a flat soaker.

For laps and joints

- Horizontal laps to be 32mm
- 2mm end gap between boards
- Ensure that joints are made over supports
- Always drill for nailing within 50mm of board end

Internal corners

Mitre or butt fit junctions, external and internal corners with corrosion resistant soakers in accordance with Acceptable Solution E2/AS1.

Windows

All windows should be installed in accordance with Acceptable Solution E2/AS1.

All window details may change at anytime, please ensure strict accordance with E2/AS1. Ensure support bars are provided in accordance with NZBC Acceptable Solution E2/AS1

Cutting and Sealing

When you cut Garrison weatherboard you do not have to re-treat, but you must prime any cuts with 2 coats of 100% exterior premium undercoat. When using putties, mastics and sealants with Garrison, ensure they are compatible with acrylic based paints and for exterior application. If you are unsure, seek professional advice from the sealant manufacturer.

— Painting

Weatherboards must be dry before painting (check with moisture meter).

Garrison is a pre-primed and undercoated weatherboard. To ensure the optimum finish for your construction, follow the instructions below

- Check board moisture content using a correctly calibrated moisture meter or measure board dimensions. If the board has greater dimensions than that of the profile spec it is likely to have gained moisture. Board moisture content should be below 15%.
- If board moisture content is elevated do not paint. Let the board dry back to factory dimensions. Painting boards at elevated moisture content increases the risk of shrinkage lap marks occurring.
- Check all end grain and cuts have been primed and undercoated.
- Nail holes should be primed prior to filling. Priming nail holes reduces nail hole moisture uptake.

All painting and preparation should be carried out in accordance with the appropriate clauses in AS/NZS 2311 Guide to the painting of Buildings.

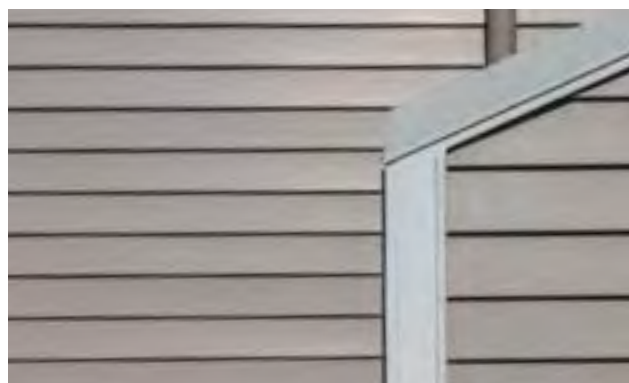
If weatherboards have been exposed to weather for any length of time without two quality coats of top coat and or the primer adhesion looks unsound it is recommended to re-prime in accordance with AS/NZS 2311. Contact Claymark for additional assistance.

Weatherboards must be painted when the surface is dry. If the weatherboards have been wet or had moisture in them, they must be allowed to return to their original state with a moisture content of 12 – 15%. If weatherboards are painted at a higher moisture content you may see swelling between the finger joints.

To protect against dimensional change, applying the manufacturer's recommended painting specification will provide protection against moisture uptake. Garrison will restrict moisture uptake, however, should Garrison be exposed to moisture prior to final painting and this results in temporary dimensional swelling, it is essential the Garrison product be given time to dry out and return to its original dimensions before the final coats are applied.

Remove all dirt, chalk or other contaminants before painting. All nail holes should be filled with exterior grade wood filler, then spot primed, with two coats of premium top coat exterior paint.

For an optimum finish a light sand is recommended before applying final coats of paint. Garrison should be



painted as soon as possible after installation, and no more than 90 days after installation. Primers cannot withstand extended periods exposed to the weather.

Apply two full coats of 100% acrylic premium quality exterior paint with Tannin Blocking Properties as per paint manufacturers label instruction. You must use a paint with a LRV (light reflectance value) of greater than 45%. A Matt finish or Low Sheen is recommended rather than gloss finish.

Total Garrison paint film build should exceed 130 microns of dry film build (the paint supplier can check this onsite).

Top coats can be applied using a brush, roller or spray units. Spray may be either conventional or airless sprays. Ensure full coverage to specified film build is achieved. Ensure that the final coating is evenly applied on all surfaces of the boards.

Wet brushes with water prior to use to avoid clogging. However, ensure that the minimum paint film build is being achieved. In the hotter summer months it is recommended to undertake painting on the shaded side of the house and not in direct sunshine.

Where the top coat is being applied with a roller use a roller with a medium nap. Finish with light parallel strokes with a brush.

Dark colours absorb heat from the sun and increase the risk of dimensional change to the boards and substrate degradation. To comply with the Claymark warranty conditions, select colours in a range of 45% light reflective value (LRV) or greater.

Do not use sealants or glues between the boards, particularly in the horizontal laps, as this may inhibit natural seasonal board movement

- Claymark recommends the use of Dulux Weathershield X10 for top coating.

Maintenance



Timber weatherboards should be cleaned on a regular basis and at least once a year. Houses situated in a sea spray zone should be checked and could require washing two to three times a year. Particular attention should be paid to soffits and overhangs. Allowing mould, fungi and marine salts to build up by not washing could have a detrimental effect on both the paint and the timber substrate.

When maintenance is required, use a premium primer and premium undercoats followed by the topcoat using the same paint as originally used. If small paint or substrate defects appear these should be repaired early to prevent further unnecessary degradation to the substrate.

As timber weatherboards are a natural product you could experience some movement, if this occurs you should make good the affected areas by priming and then re-applying with the original topcoat. Timber weatherboards are designed to accommodate moisture, thermal and seismic movement in the board laps.

DO NOT use SEALANTS or GLUES between the boards, particularly in the horizontal lap, as this may inhibit the natural expansion and contraction of the cladding. The movement of a building and timber substrates will reduce overtime and settle at a normal equilibrium.

Different sides of the house could face different characteristics, with north facing sides requiring more maintenance. Refer to the paint manufacturer for time frames for repainting of timber weatherboards.

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Figure 1.01 Cavity fixed – base of wall – concrete floor

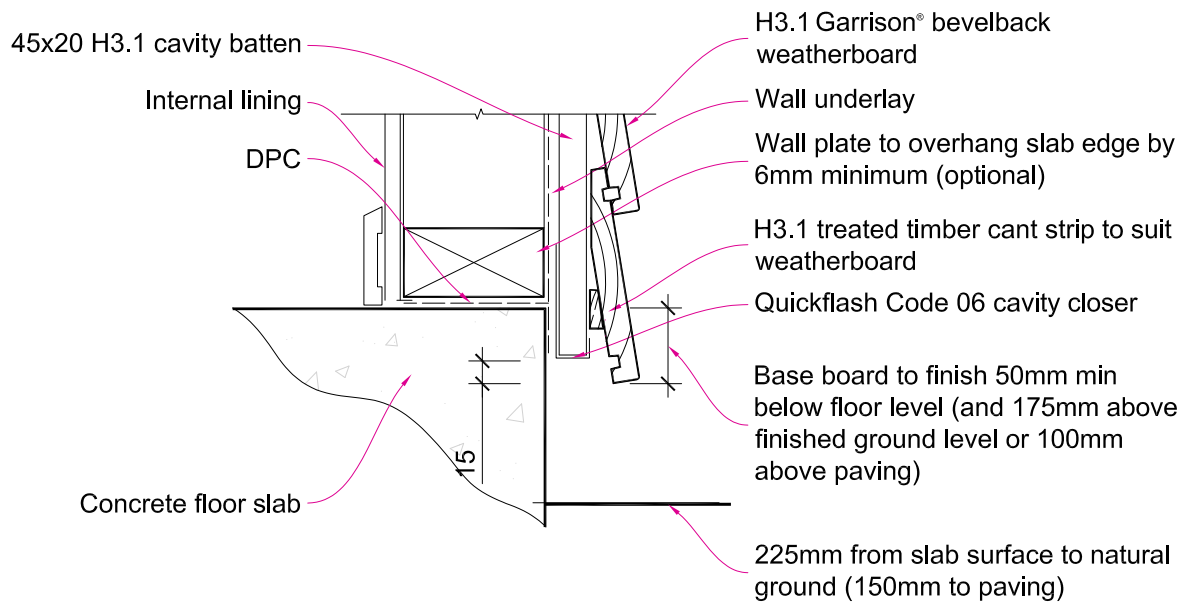


Figure 1.02 Cavity fixed – base of wall – timber floor

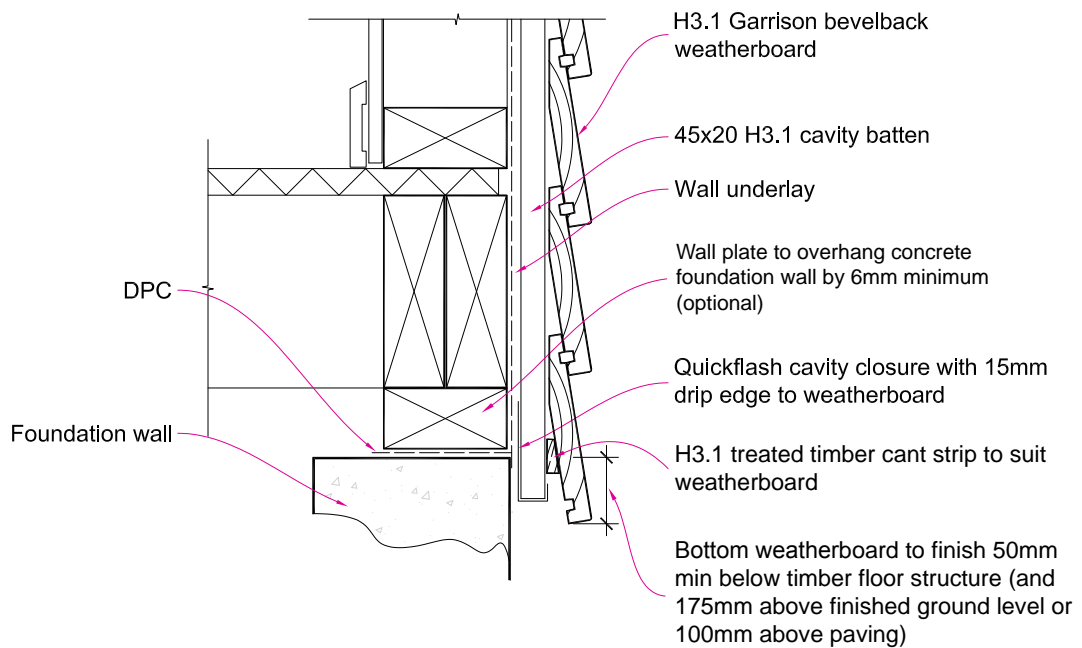


Figure 1.03 Cavity fixed – eaves – angled soffit

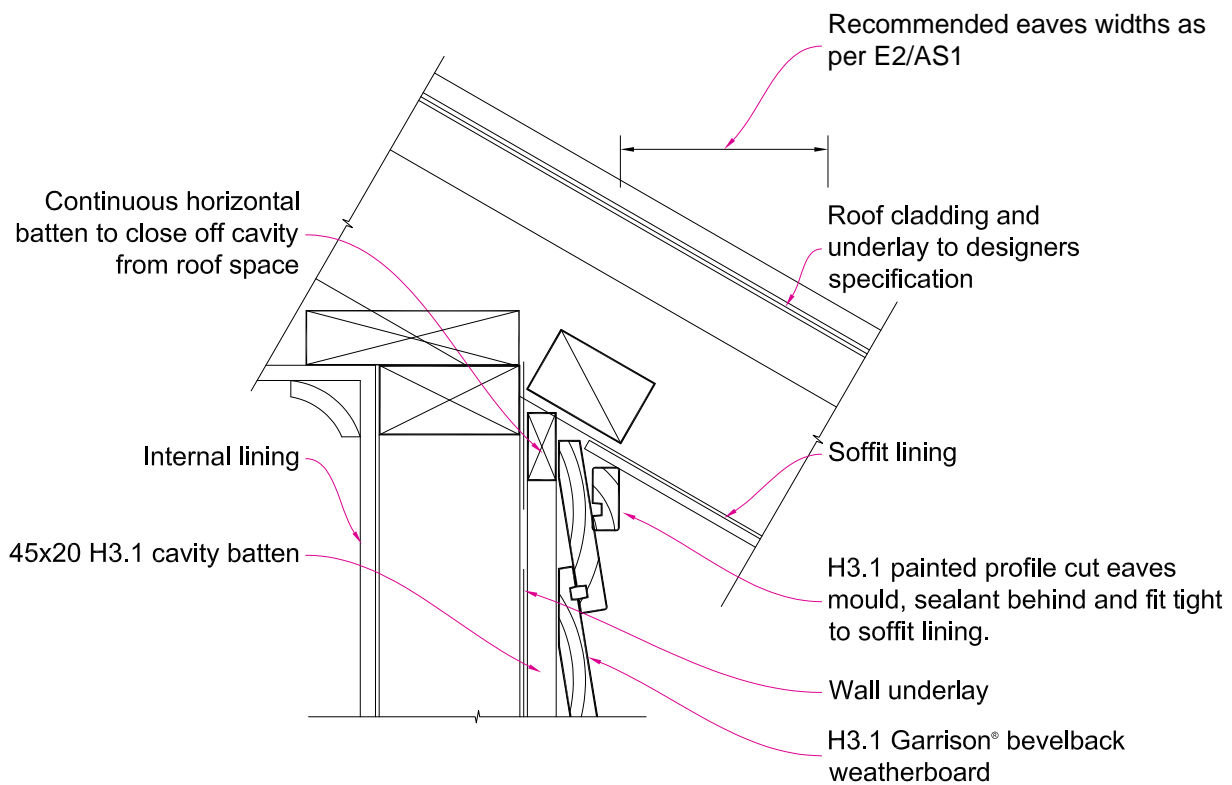


Figure 1.04 Cavity fixed – eaves – flat soffit

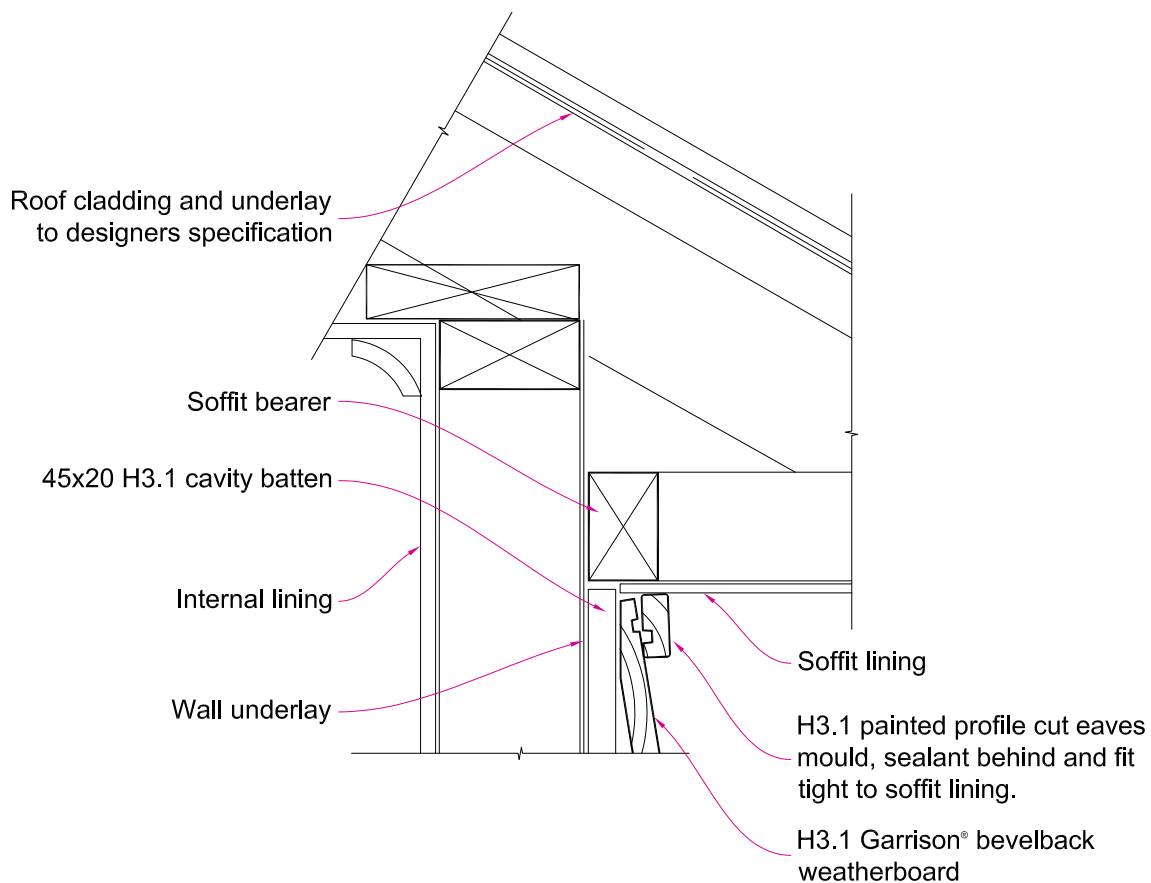


Figure 1.05 Cavity fixed – eaves – reverse raked soffit

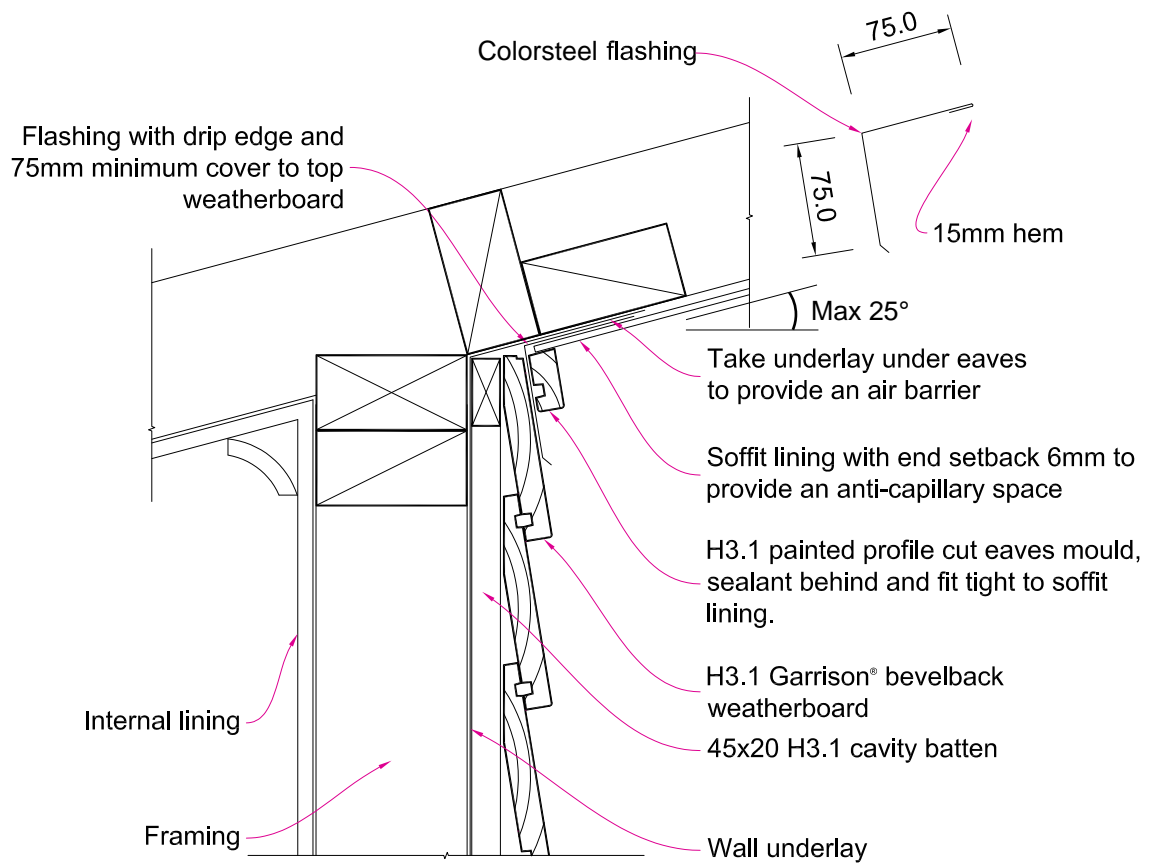


Figure 1.06 Cavity fixed – external corner – mitred

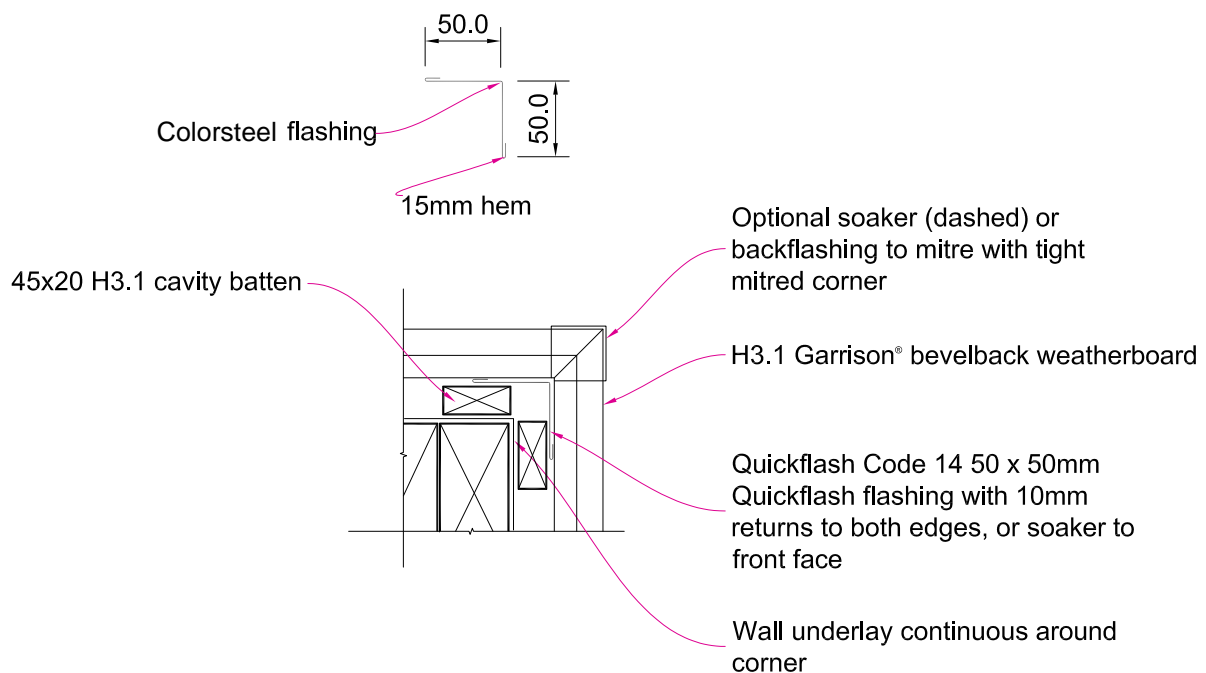


Figure 1.07 Cavity fixed – external corner – prefabricated box

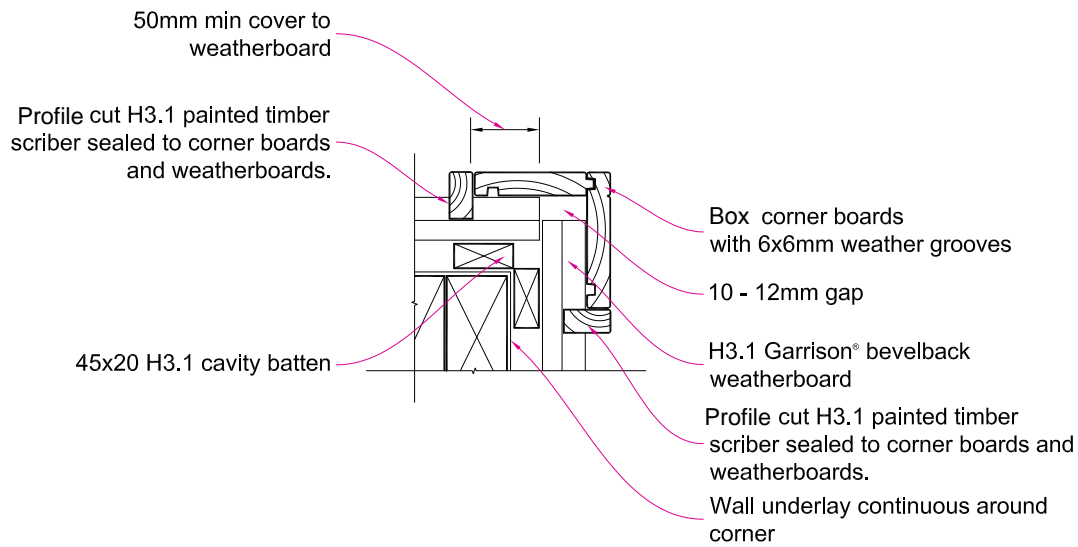


Figure 1.08 Internal corner – scribed

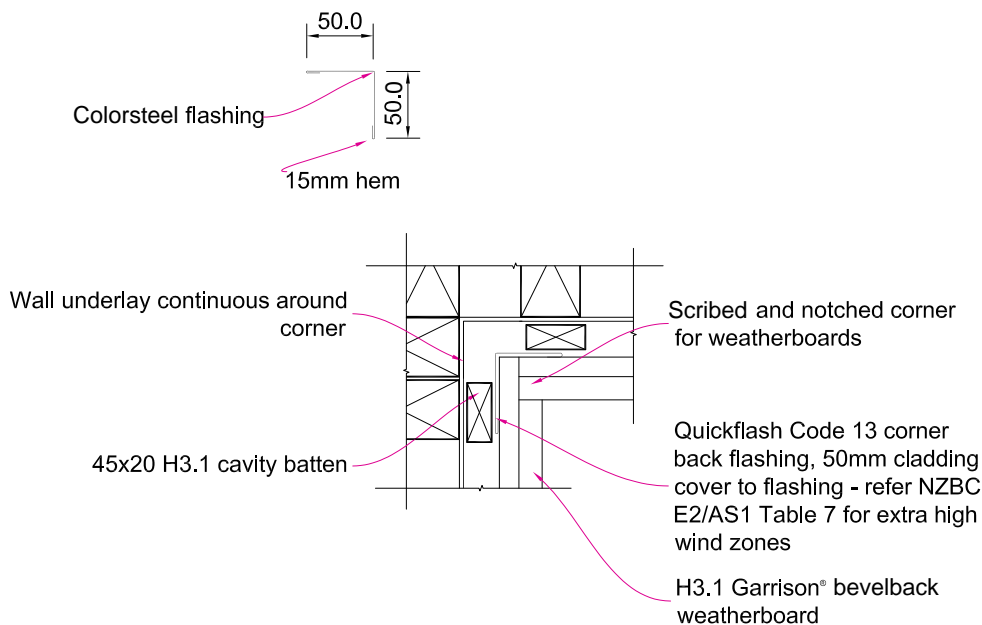


Figure 1.09 Cavity fixed - aluminium window - head

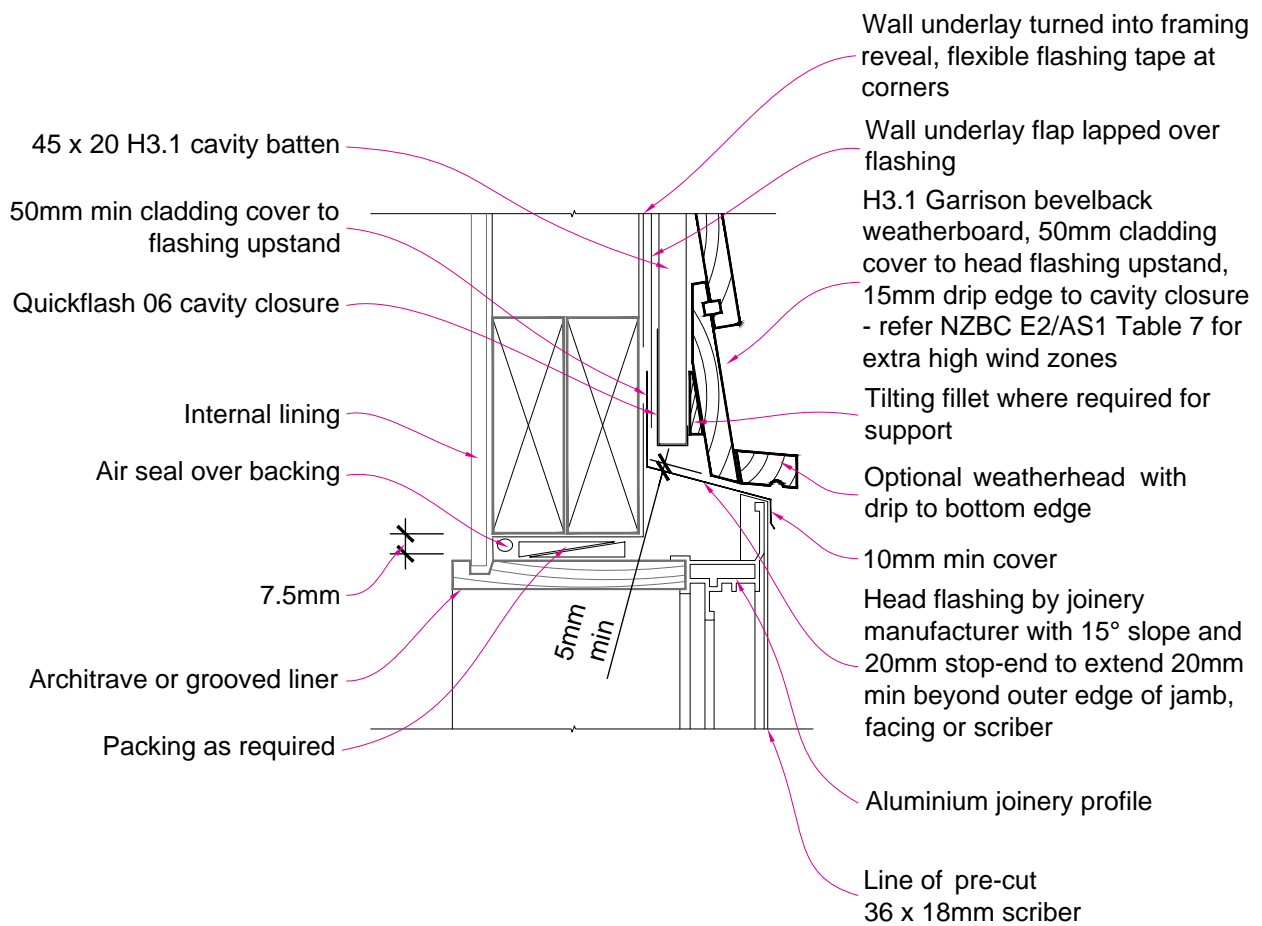


Figure 1.10 Cavity fixed – aluminium window – sill

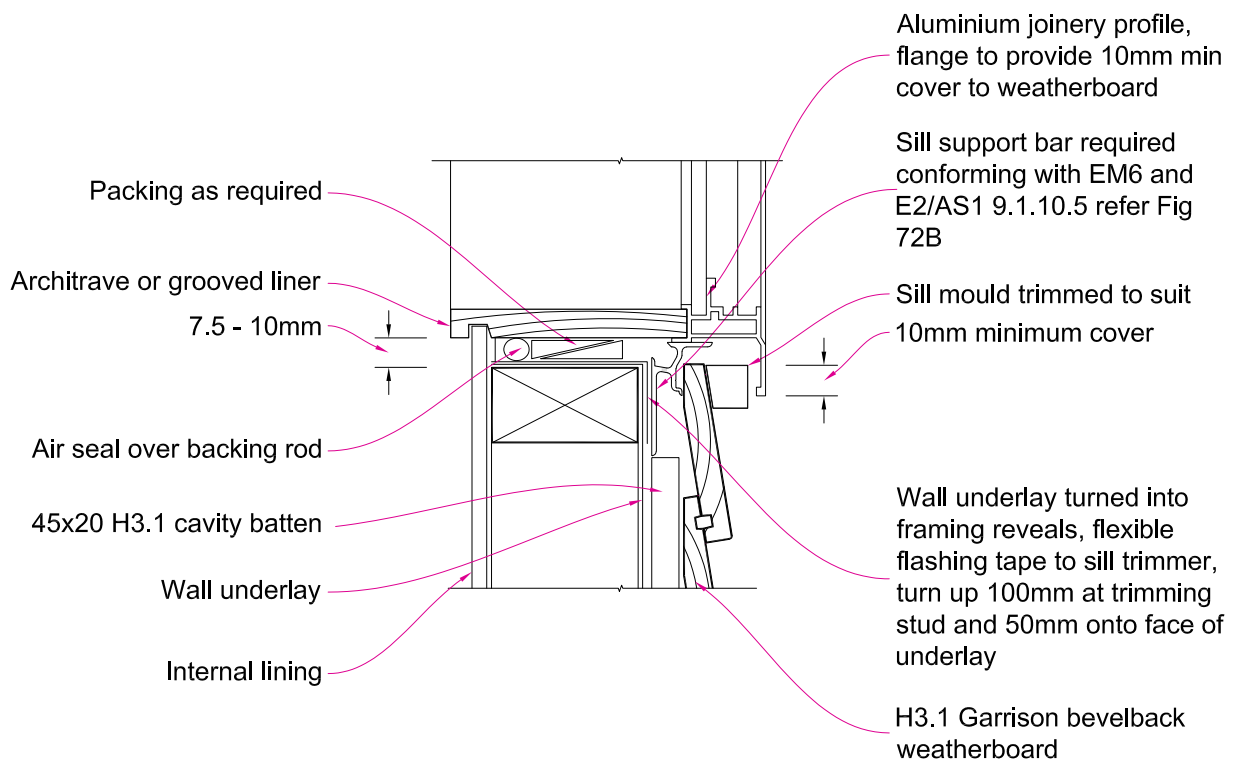


Figure 1.11 Cavity fixed – aluminium window – jamb

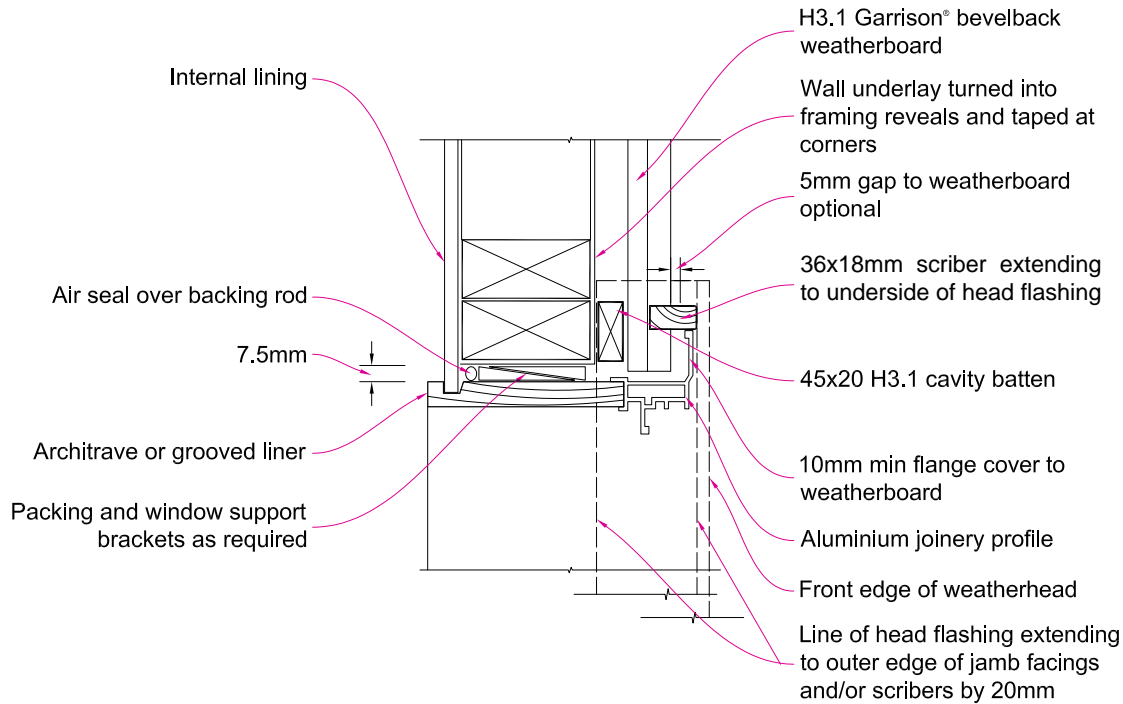


Figure 1.12 Cavity fixed – meter box

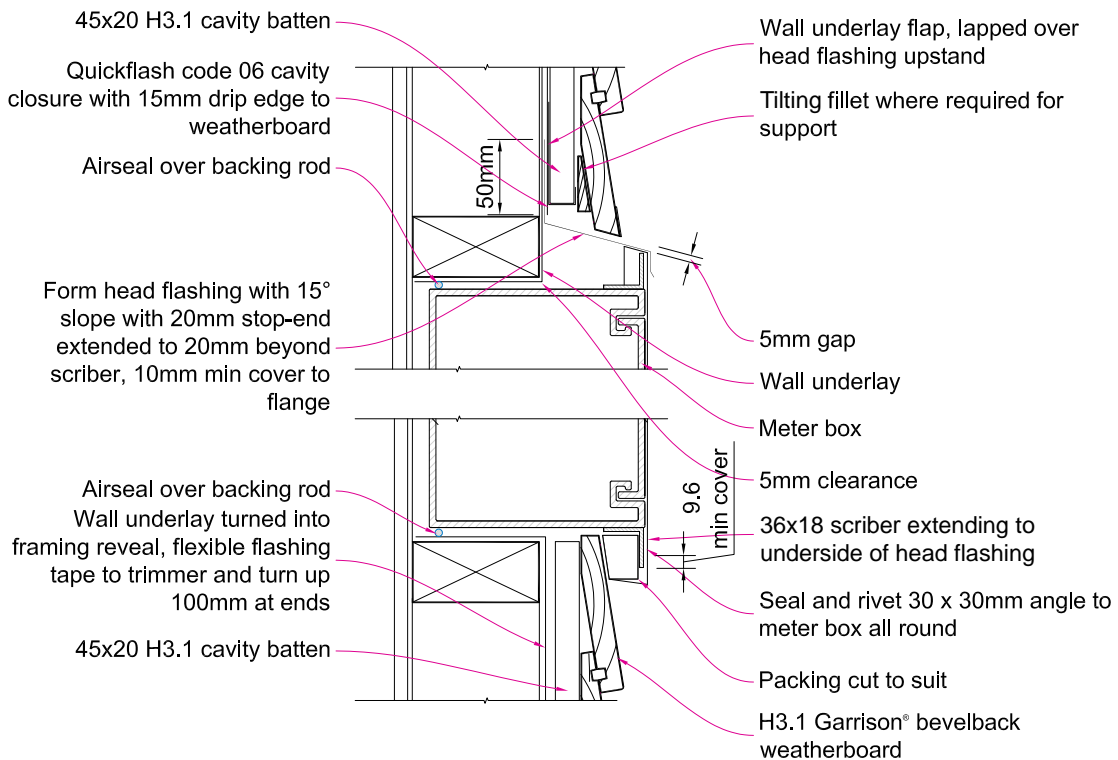


Figure 1.13 Cavity fixed – pipe penetration

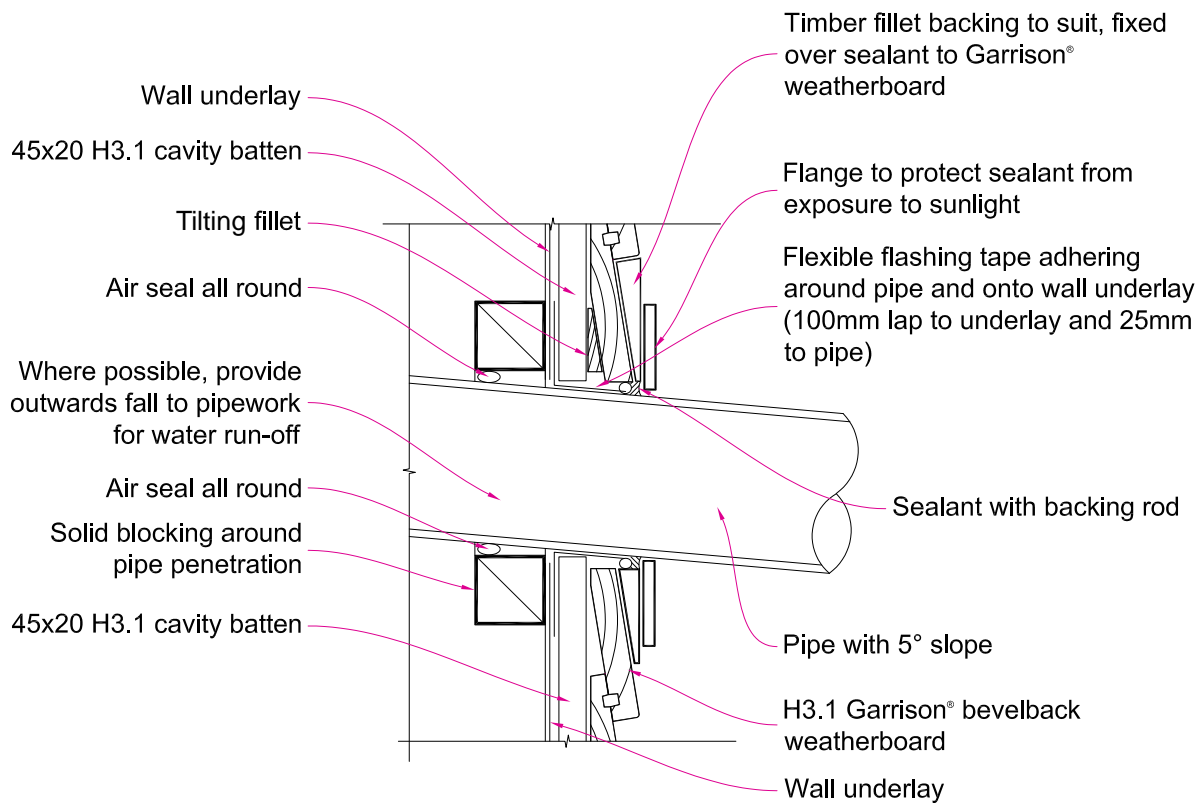


Figure 1.14 Cavity fixed – nailing

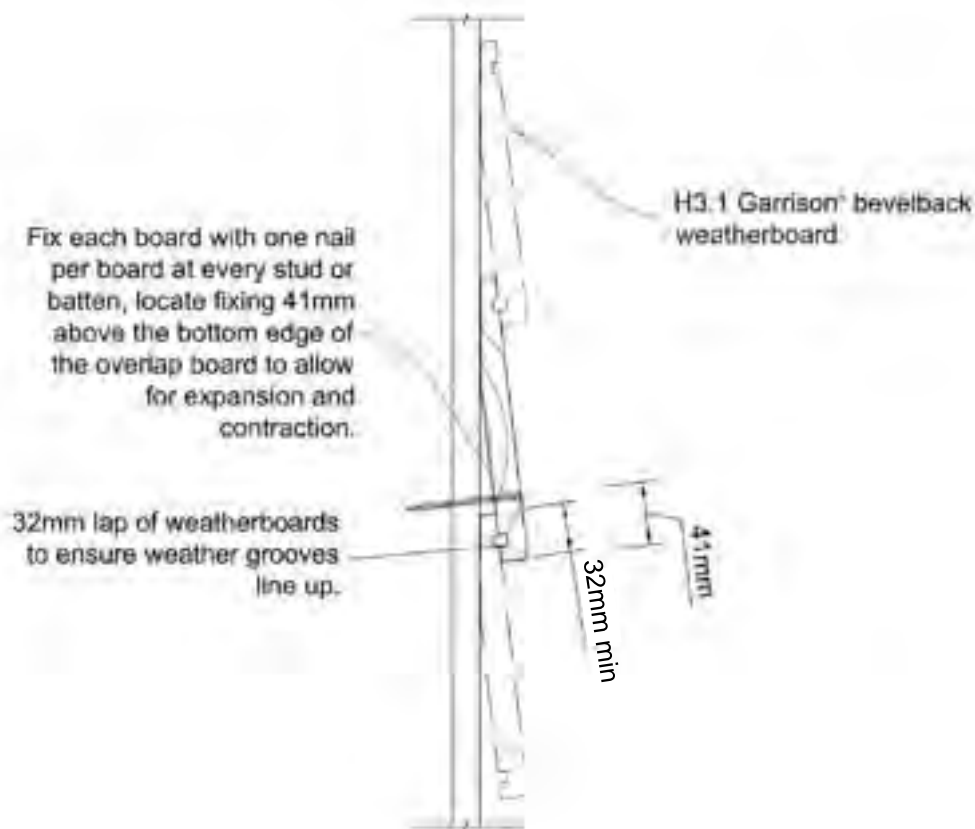


Figure 1.15 Cavity fixed – garage door jamb – head

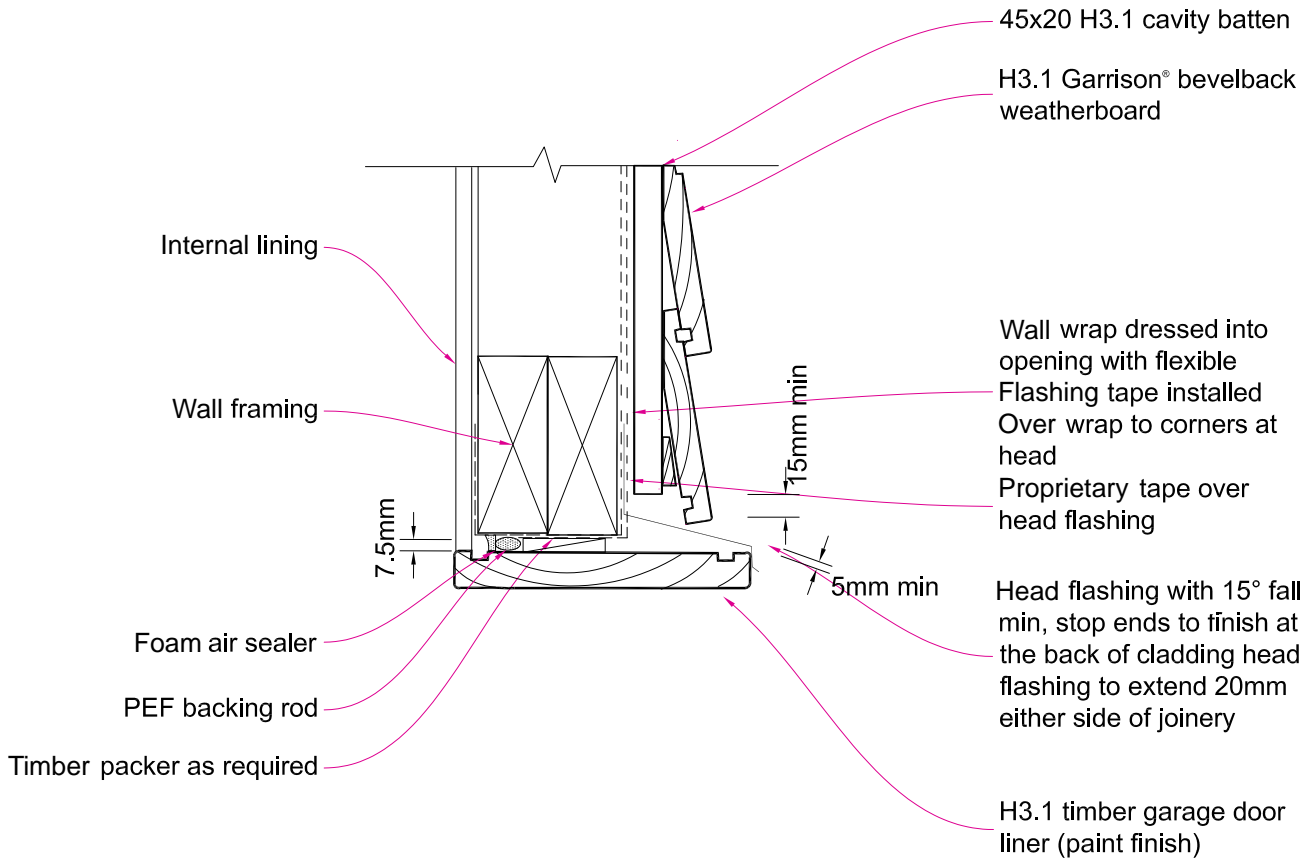


Figure 1.16 Cavity fixed – garage door jamb

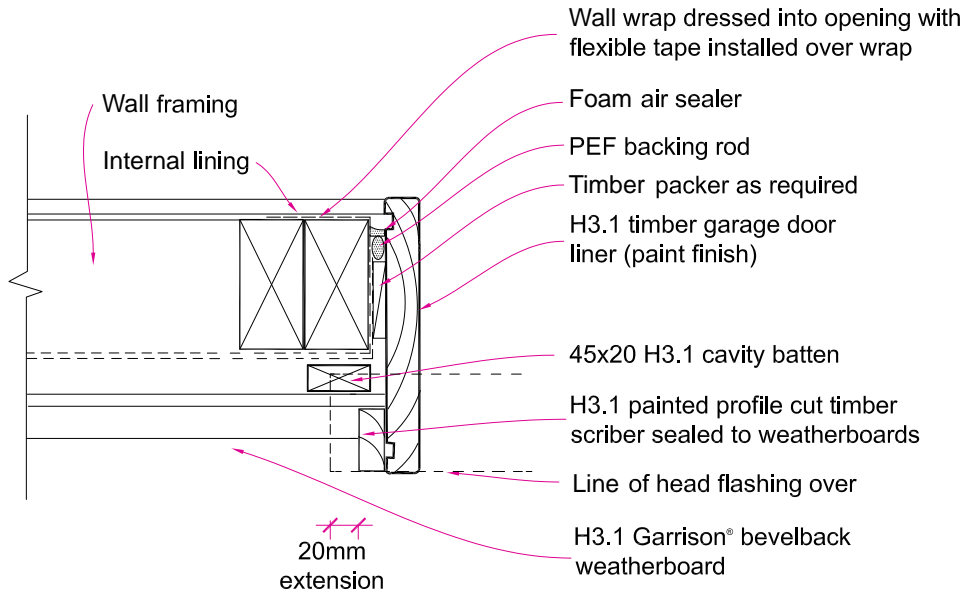
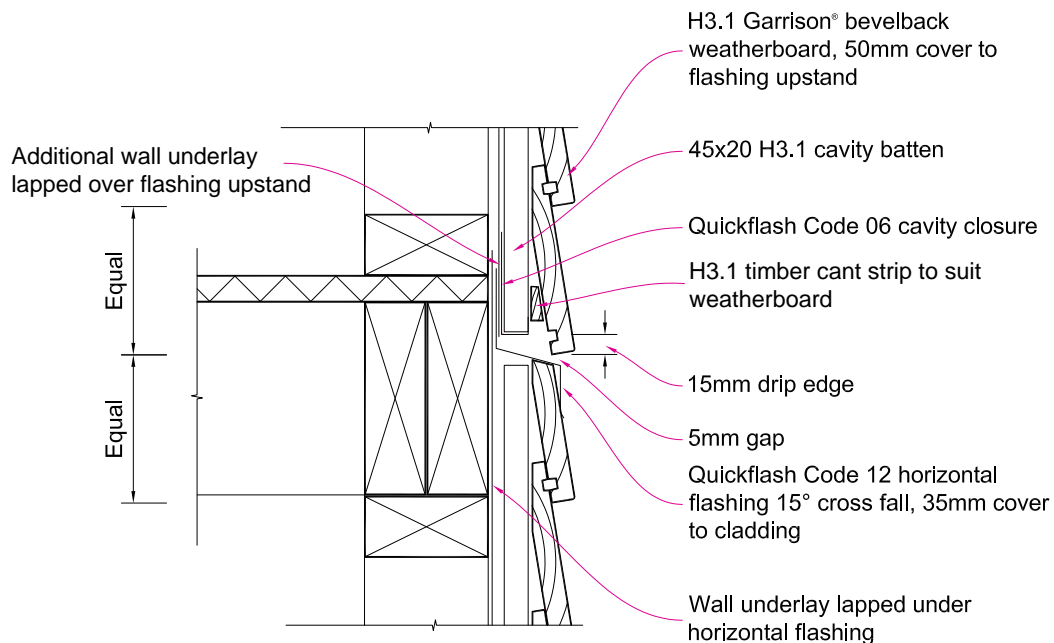


Figure 1.17 Cavity fixed – horizontal cavity joint



Note: Horizontal drained joints must be provided to limit cavities to 2-storeys or maximum 7m in height in accordance with NZBC Acceptable Solution E2/AS1 paragraph 9.1.9.4(b)

Figure 1.18 Cavity fixed – internal corner – masonry veneer

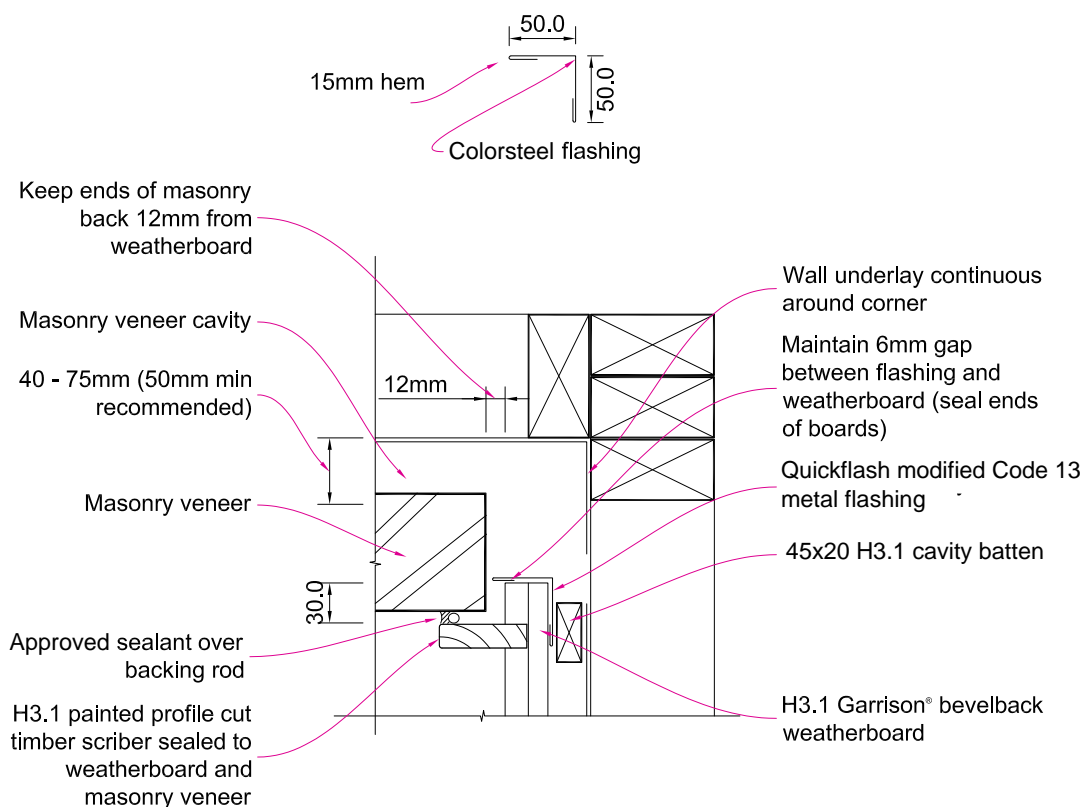


Figure 1.19 Cavity fixed – acc panel – internal corner – junction

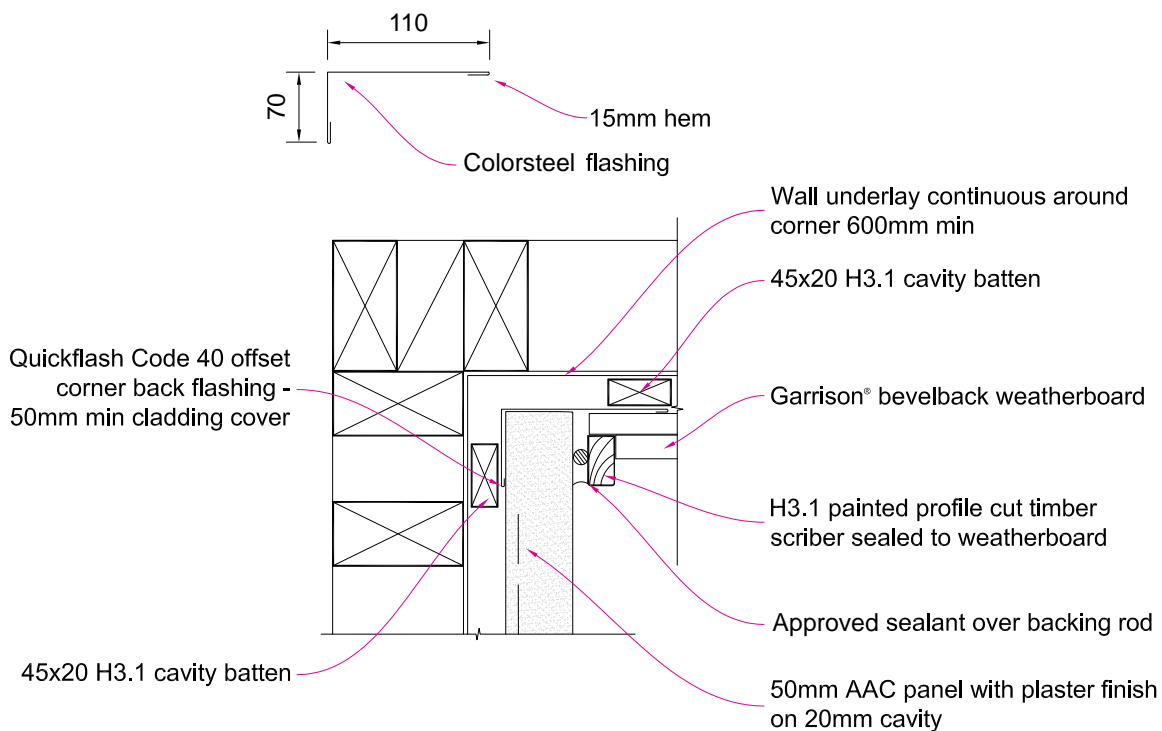


Figure 1.20 Cavity fixed – plywood – internal corner – junction

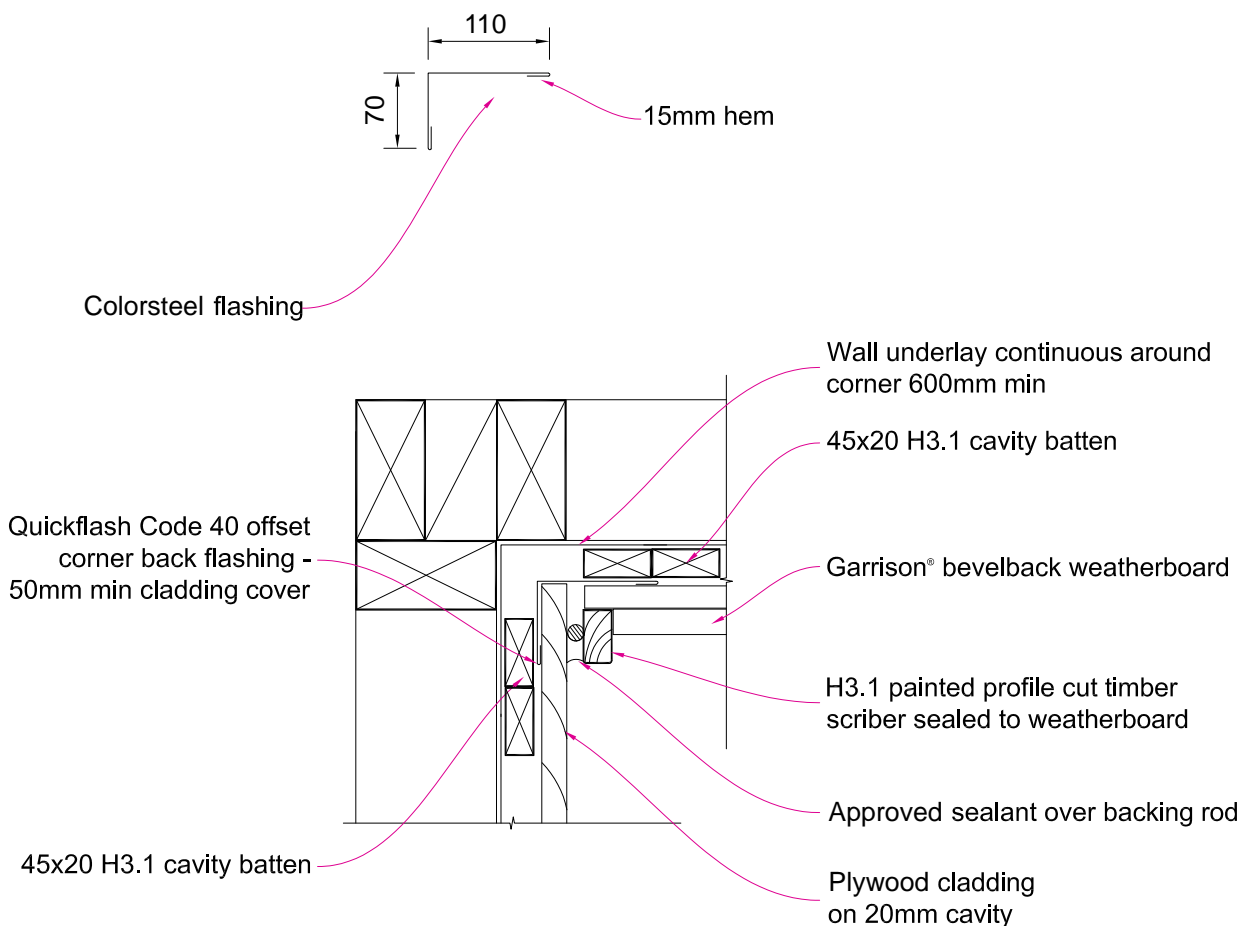
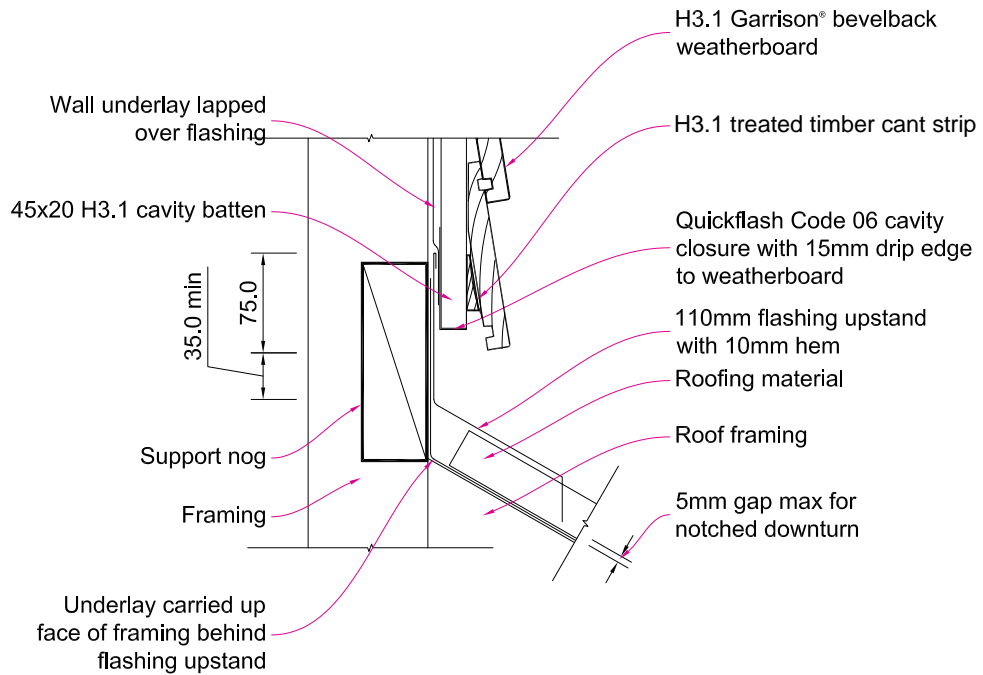
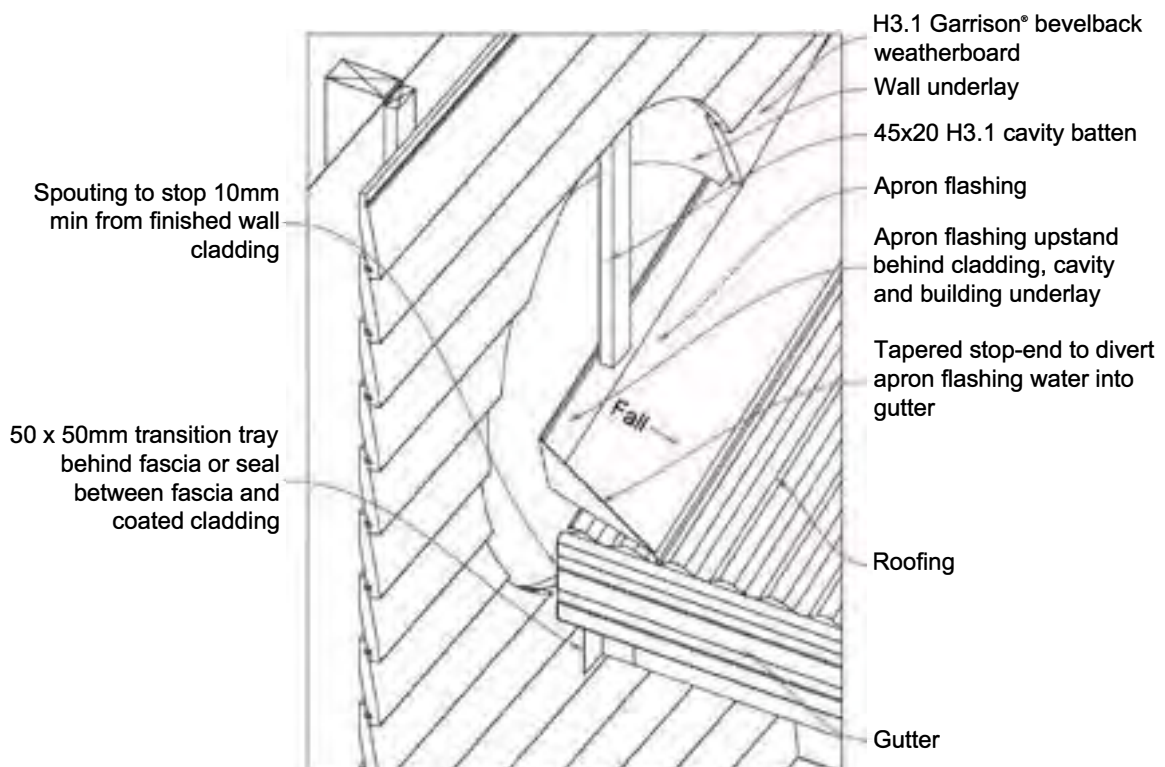


Figure 1.21 Cavity fixed – apron flashing



Note: Refer to NZBC Acceptable Solution E2/AS1 Table 7 for apron flashing cover over roofing

Figure 1.22 Cavity fixed – apron flashing – stop end



Note: Refer to NZBC Acceptable Solution E2/AS1 Table 7 for apron flashing cover over roofing

— Warranty

Conditions of Warranty:

To validate the warranty all procedures and instructions must be strictly followed. All fixers of the product must be a licensed building practitioner.

Limited Warranty – Paint Pre-Finished Board Limited Warranty Two Years

Garrison is supplied with one coat of new generation sealer and two machine applied acrylic undercoats. Claymark offers a Limited Warranty for a period of two years from the date of installation or exposure of the board. This Limited Warranty applies when Garrison is finished with two coats of premium Acrylic topcoat within 90 days from installation. If for any reason any remedial work is required under this warranty which does require repainting certain areas, the customer must acknowledge and accept that there may be slight variations from the new paint being applied. Film Erosion: The paint film resists erosion leading to substrate exposure. Moisture: Provides protection to the substrate from external moisture. Mildew: The film provides mildew resistance.

Limited Warranty 15 Year Limited Warranty Against Insects and Decay

Garrison products are proudly backed by a limited 15 Year warranty against any fungal decay/rot and insect attack (termites). Where any Garrison product, installed in compliance with manufacturer's recommendations, becomes structurally unserviceable within 15 years of purchase, due to fungal decay/rot and insect attack (termites), replacement material will be provided by the manufacturer. This warranty is subject to terms and conditions in the handling guide, including adherence to building codes and standards. For any claim to be activated, Claymark must receive written notification within 30 days of the defect becoming apparent. For best performance and results, you must follow all of the recommendations as set out in the Garrison Handling Guide.



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J003836 12/06/2022 JUNE V-6.0



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Hamish Wells

Civil Engineer

MIPENZ CPEng 186323

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P O Box 188, Otaki 5542

Hamish Wells - 0274 459 757
James Winer - 0274 549 009
Steve Bright - 022 037 6315

Email: Engem@otm.co.nz

21st September 2016

For: Waikanae North
C/o Landmatters
20 Addington Road
Otaki

Attention: bryce@landmattersnz.com & sam@landmattersnz.com

Re: proposed Waikanae North subdivision of 177 new residential lots off Waipunahau Road Waikanae

This report is an over view of the servicing and development requirements for the subdivision as shown on the attached plans:

1) **General site conditions:**

- a) **Topography and soil types:** (refer to plans 1 & 4) the site is dominated by stable Aeolian formed sand dunes up to 20m high above the surrounding land form, interdunal flats and hollows contain peats and silts over relatively dense underlying sands silts and gravels. The depth of peat varies up to 3m depending on location. Shallow dunes run through the peat areas and site soil conditions can vary significantly over short distances. The low areas are the remains of ancient peat swamps formed in the interdunal hollows and subsequently drained to form the farmland as seen on the site today. The field observations made for this report confirm those made by Beca Consultants for their plan change report of August 2006 and Tonkin and Taylors report for the MOE dated May 2010.
- b) **Existing drainage:** (refer to plan 3) to enable the land to be farmed effectively the low areas of the land have been extensively modified with a series of open cut drains and realignments of existing streams. The eastern part of the site is drained to its northern boundary. Along that northern boundary is a more significant drain, fed also by farm land to the north east. This drain runs north west, crosses the north west corner of the property, turns south west and discharges into what appears to be the original natural drainage path for the area. This has been referred to as the Kakariki stream.
- c) **Existing catchment:** the catchment for the area extends beyond the site to the north east to, and possibly beyond Greenhill Road, east to the top of the Hemi Matenga reserve, and south to Martin Street west of the highway and Utauta Street east of the highway. Interconnections also appear to exist with adjacent catchments, which are likely to allow overflow from one catchment to another.
- d) **Inundation of the site:** (refer to plan 2) councils current data indicates the majority of the flat land on the site provides storage or is ponding for flood waters

in the Q100 event. For the development to proceed as proposed, appropriate mitigation measures are required to maintain that ponding capability and not compromise the existing drainage network running through the site, as the main stream channels are active stream corridors.

Extensive investigative work done by in part by myself and in the majority by AWA Environmental Limited (refer AWA report) has shown that appropriate mitigation methods can be incorporated into the earthworks design to ensure the current ponding and flow characteristics and storm water control capabilities of the site are maintained or enhanced.

2) **Site testing**

a) **Site testing**; has been limited to exploratory test pits dug by hydraulic excavator and shallow scale and hand probes, and hand auger bores.

b) **Site soil conditions are**: as per 1 b) above

3) **NZS 3604:2011 Section 3 Site requirements** part 3.3, Test Method for soil bearing capacity, part 3.3.7 Ultimate Bearing Capacity defines good ground as having 300kpa = Ultimate Bearing Capacity (UBC);

CL 3.3.7.1

The soil below the underside of the foundations shall be assumed to have an ultimate bearing capacity of not less than 300 kpa when:

- a) none of the following is encountered below the depth of the footing at any test site:
 - (i) organic topsoil
 - (ii) soft or very soft peat
 - (iii) soft or very soft clay
 - (iv) fill material, except where a certificate of suitability has been issued under NZS 4431
- b) Scaia penetrometer tests conducted in accordance with 3.3.2(a), where the number of blows per 100mm depth of penetration below the underside of the proposed footing at each test site exceeds:
 - (i) Five down to a depth equal to twice the width of the widest footing
 - (ii) Three at greater depths; and
 - (iii) Providing the set blow is relatively uniform, the number of blows per 100mm may be obtained by averaging the number of blows for depths not exceeding 300mm; and
- c) Comparisons of the results at all test sites show that soil conditions are closely similar at each test site;

Based on a standard slab on ground foundation width of 240mm for a masonry veneer clad dwelling (either 1 or 2 storey) from Figure 7.15 NZS 3604:2011 section 7 Floors - Masonry veneer foundation edge details - in situ concrete and a

minimum in ground embedment of 300mm for the concrete foundation, the minimum requirements in terms of scale blows/100mm penetration are:

Existing ground level to -300mm	not applicable to the foundation but relevant to the slab see section 7.5. re granular base for slabs, minimum 5 blows/100mm penetration in the granular fill recommended
-300mm to -800mm below existing ground level	5 blows/100mm
-800mm + depth	3 blows /100mm

4) **Analysis of the preliminary soil investigations in terms of NZS 3604:2011 section 3.**

- Without any earthworks being carried out on the site as it is, virtually any location on it would likely require specific foundation design due to either soft sands or peats.
- The site post earthworks as currently proposed would yield almost all proposed building sites capable of utilizing standard foundations in accordance with NZS 3604:2011.

5) **General and services comments**

- Annual rainfall:** Approx 1000 mm/annum
- Exposure:** all sites are exposed in terms of NZS 3604:2011
- Currently available water supply:** supply is available at the end of Waipunahau Road via a newly constructed 150d supply main, this is "ringed" back via a 100mm line to Pohe and Metapere Streets. In addition, there is a consent notice on the parent title (DP 478686 & RM 100229) which states in item 4

- With respect to Lots 4, 8, 9, 15, 16 & 17: A water supply model for the concept plan of the Waikanae North Development has been prepared by MWH New Zealand Limited and a report prepared which was entitled "Waikanae North Water Modelling – Final Report" dated 30 May, 2012. This report verifies that mitigation measures are required on the existing reticulation to meet the requirements of the proposed complete development. The model concludes that an upgrade is required as a result of the demand imposed by the development, but that before the upgrade is required, the proposed retirement village, school and up to 318 residential units (or any development form of the same demand) can be developed within the Waikanae North Development Zone water catchment. The demand has been assessed as being able to be met up to this limit before an upgrade to the Hemi Street water main is required.

Where the model clearly indicates that the upgrade is required as a direct result of the demand imposed by the development in excess of the above limit, the cost of any upgrade to existing services shall be met by the consent holder for the development which creates that demand.

If any of the design parameters change as the staged development proceeds, the Water Model may need to be recalibrated to reflect these changes.

For the area referred to, there are currently 83 lots developed in Mahia Lane, Parata Street & Waipunahau Road, with another 60 proposed off Waipunahau Road (although the status of the consent for those proposed lots is unknown). Therefore $318 - 83 = 235$ residential "units" available. This application is for 177 residential units, and water supply is therefore available without any upgrades to the existing network. It should be noted that the above consent notice is based on MWH's Waikanae North Water Modeling Report Rev 1 30/05/2012 Final report. All water reticulation for the proposed development will be typical NZS 4404 standard.

- d) **Sewerage reticulation:** is available at multiple locations along the entire southern boundary and council have indicated that there are no capacity issues with this line. The development will require network extensions at the end of Waipunahau Road (existing SS 300mm diameter invert 13.20m) and at MH KWWN004489 in the north west corner of 29 Manu Grove (existing SS 450 diameter MH invert 6.45m). The sewer extension off Waipunahau Road is straight forward, the extension off the Manu Grove MH will have to cross under the Kakariki Stream to service the site. This would be best achieved with the pipe being thrust bored under the stream from the south to minimize any adverse effects on the waterway and covenanted areas on the site. Sewer reticulation within the development will be typical NZS 4404 construction.
- e) **Storm water management for the proposed earthworks:** (refer plans 3 & 4) The site is drained by the Kakariki Stream and an unnamed drain on the northern boundary. The effective development of the site requires earthworks that will reduce the existing flood storage volumes on the site by 20,000m³. A detention structure already exists on the Kakariki Stream within the site, this was consented in 2011 and built shortly thereafter. It comprises an area of around 20,000m², bunded off in two locations with 450 diameter culverts draining the detention area back to the Kakariki Stream and the farm drainage system to the north. It has a current capacity of around 20,000m³.

In order to fully mitigate any adverse effects from the earthworks proposed on storage, the existing detention structure requires an effective increase in available storage volume of an equivalent amount. The initial design approach was to raise the existing spillway and bund to provide the appropriate additional detention volume, with no other change to the existing system.

To verify that approach, AWA Environmental Ltd carried out a detailed analysis of this concept and have determined that when raising the available detention capacity is combined with implementation of the original stormwater "Masterplan" for Waikanae North (refer Pond 1 Zone # page 13 AWA report), creating the larger volume of detention, was indeed effective in mitigating any adverse effects from the proposed earthworks in terms of loss of flood storage volume (refer to AWA Environmental Ltd report 15, September 2016).

The proposed final design will lift the existing overflow spillway on the Kakariki Stream from RL 9.2m to RL 10.25m, and lift the existing detention bund height from RL 10.5m to RL 11.0. The existing 450 diameter culvert through the bund, which carries the normal flow of the Kakariki Stream will remain unaltered. The

northern bund and associated 450 culvert will be relocated to a new position and a new more natural channel formed to replace the drain.

Effectively the only change to the detention area will be to provide more storage and construct part of "Pond 1" in Zone 3.

- f) **Stormwater management for each site:** a hydrologically neutral site development solution will be required for each residential lot when it is built on. The receiving ground on the new sites will be porous sand and the typical techniques currently used across the district on new builds, such as effective ground soakage and on site detention combined with porous paving where appropriate, will ensure that increased runoff from site development will be managed on site. Typical sizing for ground soakage devices are indicated in paragraph 6 below.
- g) **Stormwater management for the new roads:** (refer sheets 5, 6 & 8) The new roads will conform to traditional cross section and form, with one significant difference, the stormwater reticulation within the road reserve will be a continuous ground soakage trench sized to take all surface water collected within the road reserve area to ground under the road. This design has proven particularly effective at Miro Street and Riverbank Road Otaki on gravels and Kelsi Street and Atrill Place in Wanganui on medium to low porosity sands. Variations of the basic design function effectively at other developments in Waikanae and at the large Waitarere Rise subdivision at Waitarere Beach. The same methods have also been successfully applied on pumice soils in Taupo and the Turangi area. The basic principle of operation is well proven and complies with KCDC design requirements.
- h) **Seasonal ground water variation** is not significant on the site as it is relatively well drained by the existing drains and streams.
- 6) **Preliminary soil percolation values for on site disposal to ground**

Test depth		0 - 100mm
Soil category	sands	Clr 2 / 3
Soil infiltration value for design (Si) (ie field test value/4)		1 - 3 ltr/m ² /min

Note: the Si value above is an indicative averaged value from observations on the site and comparison with equivalent soils post earthworks in the immediate area.

Calculations based on 300m² of house and paved area using an Si value of 1.4l/m²/min indicate a soakage trench system of 19m length x 1.2m wide x 1.2m effective depth and backfilled with rail ballast or clean no fines river run is suitable for the soil type on the site and the predicted range of 100 year storm events.

If rainwater "crates" such as Rainsmart modular tanks are used, the higher void ratio allows for a more compact install of 11m long by the same dimensions as above.

If on site detention is combined with ground soakage techniques, the required footprint for the soakage system can be potentially reduced further.

It should be noted that any system used to provide total on site disposal of stormwater runoff on a residential site, is site specific for the dwelling, out buildings and hard stand areas proposed for that site. Specific engineering design is required and multiple solutions are available. The systems detailed above are basic, simple proven solutions to on site stormwater management for individual lots.

The same principals are applied to the paved road areas to address increased runoff from the roads. A continuous soakage trench is to be used. This will underlie all the paved roads, the trench as shown on the plans is sized to handle Q100 flows from the road pavement and provide appropriate storage.

The road carriageway geometric design is similar to that used in Waterstone Avenue in Paraparaumu, and is to provide both a pleasing appearance and practical traffic lanes and parking for the development.

The main access road has a carriageway width of 10m and reserve of 18m, and is sized for future extension to the west. Side roads are 15m reserve width with 6m carriageway. Right of ways as per KCDC requirements.

- 7) **Specific environmental, public health and other constraints;** there are none apparent.
- 8) **Earthworks and earthworks management;** in order to construct the building platforms and roads for the 177 new lots proposed the following earthworks will be required.
- a) 99,640m² cut area
 - b) 66,600m² fill area
 - c) Raising the existing spill way and bund
 - d) Relocation of the "northern bund" and culvert
 - e) Reinstatement of all ground cover

The principal issue to be addressed with sites composed of predominantly Aeolian deposited sands is the potential for dust and sand movement by wind, it is after all, the mechanism that put the sand on the site, and if vegetative cover is lost or removed for significant time frames, it will most certainly move it on to other places.

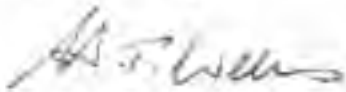
Appendix A of this report is an Earthworks Management Plan, the main thrust of which is prevention of uncontrolled wind generated transportation of the on site soils within and beyond the site.

- 9) **In conclusion;** the site presents two engineering challenges over a standard green field development:
- a) Maintaining the existing flood storage and ponding volumes with no change in effects beyond the site boundaries. This can be addressed by full implementation of the overall developments stormwater "masterplan" and an additional 20,000m³ detention capacity to the existing detention structure.
 - b) Providing hydrological neutrality for both new residential sites and new roading which can be dealt with by appropriate proven application of sound engineering design.

There are thus no insurmountable engineering issues that would prevent the proposed development being approved for construction.

Should you require any further information please contact me directly.

Yours faithfully



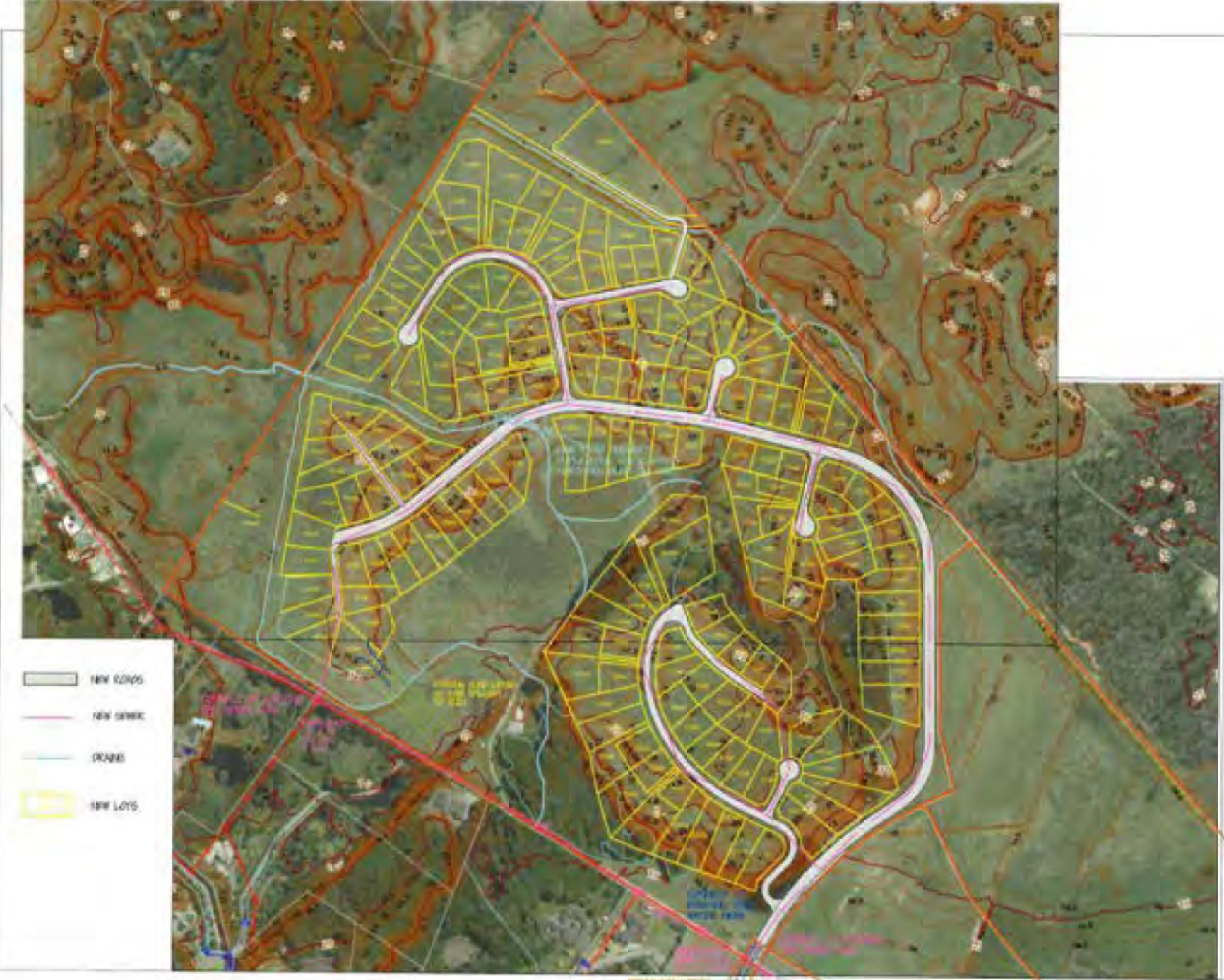
Hamish Wells

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Zealand, postalCode=Hamish Wells
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Hamish Wells

Attached/appended

- 1) Plans 1 – 8
- 2) Appendix A - EMP
- 3) Copy of GWRC "Small Earthworks"
- 4) Bund drawings
- 5) SW trial calculations

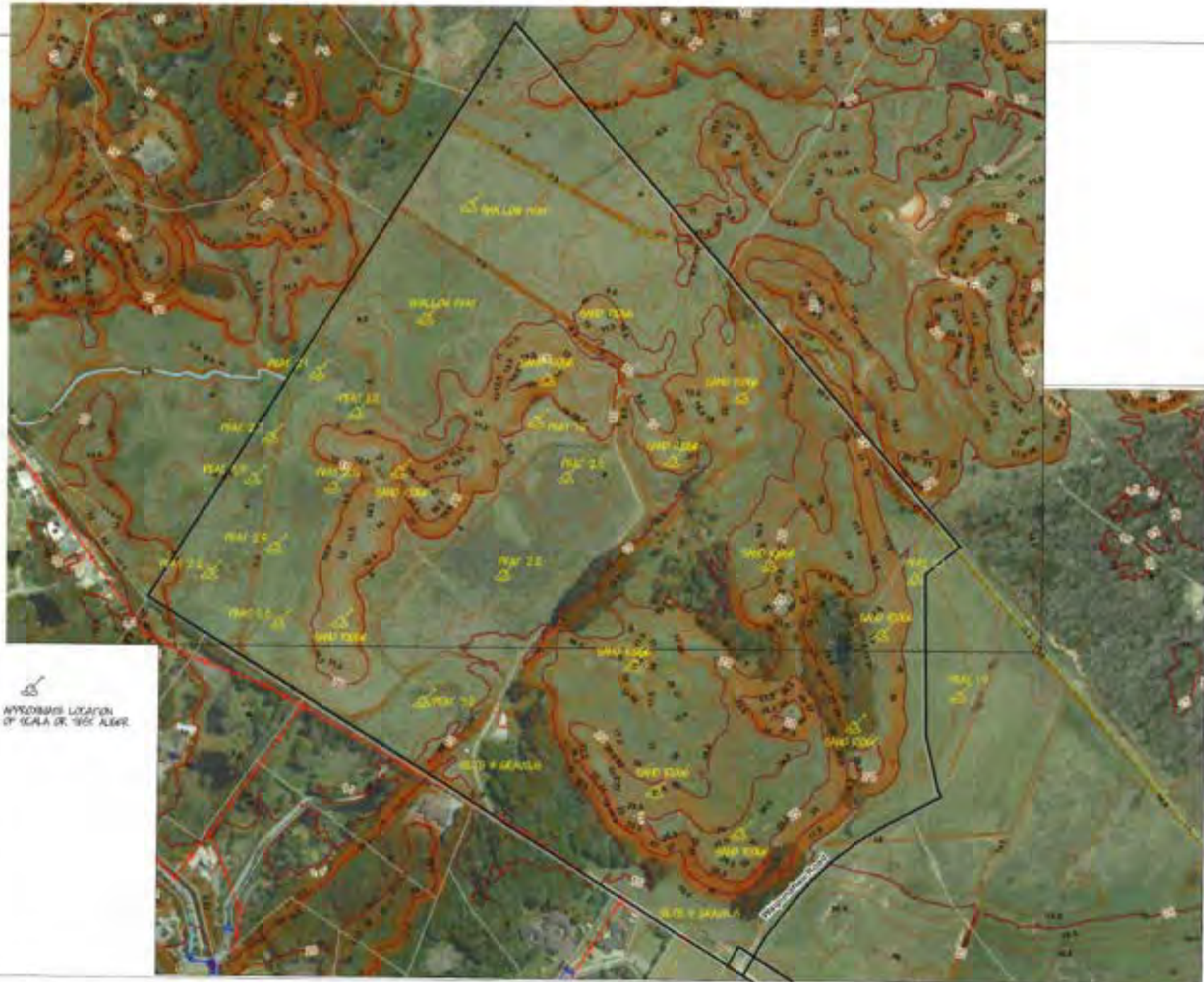


- NEW CONTOUR
- NEW ROAD
- DRAIN
- NEW LOTS

HAMISH WELLS
 CONSULTING CIVIL ENGINEER
 2002 OTTER ROAD
 2002 ALBANY
 0624 408 757
 URBAN GROUP • 06-323 4444

LANDMATTERS
WAIKANAЕ NORTH

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CAD FILE	1:50
COORD. SCALE	
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GENERAL LAYOUT	
SHEET 1 OF 5	

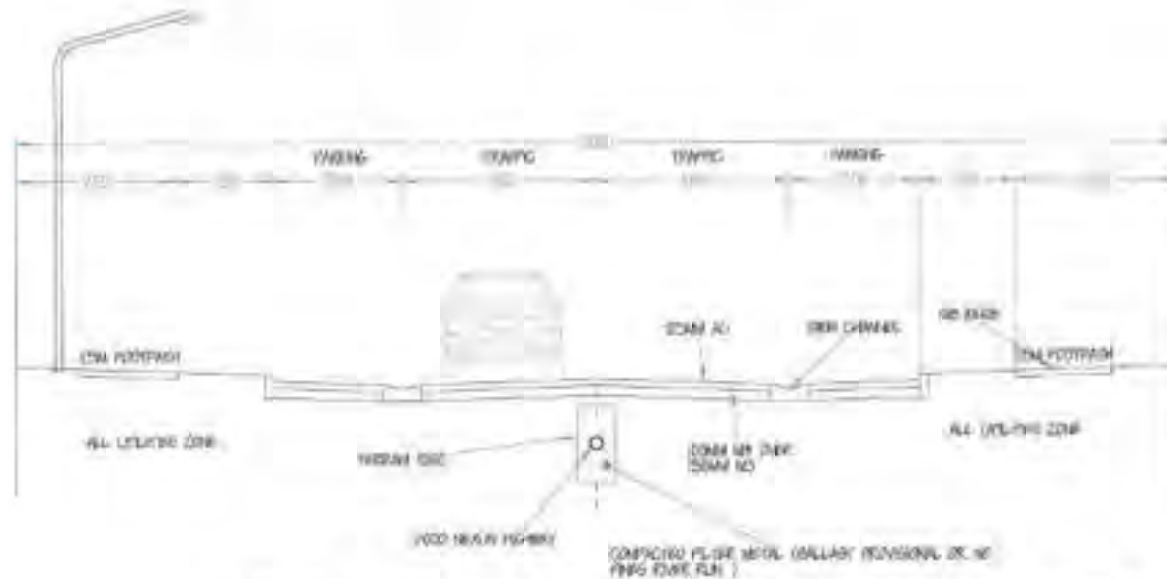


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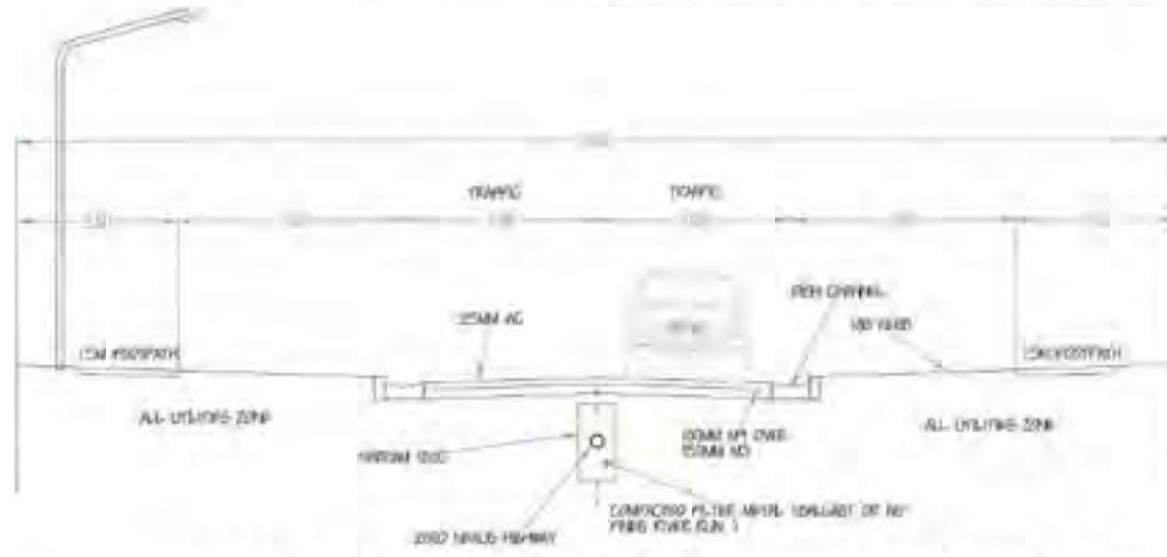
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TYPICAL ROAD CROSS SECTION AT PARKING BAYS 18M ROAD RESERVE



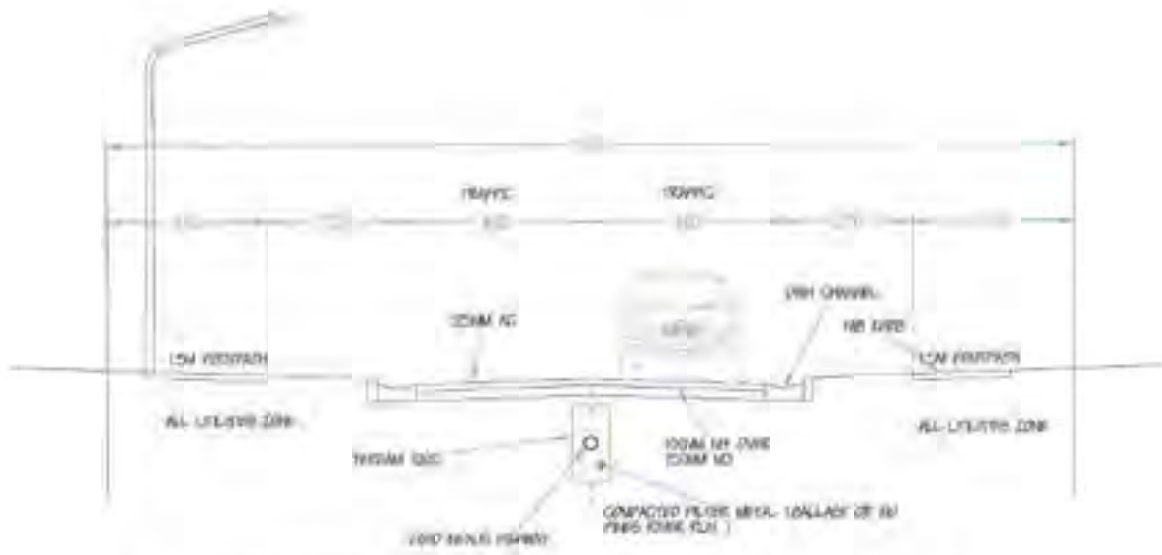
TYPICAL ROAD CROSS SECTION BETWEEN PARKING BAYS 18M ROAD RESERVE

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 2019 002 6004
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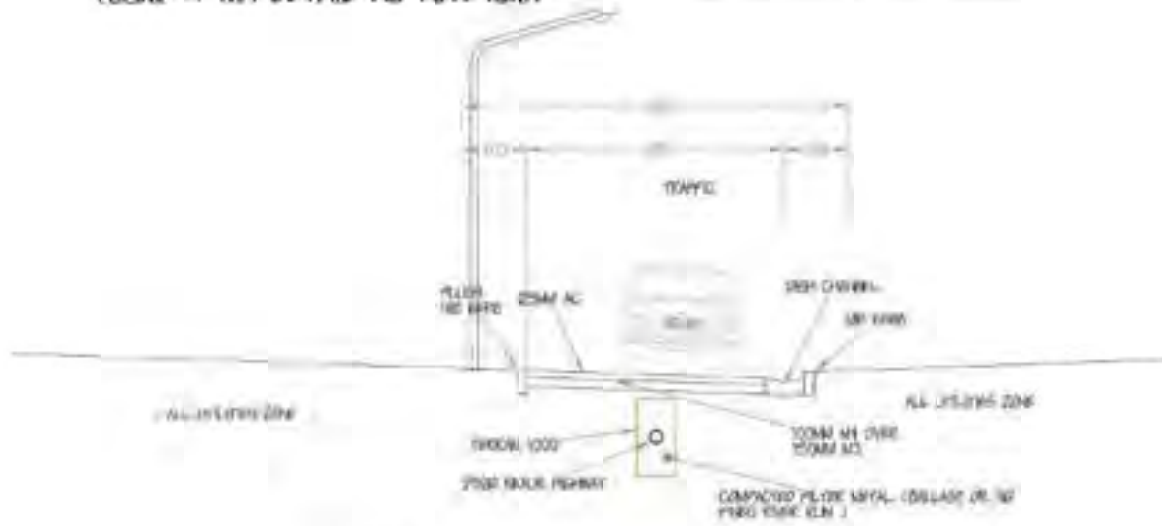
LANDMATTERS
 WAIKANAÉ NORTH

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DATE: 01/05/2024
 DRAWN BY: JH
 CHECKED BY: JH
 PROJECT NO: 2401
 SHEET NO: 5 OF 6
 X 000000



TYPICAL ROAD CROSS SECTION BETWEEN PARKING BAYS 1.5M ROAD RESERVE (SUMP & MH DETAIL AS FOR 1.8M)



TYPICAL ROAD CROSS SECTION PRIVATE WAY

HAMISH WELLS
 CONSULTING CIVIL ENGINEER
 2006 0709 5004
 2006 0709 5004
 0274 459 707
 hwp@hamishwells.com

LANDMATTERS
 WAIKANAЕ NORTH

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NH-001
 DRAWN BY: JH
 CHECKED BY: JH
 PROJECT SCALE:
 1:75
 SHEET TOTAL:
 8 SHEETS
 K. BROWN
 SHEET 7 OF 8

**CONSENT NOTICE
PURSUANT TO SECTION 221 OF
THE RESOURCE MANAGEMENT ACT 1991**

**IN THE MATTER OF A PLAN LODGED FOR
DEPOSIT UNDER NUMBER 582129 AND RESOURCE CONSENTS RM160213 A-C**

(being the subdivision of Lot 4 DP 478686 & Lot 201 DP 546292)
At Waipunahau Road, Waikanae
For W North Ltd

The Regional Regulatory Titles Officer at Wellington

PURSUANT to Section 221 of the Resource Management Act 1991 the Kapiti Coast District Council hereby gives notice that it has consented to the subdivision and in respect to Lots 40-60, 65-75, 126, 128-130 & 200-203 the following conditions are to be complied with on a continuing basis:

1. **With respect to Lots 40-60, 65-75, 126, 128-130 and 200-203:** Foundation design and construction for any new building or additions/alterations to a building shall take into account the findings and recommendations within the Foundation Recommendations prepared by Miyamoto dated 28 September 2022, submitted to Council in relation to application RM160213. A copy of the Foundation recommendations report is available in Council's Office at any time the office is open to the public and is stored electronically under e-docs reference RESCON-243241487-105217.
2. **With respect to Lots 40-60, 65-75, 126 and 128-130:** Further subdivision is prohibited.
3. **With respect to Lots 45, 56, 69 and 130:** The vehicle crossings for these lots shall be formed, metalled and sealed between the carriageway edge and the road boundary at the entry to each corner lot. These lots shall not have vehicle access to the through road.
4. **With respect to Lots 40, 48-53, 55 and 58-60:** There shall be no close boarded fences higher than 0.7m or open type fences (more than 50% visually permeable) higher than 1.2m shall be constructed within 3m of the common boundaries between any reserve and these lots.
5. **With respect of Lots 40-43, 48-50, 65 and 72-75:** The construction of dwellings, accessory buildings and associated structures are authorised on these lots that have an underlying zoning of Open Space Precinct provided that they comply with any other conditions prescribed under this consent notice.
6. **With respect of Lots 41-47, 51, 52, 54-60, 65-74, 126 and 128-130:** – The maximum coverage area of all buildings on these lots are to be 250m². If the residential lot area exceeds 1000m² the maximum site coverage shall be 25%.

7. **With respect of Lots 40-49, 52-54, 56-60, 65-69, 71-75, 126 and 128-130:** - Any buildings on these lots that the District Plan requires to be 3m side yard setback from the boundary of the lot shall be reduced to 1.5m.

8. **With respect of Lots 40-49, 52-54, 56-60, 65-69, 71-75, 126 and 128-130:**

The front yard setback of these lots shall be:

- i. Any primary residential building (habitable rooms) shall be set back at least 3m from any road boundary.
- ii. Any accessory building (including attached garages and car ports) shall be setback at least 5m from any road boundary and at least 1m behind the front façade of the primary residential building; and
- iii. Any eave which intrudes the front yard as required by standard (i) and (ii) above by no greater than 0.6m shall be excluded, except where the eave would overhang any easement.

9. **With respect to Lots 40-60, 65-75, 126 and 128-130:** Any future dwelling on these lots shall comply with the Preserve Precinct standards as follows:

- a) Rainwater storage tanks with a minimum capacity of 10,000 litres for the supply of non-potable water for outdoor use and indoor toilets;
- b) Rainwater storage tanks with a minimum capacity of 4,500 litres for the supply of non-potable water for outdoor use and indoor toilets and a greywater re-use system for outdoor irrigation. The greywater re-use system shall take all water from bathrooms (with the exception of toilets) and the washing machine.
- c) Solar hot water heating shall be fitted to each household unit with a minimum of 2m² of solar panel per unit.
- d) Thermal insulation standard for habitable rooms shall be insulated to comply with the following minimums: Walls R2.6, Roof R4.6 and Floors R2.0.
- e) A design certificate signed by a registered architect, member of Architectural Designers of New Zealand, registered engineer or suitably qualified building inspector stating that the plans will achieve compliance with the above standards.

Note: Where there are no specific Waikanae North Zone standards, the permitted activity standards of the District Plan

10. **With respect to Lots 40, 48, 49, 51 and 52:** No earthworks, building, construction, planting (except for species native to the Foxton Ecological District), garden waste or rubbish dumping, or trimming, modification or removal of vegetation is permitted within the ecological site K133 or within the 10m wide of its buffer area.

11. **With respect to Lots 40-60, 65-75, 126, 128-130 and 200-203:** The consent holder shall provide a stormwater attenuation/ disposal system for these Lots which shall comply with the requirements of Part 3 E(v) Performance Criteria of KCDC'S SDPR: 2012. The stormwater disposal design shall be in accordance with the requirements and intent of the Engineering Services Report entitled Proposed Waikanae North Subdivision of 177 new residential lots off Waipunahau Road, Waikanae prepared by Hamish Wells dated 21 September 2016 submitted to Council in relation to the application No. RM160213 and is stored electronically under e-docs reference RESCON-243241487-88199.

Issued in respect of application RM160213 on this 9th day of December 2022.



Sarah Nicole Banks
AUTHORISED OFFICER



Sophas Uch
AUTHORISED OFFICER

28 September 2022

Waikanae North Ltd c/o LandMatters
Attention: Phillip Mitchell

Manu Park Subdivision, Waikanae - Stage 2: Foundation Recommendations

MINZ Ref: 210292.02-TM-001[B]

1. Introduction

Miyamoto International NZ Ltd (Miyamoto) has been engaged by Waikanae North Ltd c/o LandMatters, the Client, to undertake a 'post-earthworks' geotechnical assessment and provide recommendations for new building foundations within Stage 2 of the Manu Park Subdivision. This memorandum may be used in support of building consent application for the lot specific developments.

The Stage 2 Manu Park Subdivision comprises 36No. new residential lots (Lot Nos. 40 to 60, 65 to 75, 126 & 128 to 130). The site location and layout are shown in Figure 1 and the Cuttriss Consultants (Cuttriss) Engineering Plans included in Appendix A.

At the time of writing, the earthworks for Stage 2 were complete. The design, monitoring, verification and certification of the Stage 2 earthworks (already complete) has been undertaken by Cuttriss with the earthworks completion report provided under separate heading.

To assess the 'post-earthworks' liquefaction risk across Stage 2 and to inform appropriate foundation recommendations, Miyamoto directed a deep ground investigation and have undertaken a liquefaction assessment for Stage 2, the results of which are included within this technical memorandum (TM).

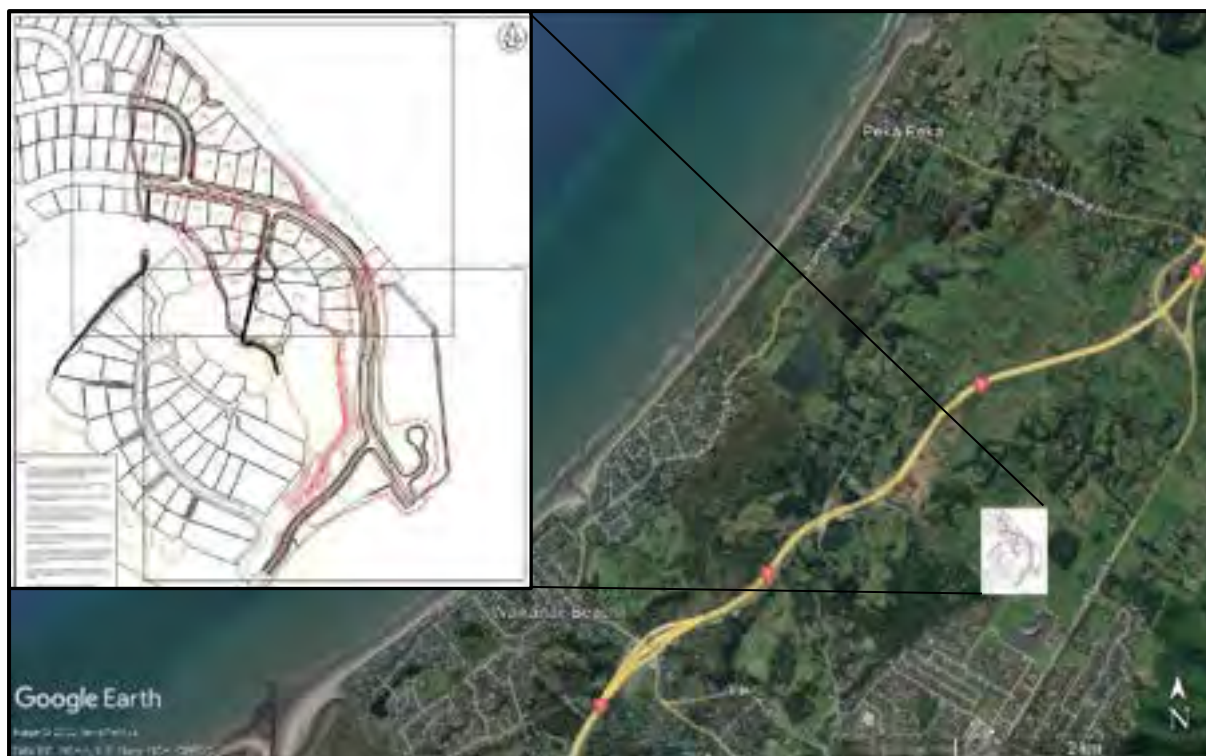


Figure 1: Site Location & Layout

2. Stage 2 Earthworks

As detailed above, the design, monitoring, verification and certification of the Stage 2 earthworks has been undertaken by Cuttriss with the earthworks completion report provided under separate heading. In summary, the earthworks comprised a balanced cut / fill operation to create a level grade for the residential lots, with unsuitable materials (topsoil, organics etc.) removed and site won sand material used as engineered fill. Cuttriss have certified the earthworks in accordance with NZS4431 and NZS4404.

3. Ground Investigation

To facilitate a 'post-earthworks' liquefaction assessment, a deep ground investigation comprising 6No. cone penetration tests (CPT) was undertaken by Griffiths on behalf of Miyamoto in September 2022. The locations of the tests are shown in Figure 2 and the CPT plots are provided in Appendix B.

In addition to the stage specific CPTs, the following ground investigation information has been used to inform our understanding of the ground conditions:

- Subgrade and fill inspections along with a number of scala penetrometer tests undertaken by Cuttriss as part of the Stage 2 earthworks monitoring and verification (selected results are included in Appendix B, a full set of results are covered under separate heading by Cuttriss).
- Shallow and deep ground investigations undertaken for the wider subdivision (the results of which are discussed in the various Stage reports).



Figure 2: Geotechnical Investigation Location Plan

4. Liquefaction Assessment

Ground Motion Parameters

The ground motion parameters for geotechnical analysis including liquefaction hazard assessment have been assessed using the MBIE – NZGS Earthquake Geotechnical Engineering Practice Module 1 (November 2021) with:

- Recommended interim seismic hazard of New Zealand for geotechnical assessments as presented in Table A1 (Appendix A) for Peak Ground Acceleration (a_{max}) and Earthquake Magnitude (M_w) values for Site Classes A, B, C, D and E, for level ground conditions.

The derived ground motion parameters for the design events are summarised in Table 1 following the interim NZ seismic hazard.

Table 1: Design Ground Motion Parameters for Geotechnical Evaluation

Earthquake scenario / return period*	Magnitude	Peak horizontal ground acceleration a_{max}
Recommended interim seismic hazard of New Zealand for geotechnical assessments		
<i>Table A1 (Appendix A): Peak Ground Acceleration (a_{max}) and Earthquake Magnitude (M_w) values recommended for Geotechnical Assessment, for Site Classes A, B, C, D and E, for level ground conditions</i>		
1/25-year SLS event	6.5	0.13g
1/100-year Intermediate Event	7.1	0.28g
1/500-year ULS event	7.7	0.68g

* Importance level 2 (IL2) buildings with 50-year design life.

It should be noted that the above parameters are for geotechnical design purposes only. Ground motion parameters for purposes of structural analysis and design should be derived in accordance with NZS 1170.5:2004.

Liquefaction Susceptibility and Triggering

A liquefaction triggering assessment has been carried out using proprietary liquefaction assessment software (Cliq by GeoLogismiki), in general accordance with MBIE - NZGS Earthquake Geotechnical Engineering Practice Module 3 and the latest technical publications. The design criteria adopted are as follows:

- Boulanger and Idriss (2014) simplified CPT-based methods for liquefaction triggering.
- Zhang et al. (2002) post-liquefaction volumetric strain calculation for estimating the free-field settlements (it should be noted that these settlement estimates only account for the free-field component of the expected settlement. Actual total settlements under design earthquake loading may be greater or less).
- Liquefaction assessment, including evaluation of vulnerability indicators (free-field settlement values, Liquefaction Severity Number (LSN) and Liquefaction Potential Index (LPI) damaging criteria) based on the CPT data.

The results of our analysis are summarised in Table 2 and presented in Appendix C.

Table 2: Estimated “Free-Field” Ground Surface Settlements & Performance Levels

Earthquake scenario	Total Estimated Ground Surface Settlements (full depth tested)	Performance Level (as per Table 5.1 of MBIE – NZGS Module 3)
Interim NZ Seismic Hazard Model		
1/25-year SLS event	-	Insignificant effects - L0
1/100-year IE	<40 mm	LSN 0 to 5 LPI 0 to 2 Mild to moderate effects - L1 / L2
1/500-year ULS event	<60 mm	LSN 0 to 8 LPI 0 to 11 Moderate effects - L2

* **LSN = Liquefaction Severity Number.** LSN (van Ballegooy et al., 2014) is a vulnerability indicator (damage index) quantifying liquefaction-induced damage developed to reflect more damaging effects of shallow liquefaction on residential land and foundations following the Canterbury Earthquakes (2010-11). LSN considers depth weighted calculated volumetric densification strain within soil layers as a proxy for the severity of liquefaction land damage likely at the ground surface.

The liquefaction assessment indicates that liquefaction is unlikely to be triggered under SLS loading conditions with moderate effects anticipated under ULS loading conditions. Furthermore, the presence of a thick non-liquefiable crust (2.5 m to 6.5 m in thickness) provides additional resilience and significantly reduces the severity of liquefaction induced damage (demonstrated by the low values of LSN).

5. Foundation Recommendations

With consideration of the assessment presented herein, NZS3604 foundation systems are considered feasible for NZS3604 compliant structures, with consideration of the available bearing capacity.

The following geotechnical ultimate bearing capacities (GUBC) may be assumed for typical foundations:

- Min. 300 mm wide strip footing / ground beam / slab thickening:
 - 200 kPa at 0.3 mbgl.
 - 300 kPa at 0.5 mbgl.
- Min. 400 mm square pad footing / pile base:
 - 300 kPa at 0.4 mbgl.

The subgrade should be inspected by a suitably experienced geo-professional during construction and compacted / proof rolled prior to foundation construction. Any material identified as being soft or unsuitable should be removed and replaced with compacted hardfill (or site materials suitable for backfill and compaction).

6. Limitations

This memorandum is subject to the following limitations:

- This memorandum has been prepared by Miyamoto for the Client for the purpose/s agreed with the Client (Purpose). Miyamoto accepts no responsibility for the validity, appropriateness, sufficiency or consequences of the Client using the memorandum for purposes other than for the Purpose.
- The sub surface information has been obtained from investigation carried out at discrete locations, which by their nature only provide information about a relatively small volume of subsoils. While Miyamoto has taken reasonable skill and care in carrying out the investigation to determine the subsoil condition, the subsoil condition could differ substantially from the results of any sampling investigation. Miyamoto is not responsible for and does not accept any liability in respect of any difference between the actual subsoil conditions and the results of our investigation.
- Any susceptibility analysis carried out in respect of liquefaction is based on Miyamoto's current understanding as an experienced professional engineering consultant of the data, methods etc. Future seismic events may change our understanding of liquefaction and its affects, which may affect the content of this report. Miyamoto is not responsible for and does not accept any liability where the content of this report is changed due to a change in industry knowledge of matters relating to liquefaction.
- Where the Client provides information to Miyamoto, including design calculations and drawings of the as-built structure, or where the memorandum indicates that we have obtained and/or relied upon information provided from a third party, Miyamoto has not made any independent verification of this information except as expressly stated in the memorandum. Miyamoto assumes no responsibility for any inaccuracies in, or omissions to, that information.
- A change in circumstances, facts, information after the memorandum has been provided may affect the adequacy or accuracy of the memorandum. Miyamoto is not responsible for the adequacy or accuracy of the memorandum as a result of any such changes.

7. Closure

If you have any queries or you require any further clarification on any aspects of this memorandum, please do not hesitate to contact Miyamoto International (NZ) Ltd.

Prepared by:



Charles McDermott

BEng (Hons) CEngNZ CPEng IntPE(NZ)

Associate Geotechnical Engineer

Miyamoto International NZ Ltd

E charles.mcdermott@miyamoto.nz

M +64 (0) 27 566 6535

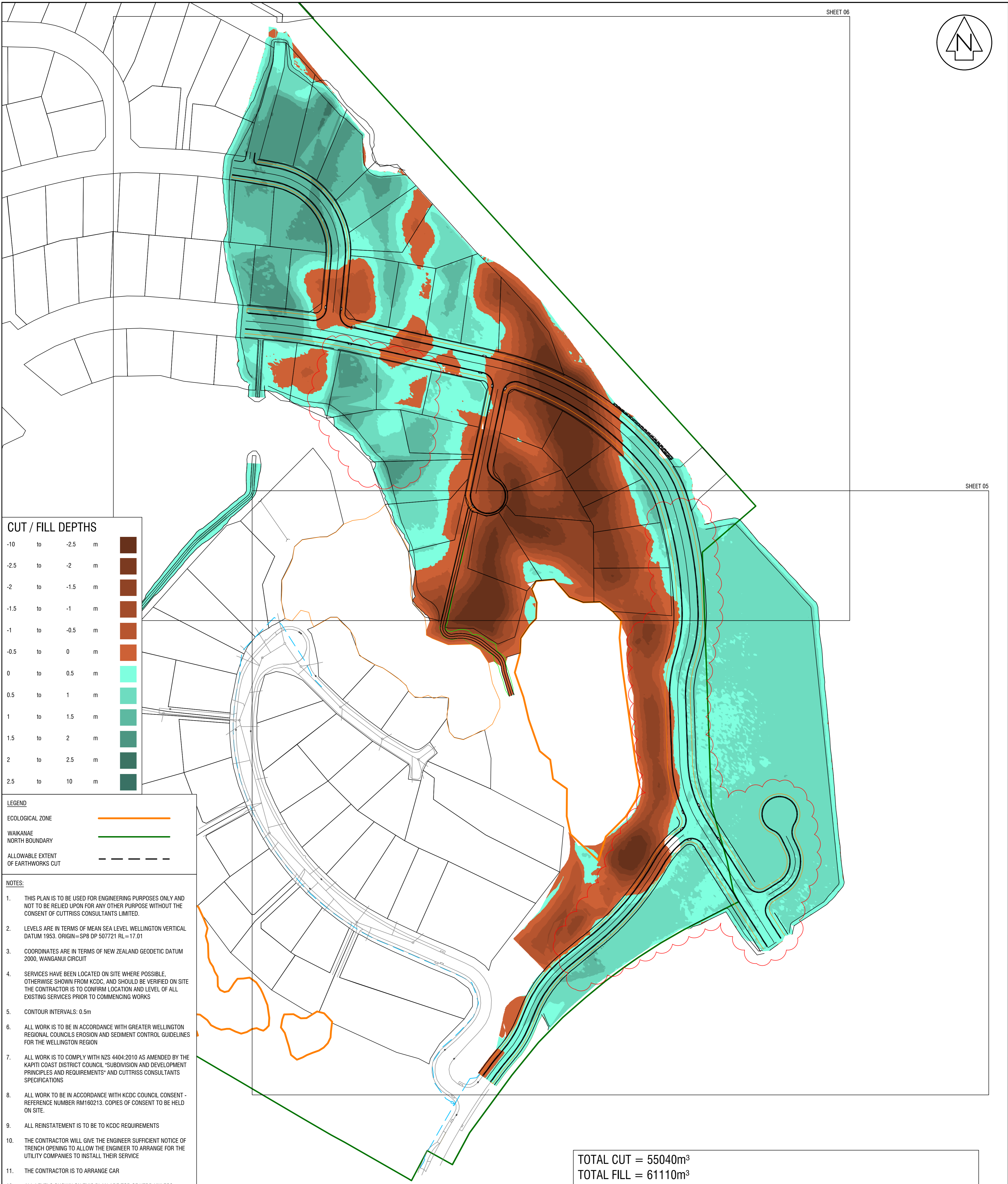
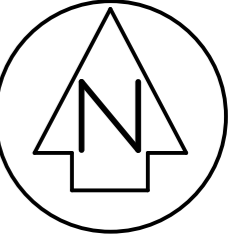
miyamoto.nz

References

- Boulanger, R.W. and Idriss, I.M., 2014. CPT and SPT based liquefaction triggering procedures. Rep. No. UCD/CGM-14, 1. Center for Geotechnical Modeling, Department of Civil and Environmental Engineering, University of California, Davis, CA, 134 pp.
- New Zealand Geotechnical Society and Ministry of Business, Innovation and Employment November 2021. Earthquake geotechnical engineering practice Module 1: Overview of the guidelines
- New Zealand Geotechnical Society and Ministry of Business, Innovation and Employment November 2021. Earthquake geotechnical engineering practice Module 2: Geotechnical investigations for earthquake engineering
- New Zealand Geotechnical Society and Ministry of Business, Innovation and Employment, November 2021. Earthquake geotechnical engineering practice Module 3: Identification, assessment and mitigation of liquefaction hazards
- New Zealand Geotechnical Society and Ministry of Business, Innovation and Employment, November 2021. Earthquake geotechnical engineering practice Module 4: Earthquake resistant foundation design
- New Zealand Standard NZS1170.5:2004. Structural Design Actions, Part 5: Earthquake Actions - Standards New Zealand, 2004
- New Zealand Standard NZS3604:2011. Timber-framed buildings – Standards New Zealand, 2011
- New Zealand Standard NZS4404:2010. Land development and subdivision infrastructure – Standards New Zealand, 2010.
- New Zealand Standard NZS4431:2022. Engineered fill construction for lightweight structures – Standards New Zealand, 2022.
- Zhang, G., Robertson, P.K. and Brachman, R.W., 2002. Estimating liquefaction-induced ground settlements from CPT for level ground. Canadian Geotechnical Journal, 39(5), pp.1168-1180

Appendix A: Cuttriss Engineering Plans (Selected)





CUT / FILL DEPTHS

-10	to	-2.5	m	
-2.5	to	-2	m	
-2	to	-1.5	m	
-1.5	to	-1	m	
-1	to	-0.5	m	
-0.5	to	0	m	
0	to	0.5	m	
0.5	to	1	m	
1	to	1.5	m	
1.5	to	2	m	
2	to	2.5	m	
2.5	to	10	m	

LEGEND

ECOLOGICAL ZONE	
WAIKANAЕ NORTH BOUNDARY	
ALLOWABLE EXTENT OF EARTHWORKS CUT	

- NOTES:**
- THIS PLAN IS TO BE USED FOR ENGINEERING PURPOSES ONLY AND NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
 - LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON VERTICAL DATUM 1953. ORIGIN=SP8 DP 507721 RL=-17.01
 - COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 2000, WANGANUI CIRCUIT
 - SERVICES HAVE BEEN LOCATED ON SITE WHERE POSSIBLE. OTHERWISE SHOWN FROM KDCDC. AND SHOULD BE VERIFIED ON SITE. THE CONTRACTOR IS TO CONFIRM LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORKS
 - CONTOUR INTERVALS: 0.5m
 - ALL WORK IS TO BE IN ACCORDANCE WITH GREATER WELLINGTON REGIONAL COUNCILS EROSION AND SEDIMENT CONTROL GUIDELINES FOR THE WELLINGTON REGION
 - ALL WORK IS TO COMPLY WITH NZS 4404:2010 AS AMENDED BY THE KAPITI COAST DISTRICT COUNCIL "SUBDIVISION AND DEVELOPMENT PRINCIPLES AND REQUIREMENTS" AND CUTTRISS CONSULTANTS SPECIFICATIONS
 - ALL WORK IS TO BE IN ACCORDANCE WITH KDCDC COUNCIL CONSENT - REFERENCE NUMBER RM160213. COPIES OF CONSENT TO BE HELD ON SITE.
 - ALL REINSTATEMENT IS TO BE TO KDCDC REQUIREMENTS
 - THE CONTRACTOR WILL GIVE THE ENGINEER SUFFICIENT NOTICE OF TRENCH OPENING TO ALLOW THE ENGINEER TO ARRANGE FOR THE UTILITY COMPANIES TO INSTALL THEIR SERVICE
 - THE CONTRACTOR IS TO ARRANGE CAR
 - ALL LEVELS SHOWN ON THIS PLAN ARE TOP OF KERB UNLESS SHOWN
 - ROAD CARRIAGEWAY WIDTH DIMENSIONS MEASURED FACE OF KERB TO FACE OF KERB
 - ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES

TOTAL CUT = 55040m³
 TOTAL FILL = 61110m³
 VOLUMES ARE SOLID IN PLACE, NO BULKING ALLOWANCE
 VOLUMES ARE TO FINISHED DESIGN SURFACE TIN
 NO ALLOWANCE FOR ADDITIONAL CUT TO SUBGRADE, TRENCHES, SOAKAGE ETC
 NO ALLOWANCE FOR ADDITIONAL FILL TO SUPPORT AND COVER NEW SEWER PIPE
 NO BULKING ALLOWANCE OR COMPACTION FACTOR ALLOWED FOR

FOR CONSTRUCTION

REVISION DETAILS	NAME	DATE
0 FOR CONSTRUCTION-UPDATES FOLLOWING KDCDC COMMENTS, CHANGES AS CLOUDED	CMB	12/11/21
P FOR CONSTRUCTION - RD 2 RAISED, SWALE ADDED	CMB	23/02/22
P.1 FOR CONSTRUCTION - LOT 58 DIG OUT ADDED	CMB	15/02/22

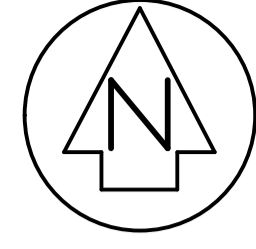
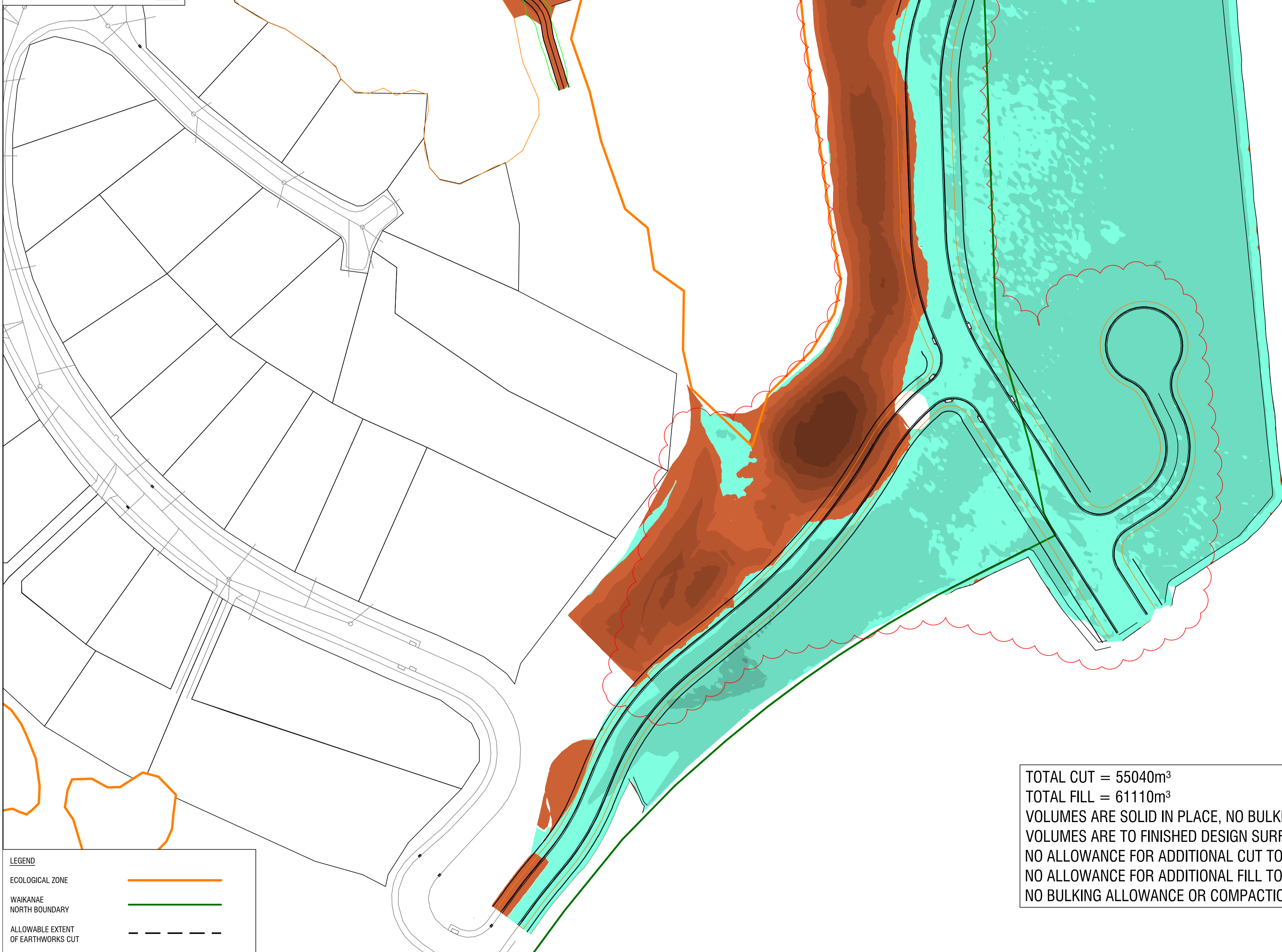
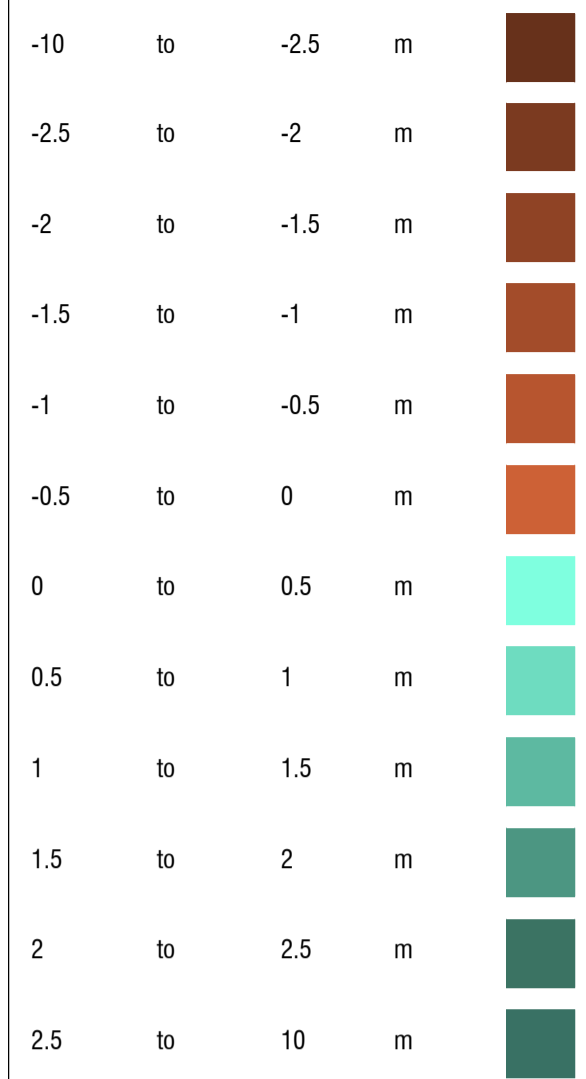
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PROJECT
MANU PARK STAGE 2 & 2A
WAIPUNAHAU ROAD, WAIKANAЕ NORTH
ENGINEERING PLANS EWP 01

CLIENT
LANDMATTERS LIMITED

SCALE A1 1:1000			REDUCED SCALE A3 - 1:2000		
FIELDWORK	NAME	DATE	DRAWING NUMBER		
DESIGNED	CMB	07/20	22621 ENG		
DRAWN	CMB	07/20	SHEET 4	OF 63	SHEETS
CHECKED	NAJ	07/20	REVISION	P.1	

CUT / FILL DEPTHS



REVISION DETAILS		NAME	DATE
0	FOR CONSTRUCTION-UPDATES FOLLOWING KCDC COMMENTS, CHANGES AS CLOUDED	CMB	12/11/21
P	FOR CONSTRUCTION - RD 2 RAISED, SWALE ADDED	CMB	23/02/22
P.1	FOR CONSTRUCTION - LOT 58 DIGOUT ADDED	CMB	15/03/22

- NOTES:**
- THIS PLAN IS TO BE USED FOR ENGINEERING PURPOSES ONLY AND NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
 - LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON VERTICAL DATUM 1953. ORIGIN=SP8 DP 507721 RL=17.01
 - COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 2000, WANGANUI CIRCUIT
 - SERVICES HAVE BEEN LOCATED ON SITE WHERE POSSIBLE, OTHERWISE SHOWN FROM KCDC, AND SHOULD BE VERIFIED ON SITE. THE CONTRACTOR IS TO CONFIRM LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORKS
 - CONTOUR INTERVALS: 0.5m
 - ALL WORK IS TO BE IN ACCORDANCE WITH GREATER WELLINGTON REGIONAL COUNCILS EROSION AND SEDIMENT CONTROL GUIDELINES FOR THE WELLINGTON REGION
 - ALL WORK IS TO COMPLY WITH NZS 4404:2010 AS AMENDED BY THE KAPITI COAST DISTRICT COUNCIL "SUBDIVISION AND DEVELOPMENT PRINCIPLES AND REQUIREMENTS" AND CUTTRISS CONSULTANTS SPECIFICATIONS
 - ALL WORK TO BE IN ACCORDANCE WITH KCDC COUNCIL CONSENT - REFERENCE NUMBER RM160213. COPIES OF CONSENT TO BE HELD ON SITE.
 - ALL REINSTATEMENT IS TO BE TO KCDC REQUIREMENTS
 - THE CONTRACTOR WILL GIVE THE ENGINEER SUFFICIENT NOTICE OF TRENCH OPENING TO ALLOW THE ENGINEER TO ARRANGE FOR THE UTILITY COMPANIES TO INSTALL THEIR SERVICE
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 - ROAD CARRIAGEWAY WIDTH DIMENSIONS MEASURED FACE OF KERB TO FACE OF KERB
 - ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES

FOR CONSTRUCTION

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CLIENT
LANDMATTERS LIMITED

PROJECT
**MANU PARK STAGE 2 & 2A
 WAIPUNAHAU ROAD
 WAIKANAЕ NORTH**

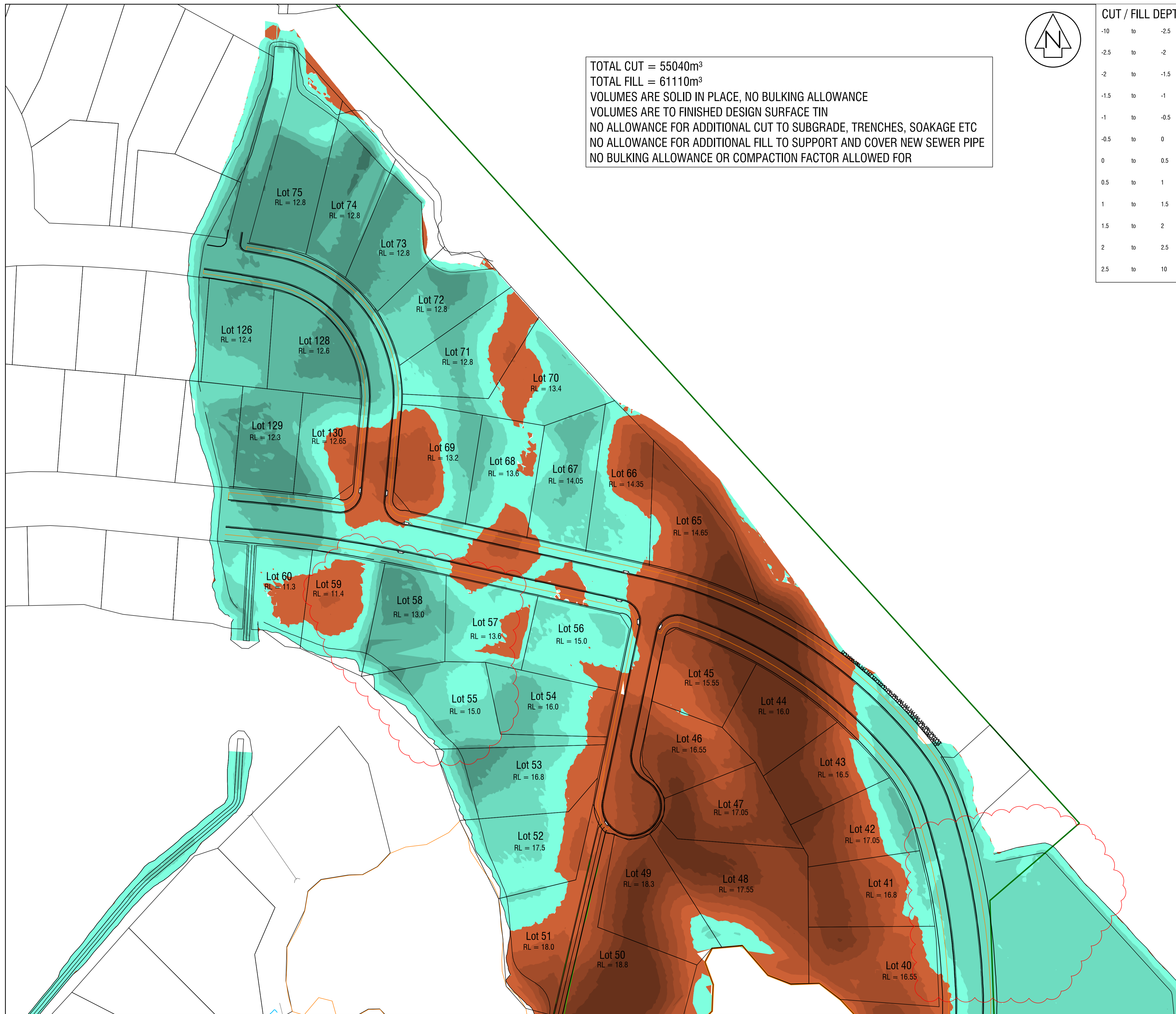
**ENGINEERING PLANS
 EWP 02**

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 TOTAL FILL = 61110m³
 VOLUMES ARE SOLID IN PLACE, NO BULKING ALLOWANCE
 VOLUMES ARE TO FINISHED DESIGN SURFACE TIN
 NO ALLOWANCE FOR ADDITIONAL CUT TO SUBGRADE, TRENCHES, SOAKAGE ETC
 NO ALLOWANCE FOR ADDITIONAL FILL TO SUPPORT AND COVER NEW SEWER PIPE
 NO BULKING ALLOWANCE OR COMPACTION FACTOR ALLOWED FOR

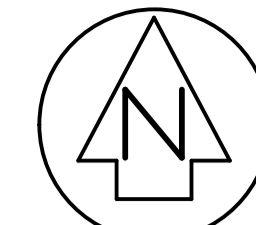
LEGEND

ECOLOGICAL ZONE	
WAIKANAЕ NORTH BOUNDARY	
ALLOWABLE EXTENT OF EARTHWORKS CUT	

SCALE		REDUCED SCALE	
A1	1:600	A3	1:1200
FIELDWORK	NAME	DATE	DRAWING NUMBER
DESIGNED	CMB	19/05/21	22621 ENG
DRAWN	CMB	19/05/21	SHEET 5 OF 64 SHEETS
CHECKED	NAJ	19/05/21	REVISION P.1



TOTAL CUT = 55040m³
 TOTAL FILL = 61110m³
 VOLUMES ARE SOLID IN PLACE, NO BULKING ALLOWANCE
 VOLUMES ARE TO FINISHED DESIGN SURFACE TIN
 NO ALLOWANCE FOR ADDITIONAL CUT TO SUBGRADE, TRENCHES, SOAKAGE ETC
 NO ALLOWANCE FOR ADDITIONAL FILL TO SUPPORT AND COVER NEW SEWER PIPE
 NO BULKING ALLOWANCE OR COMPACTION FACTOR ALLOWED FOR



CUT / FILL DEPTHS

-10	to	-2.5	m
-2.5	to	-2	m
-2	to	-1.5	m
-1.5	to	-1	m
-1	to	-0.5	m
-0.5	to	0	m
0	to	0.5	m
0.5	to	1	m
1	to	1.5	m
1.5	to	2	m
2	to	2.5	m
2.5	to	10	m

REVISION DETAILS		NAME	DATE
0	FOR CONSTRUCTION-UPDATES FOLLOWING KCDC COMMENTS, CHANGES AS CLOUDED	CMB	12/11/21
P	FOR CONSTRUCTION - RD 2 RAISED, SWALE ADDED	CMB	23/02/22
P.1	FOR CONSTRUCTION - LOT 58 DIGOUT ADDED	CMB	15/03/22

LEGEND

ECOLOGICAL ZONE 10m BUFFER	
WAIKANAE NORTH BOUNDARY	

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FOR CONSTRUCTION

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CLIENT
LANDMATTERS LIMITED

PROJECT
**MANU PARK STAGE 2 & 2A
 WAIPUNAHAU ROAD
 WAIKANAE NORTH**

**ENGINEERING PLANS
 EWP 03**

SCALE	A1 1:600	REDUCED SCALE	A3 - 1:1200
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DESIGNED	CMB	19/05/21	22621 ENG
DRAWN	CMB	19/05/21	SHEET 6 OF 64 SHEETS
CHECKED	NAJ	19/05/21	REVISION P.1

Appendix B: Ground Investigation Data





CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

1

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

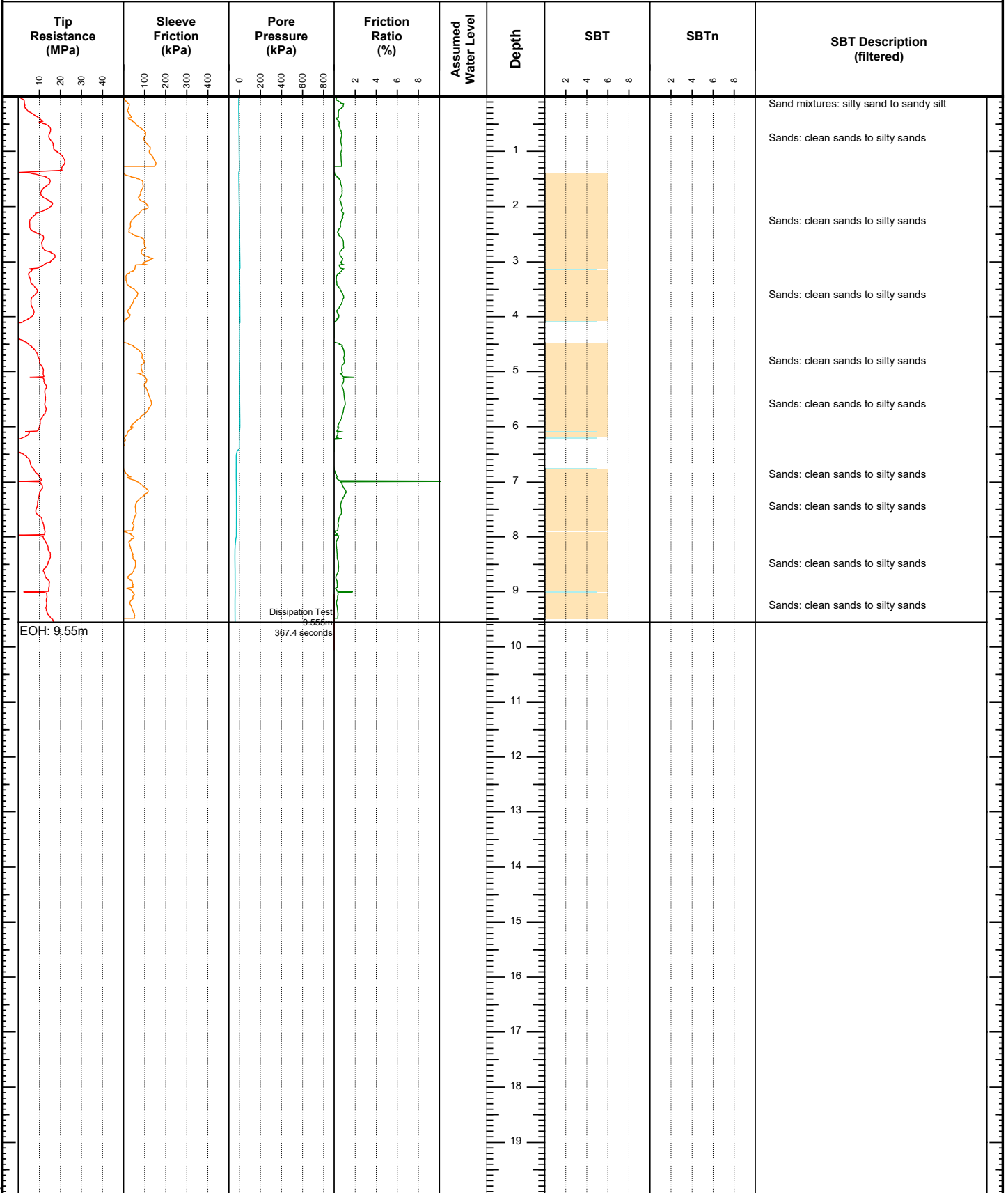
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



Dissipation Test
9.55m
367.4 seconds

EOH: 9.55m

REMARKS:

NOTES:



CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

2

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

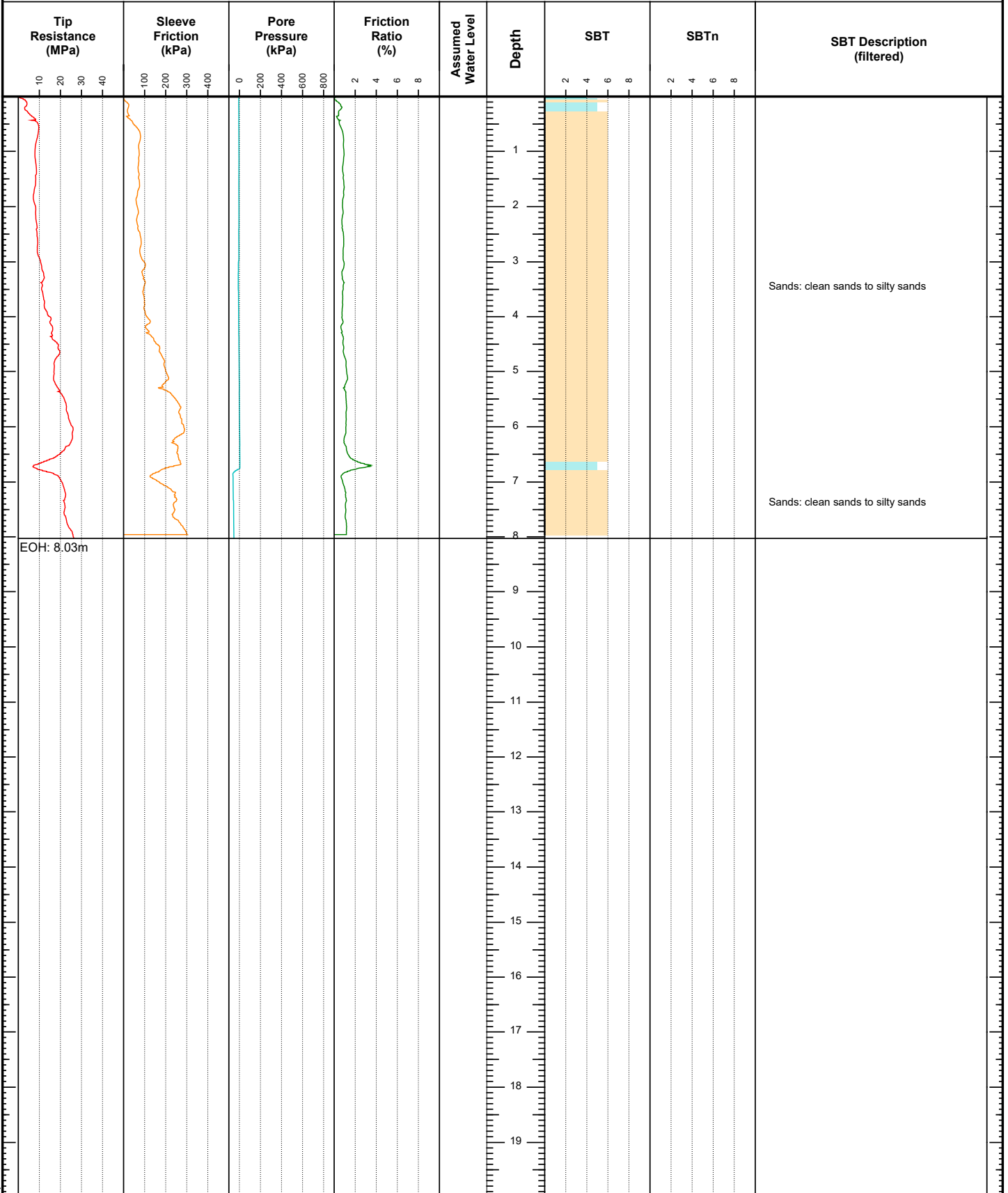
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



EOH: 8.03m

REMARKS:

NOTES:



CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

3

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

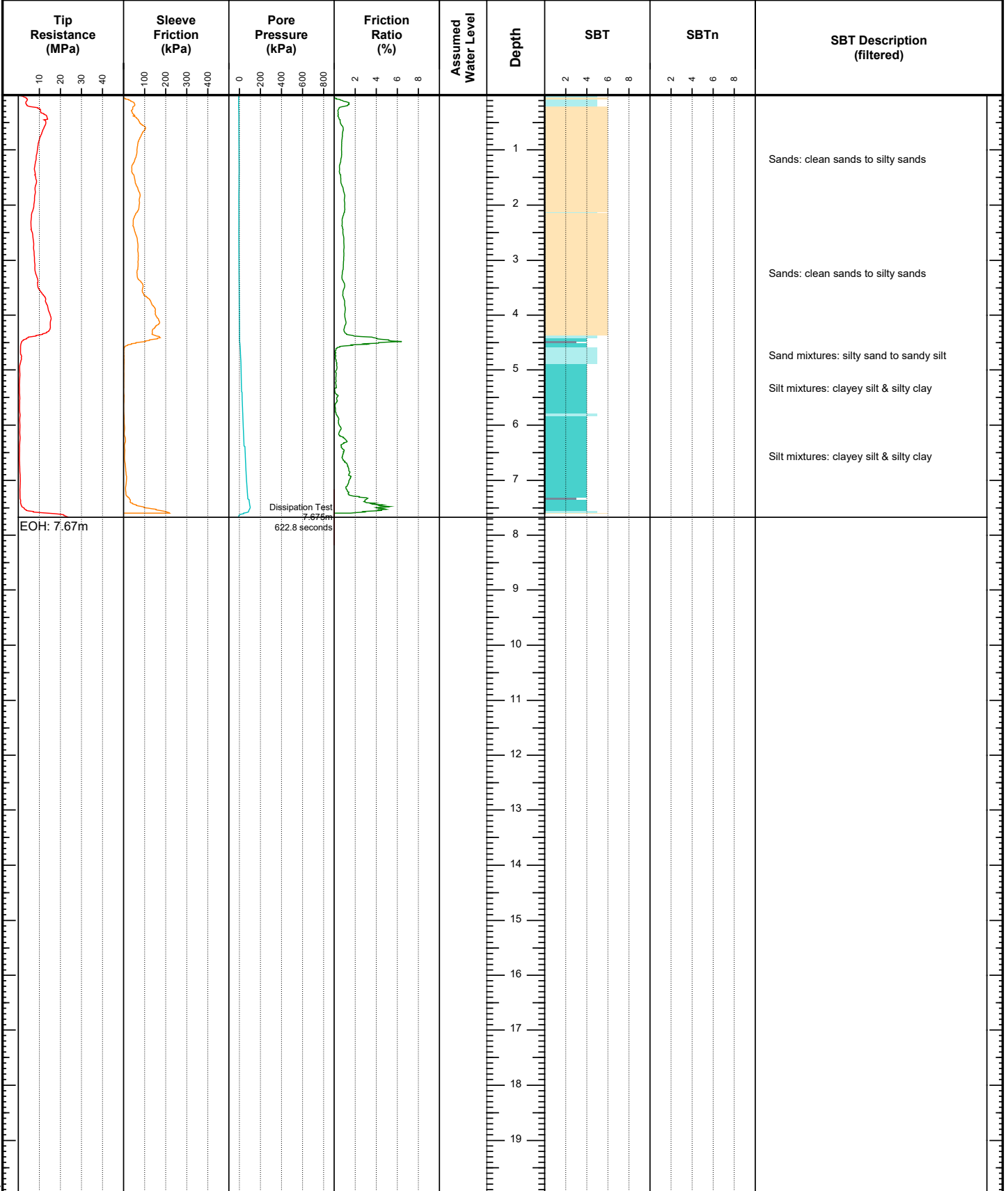
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



REMARKS:

NOTES:



CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

4

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

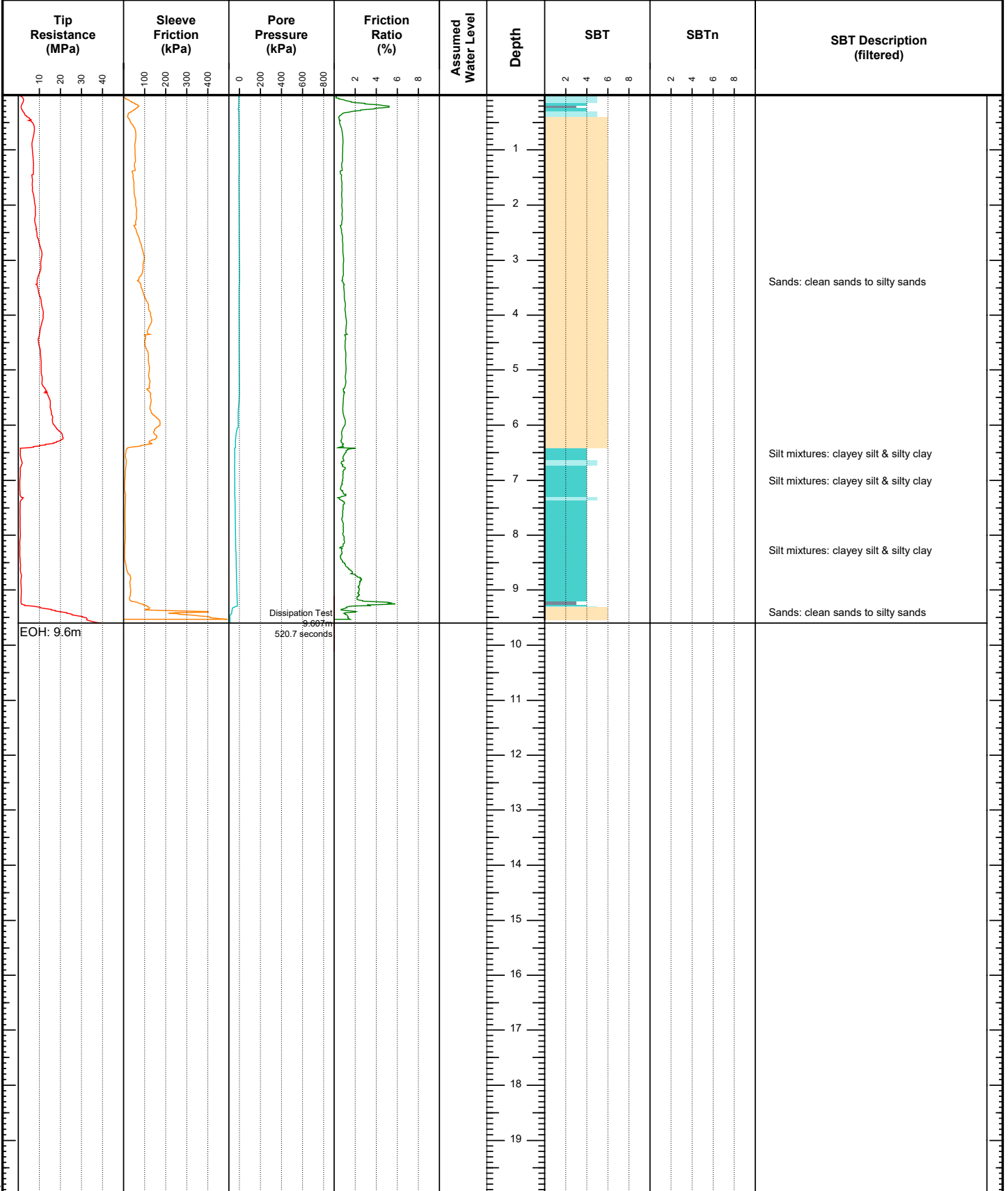
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



REMARKS:

NOTES:



CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

5

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:

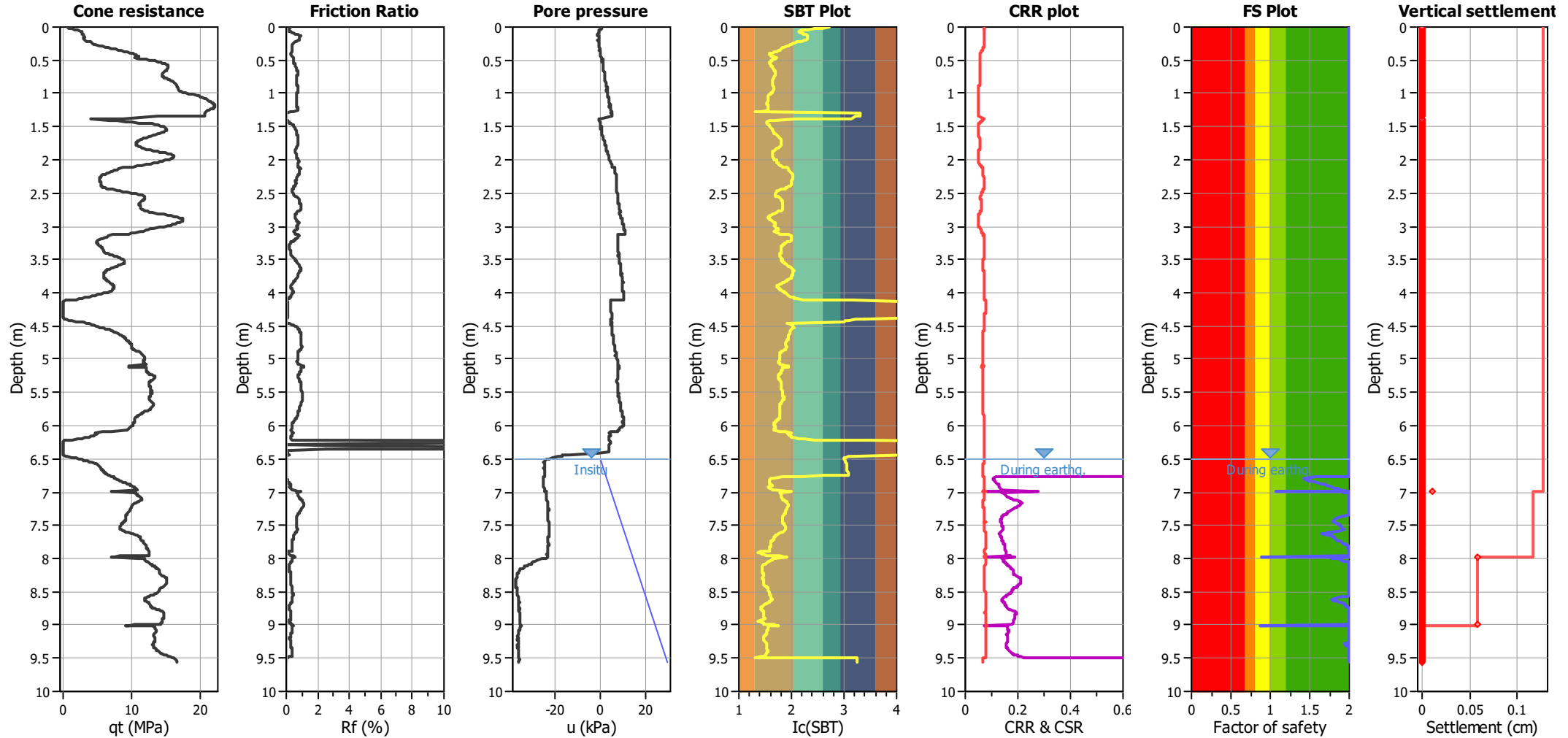
Tip Resistance (MPa)	Sleeve Friction (kPa)	Pore Pressure (kPa)	Friction Ratio (%)	Assumed Water Level	Depth	SBT	SBTn	SBT Description (filtered)
10 20 30 40	100 200 300 400	0 200 400 600 800	2 4 6 8			2 4 6 8	2 4 6 8	
								Sand mixtures: silty sand to sandy silt Sands: clean sands to silty sands Sands: clean sands to silty sands Silt mixtures: clayey silt & silty clay Silt mixtures: clayey silt & silty clay Silt mixtures: clayey silt & silty clay Silt mixtures: clayey silt & silty clay
EOH: 6.41m								
					7			
					8			
					9			
					10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			
					19			

REMARKS:

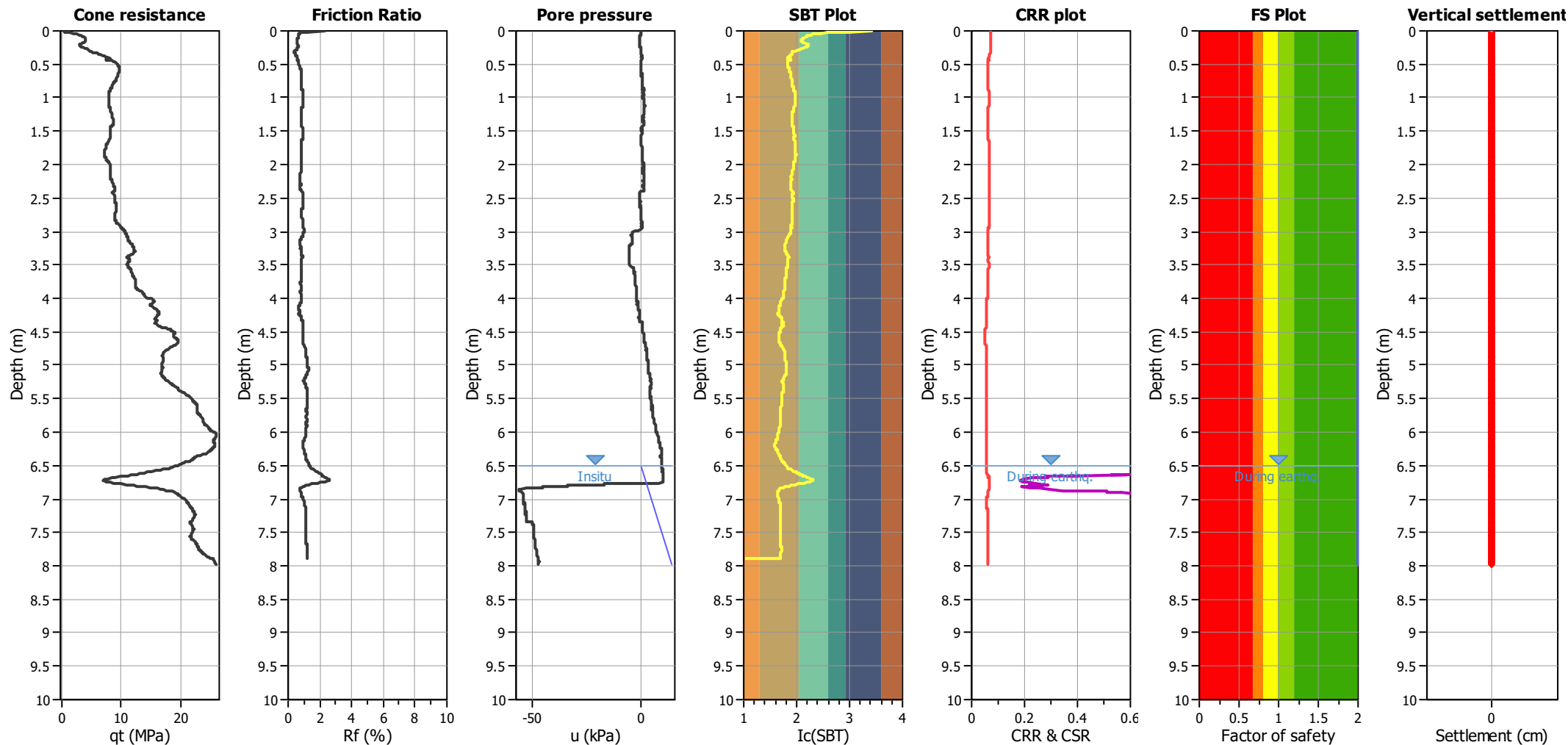
NOTES:

Appendix C: Liquefaction Assessment Results

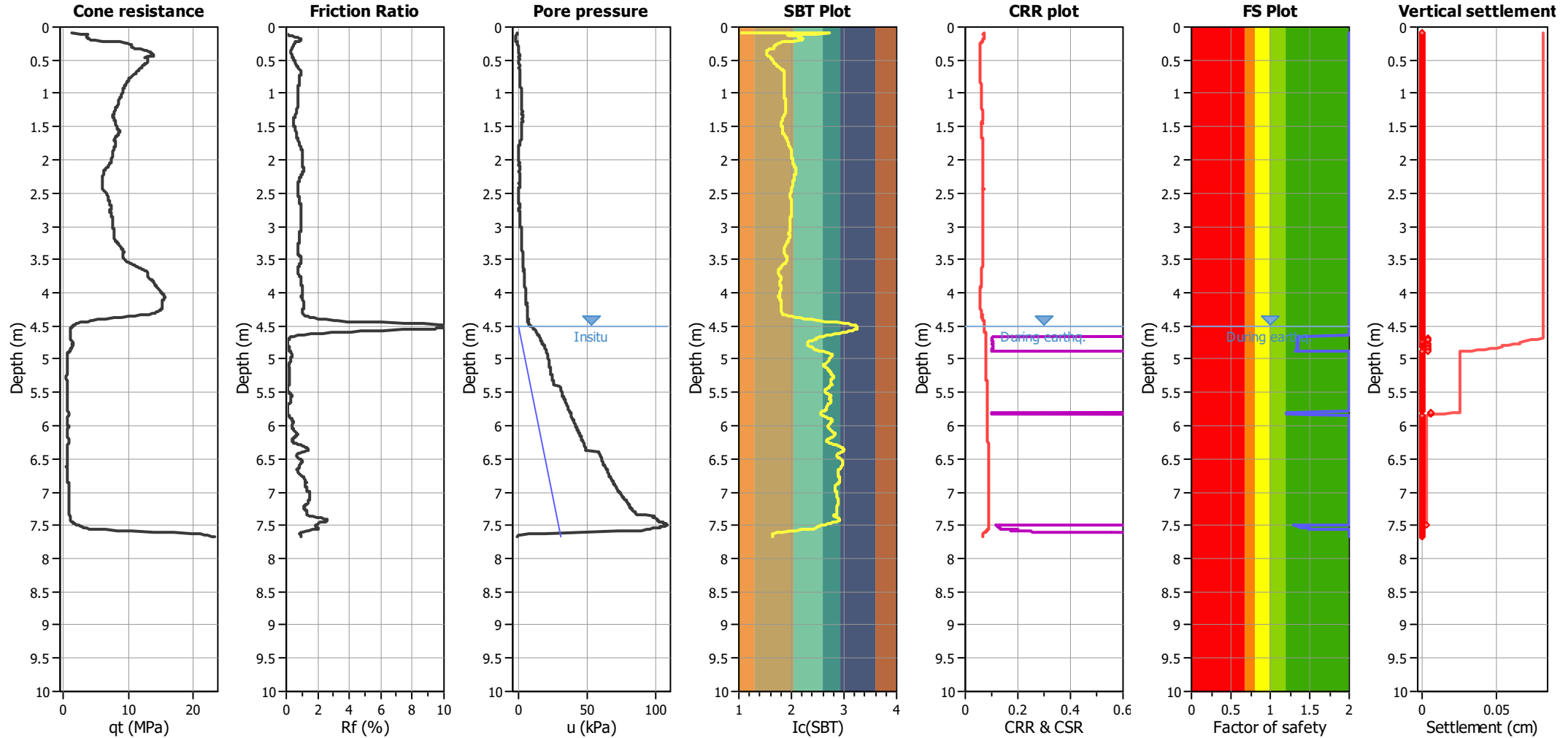




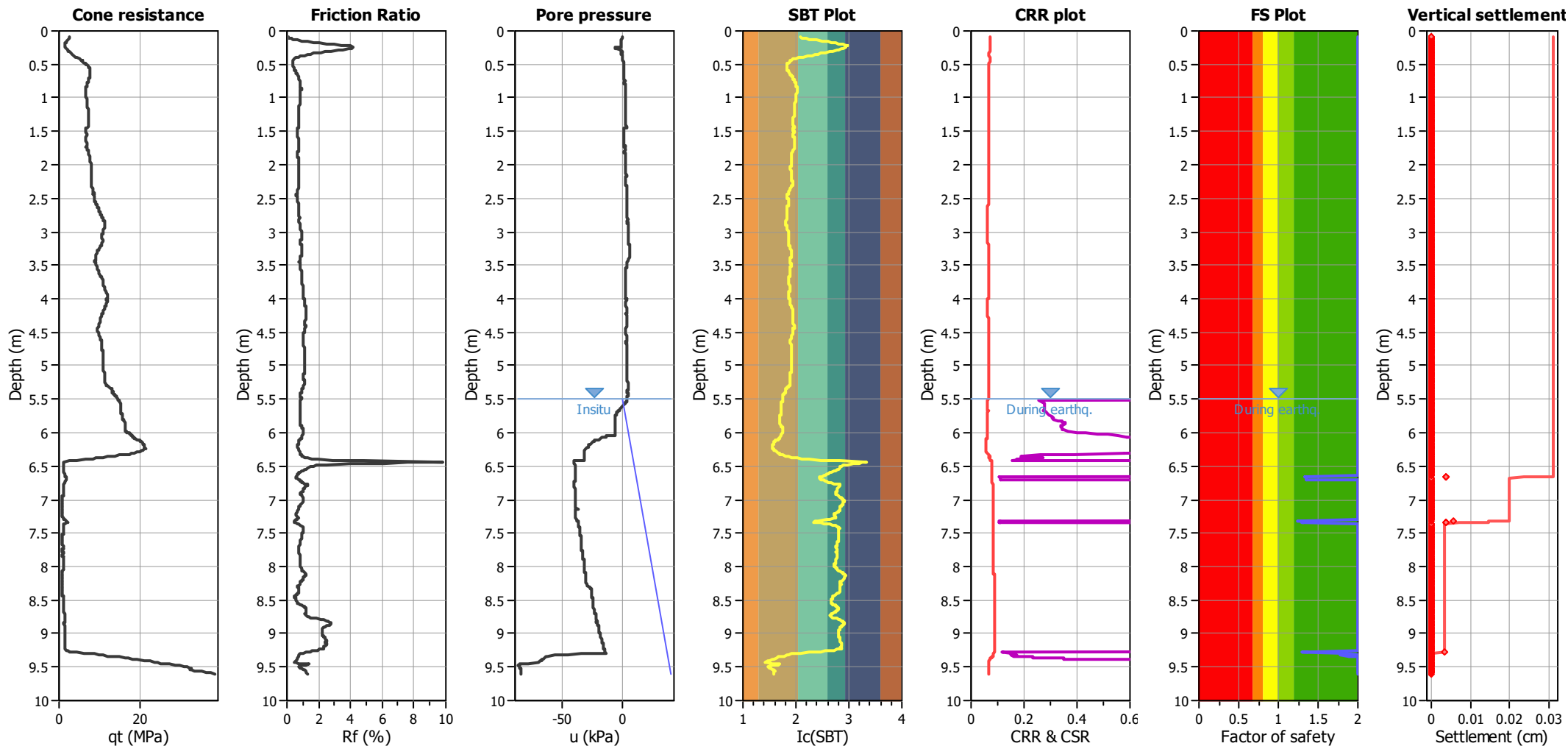
Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



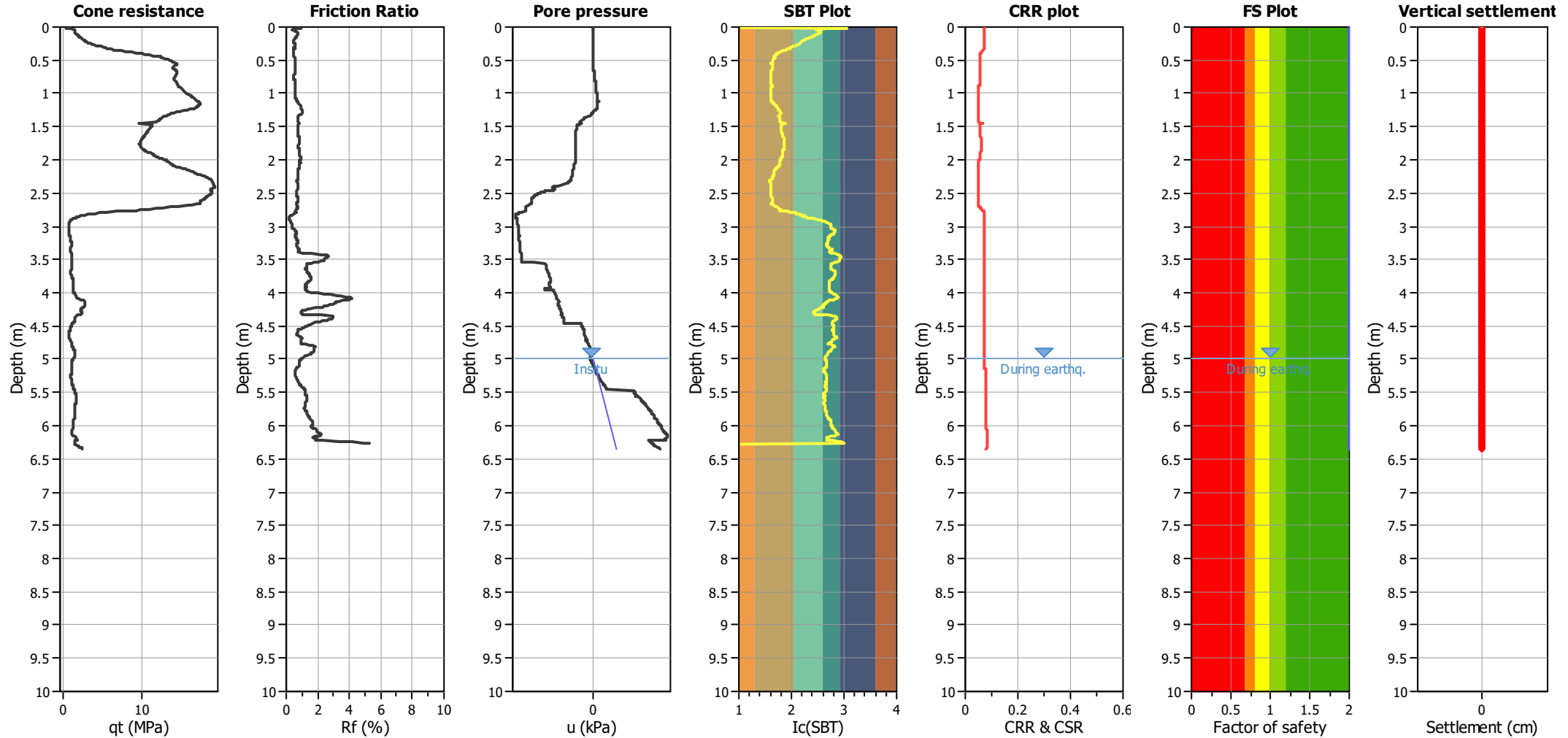
Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



Analysis method:	B&I (2014)	G.W.T. (in-situ):	5.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



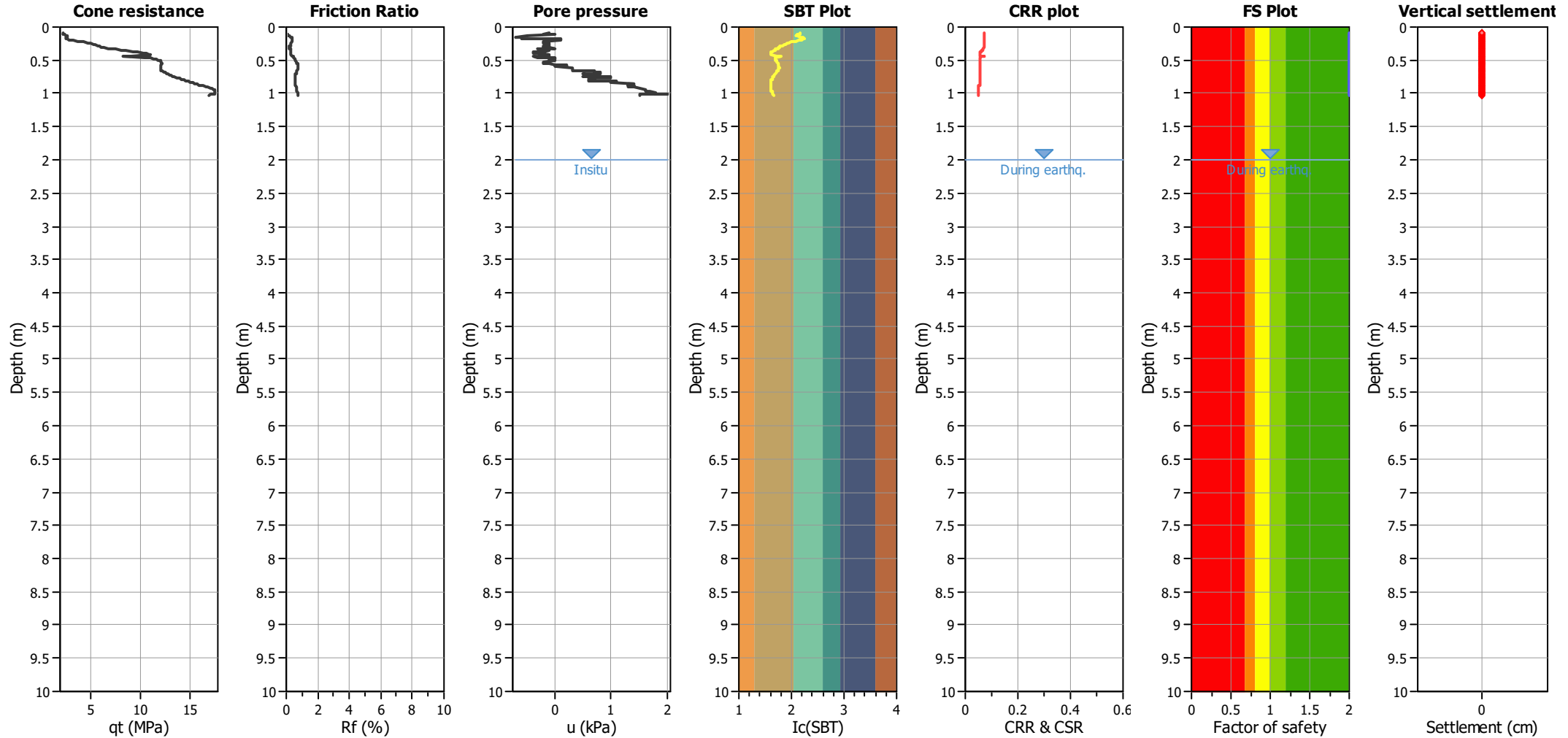
Analysis method:	B&I (2014)	G.W.T. (in-situ):	5.00 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.00 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

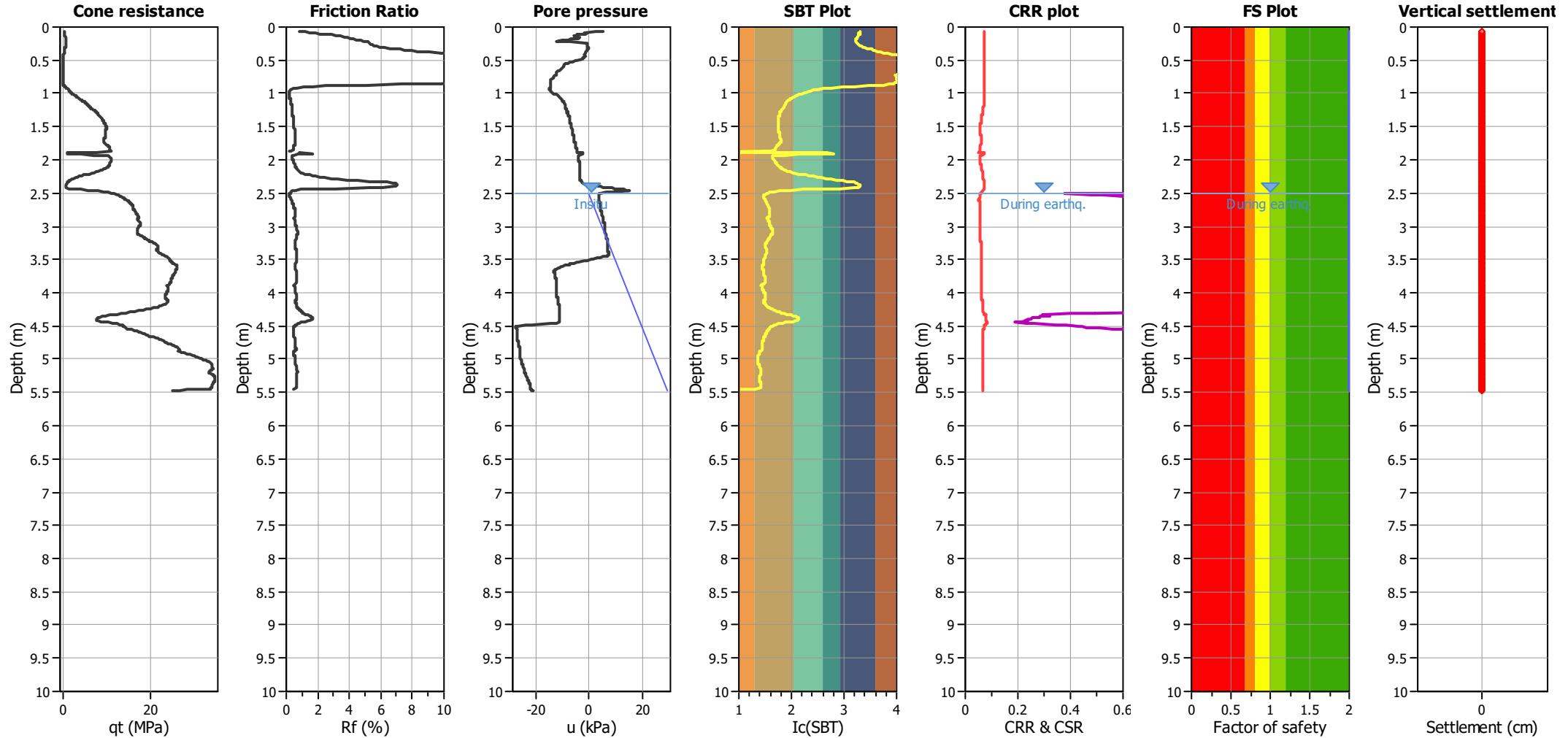
Location:

CPT: S2006 SLS_ISH

Total depth: 1.03 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



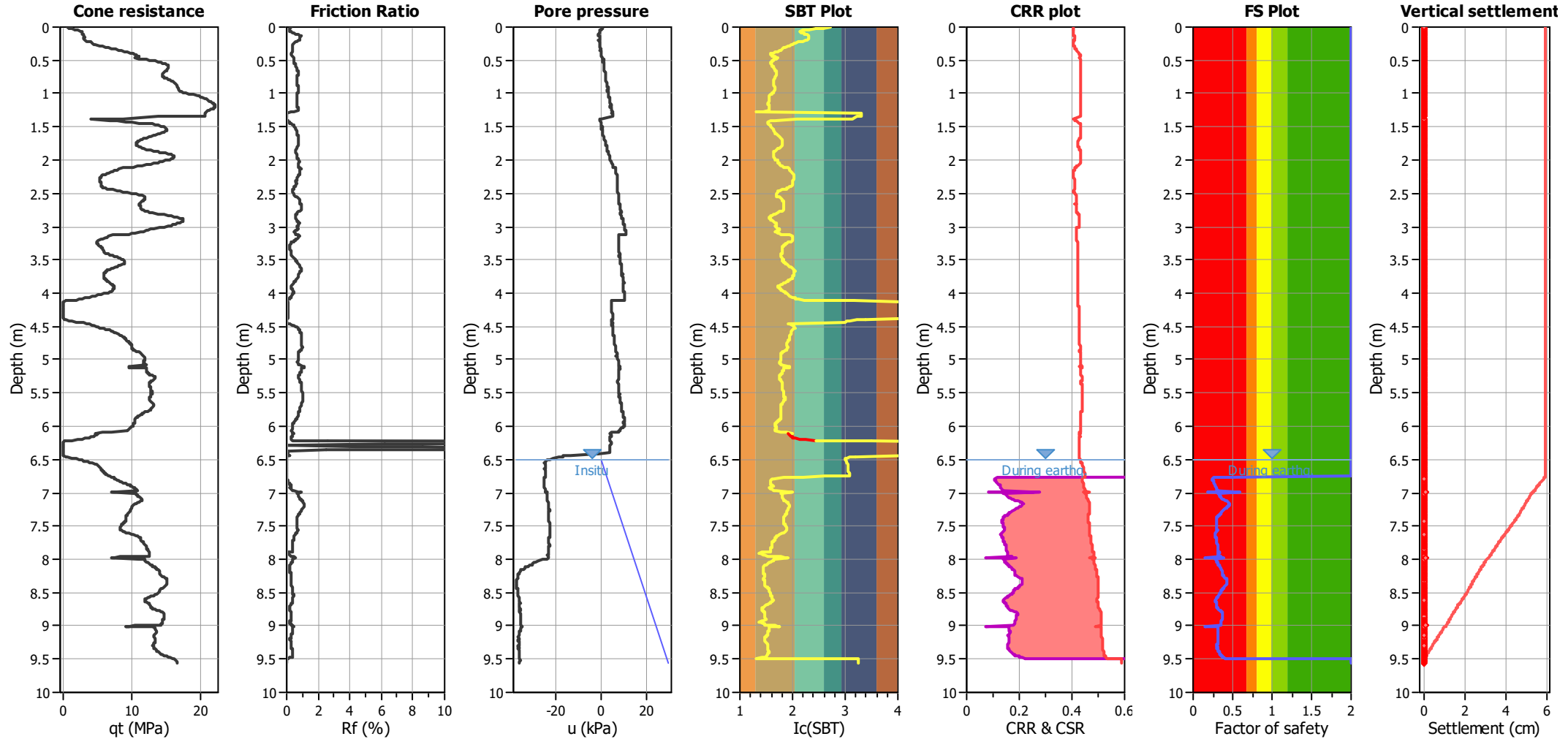
Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

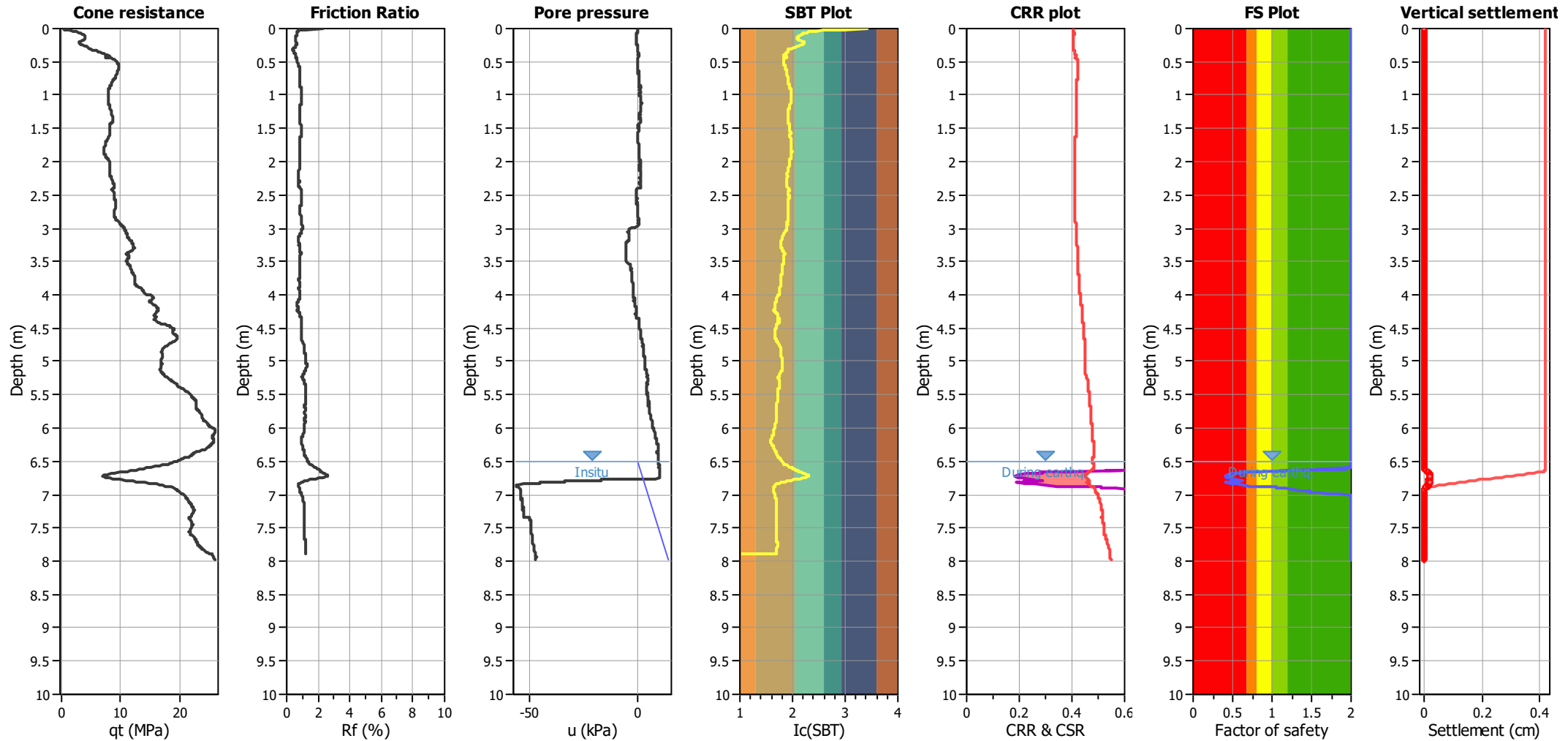
Location:

CPT: S2001 ULS_ISH

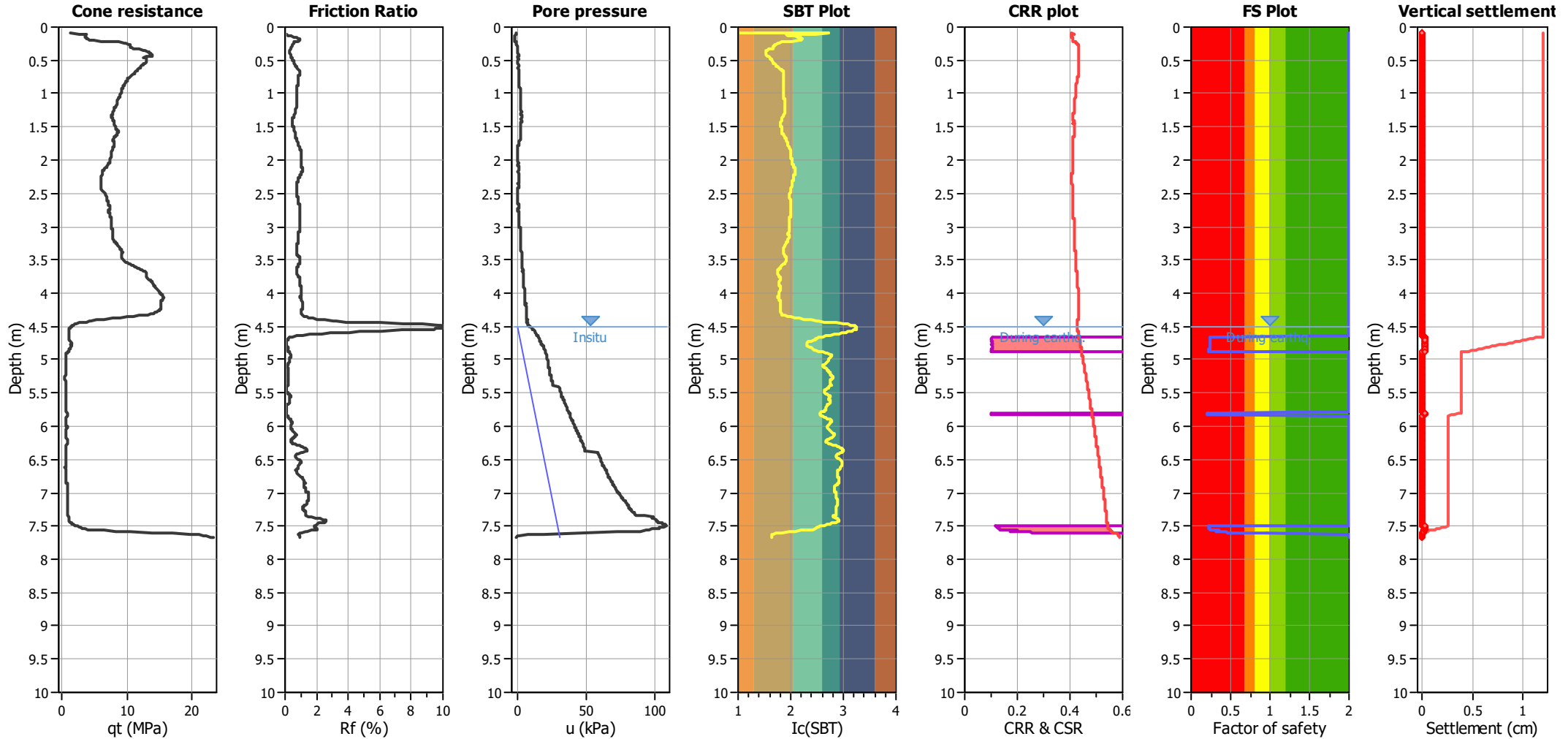
Total depth: 9.55 m



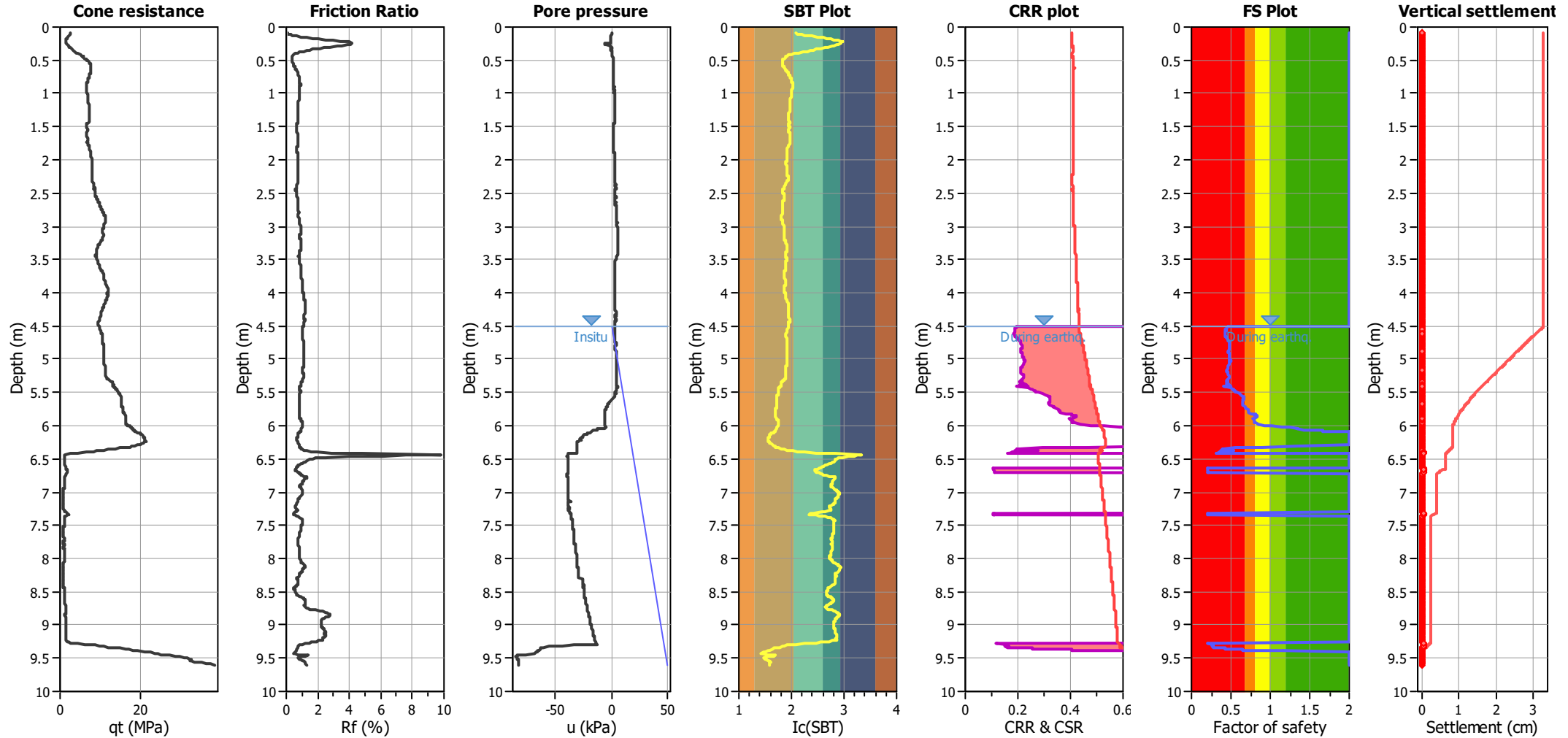
Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



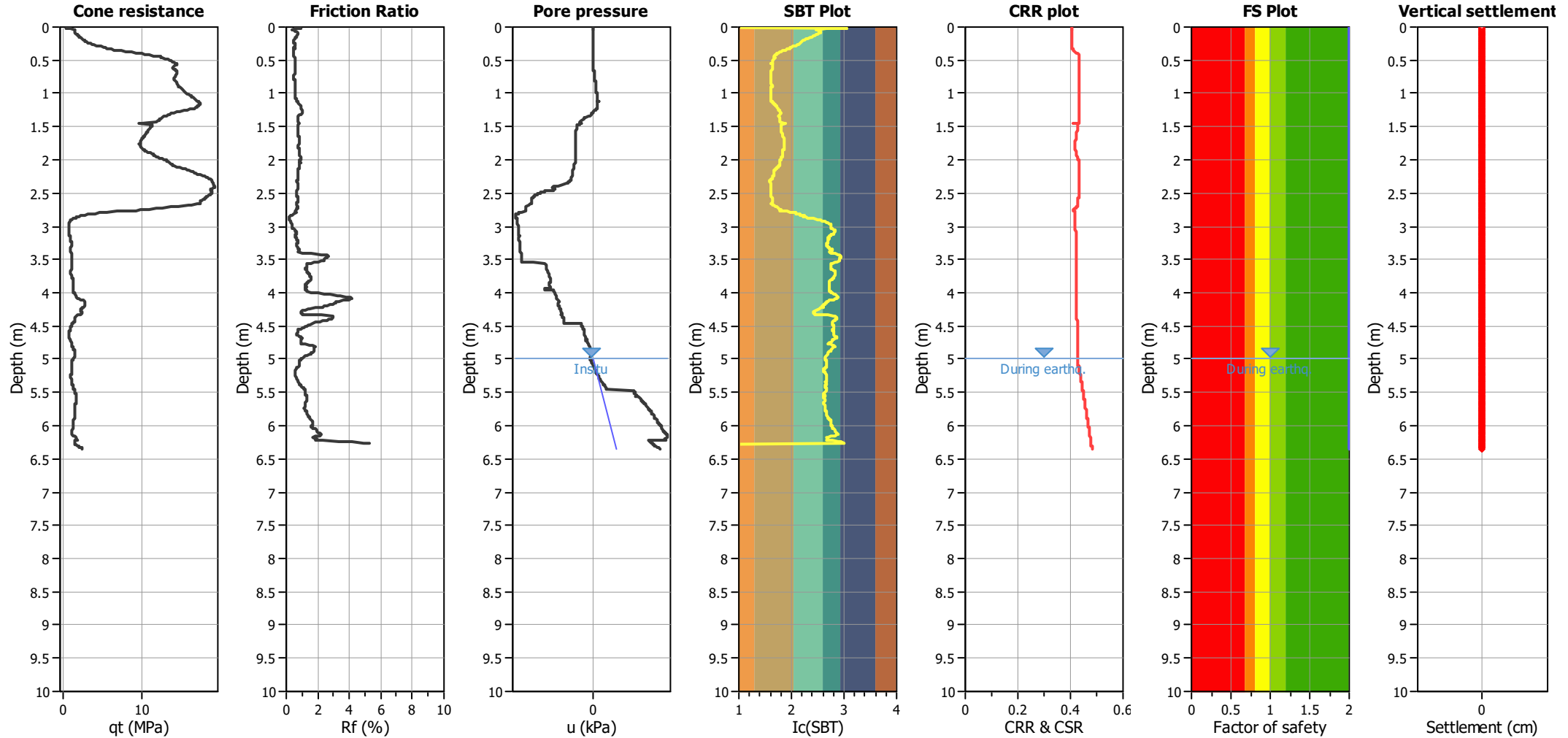
Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	No
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	Limit depth:
						N/A
						MSF method:
						Method based



Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



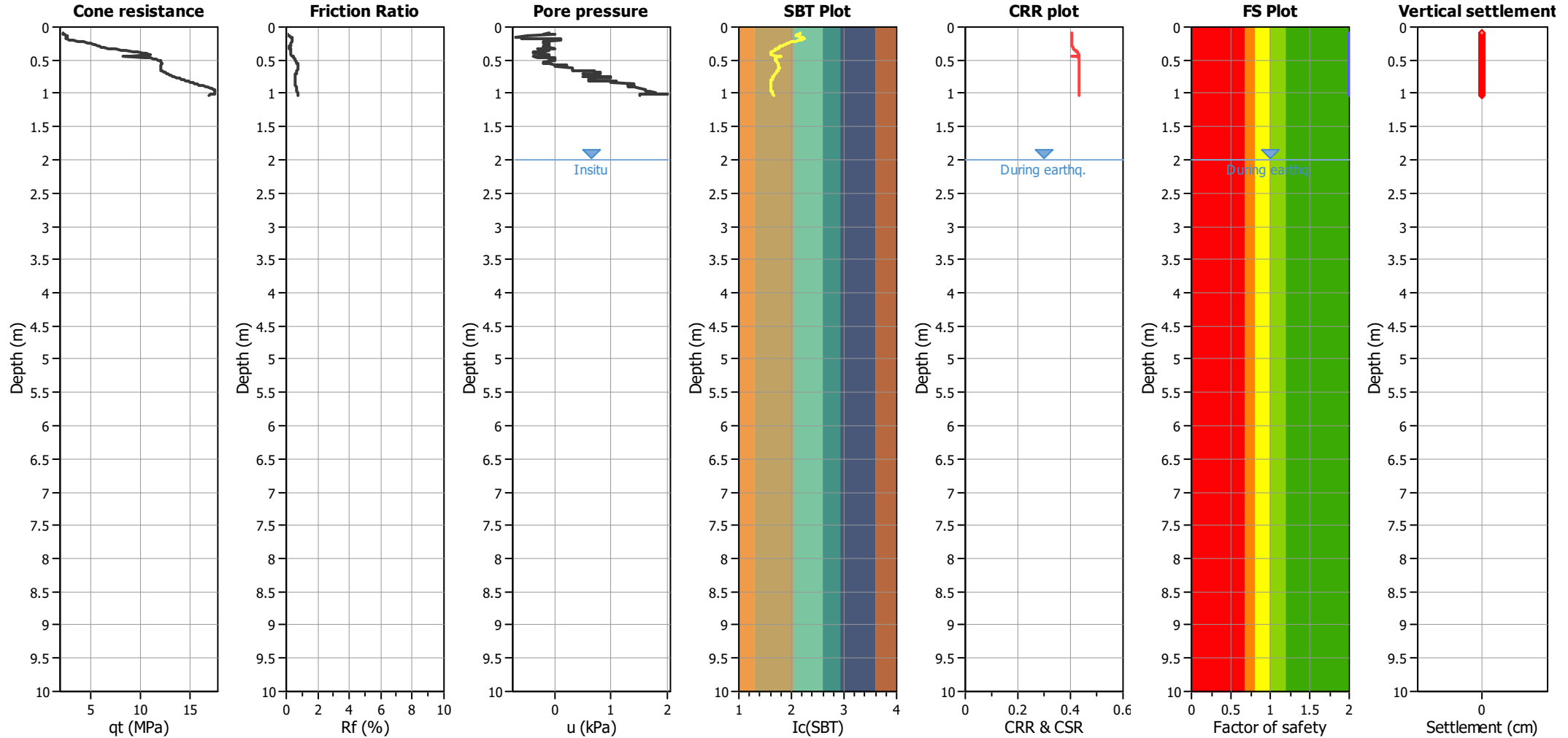
Analysis method:	B&I (2014)	G.W.T. (in-situ):	5.00 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.00 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	No
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	Limit depth:
						N/A
						MSF method:
						Method based

Project: MINZ210292 | Manu Park - Stage 2

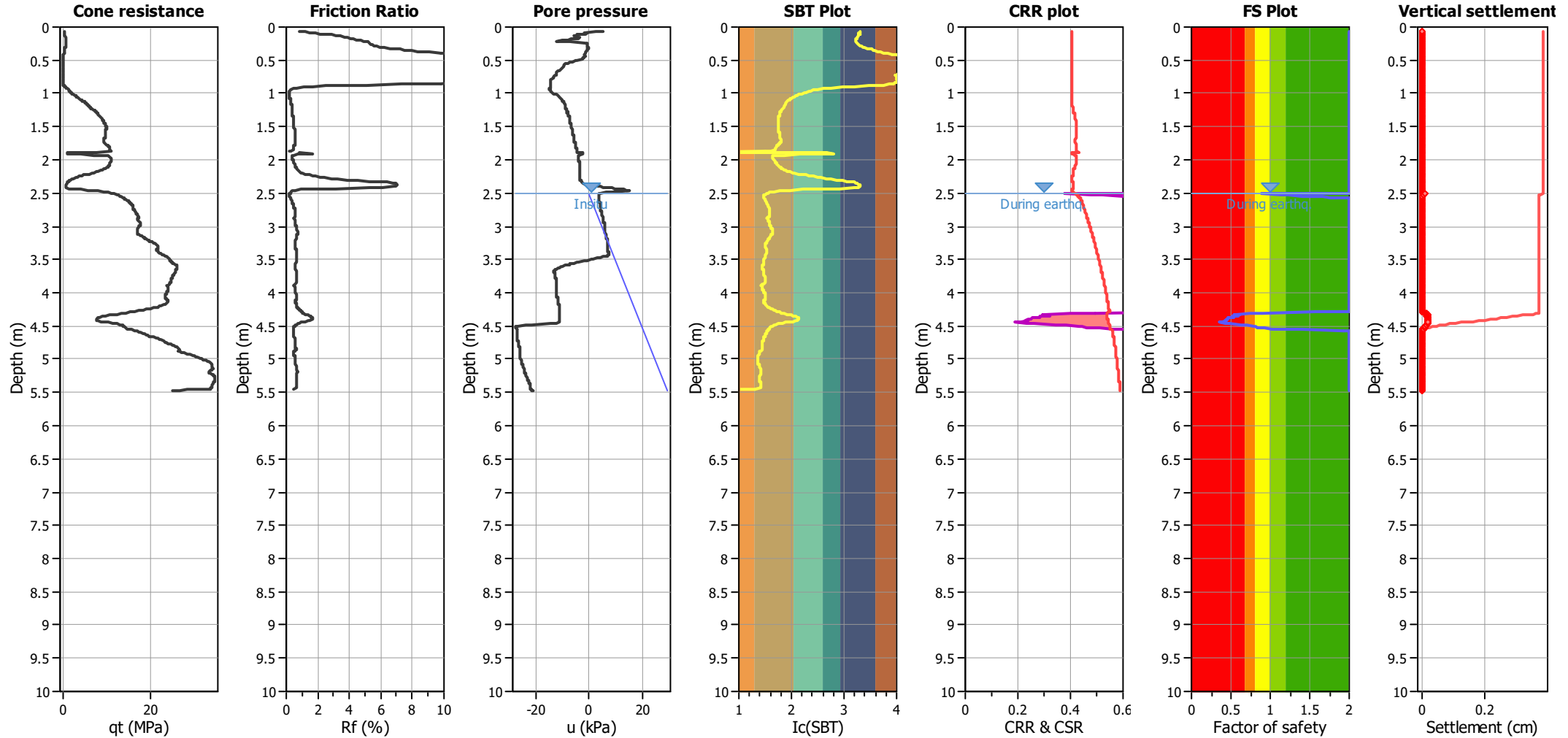
Location:

CPT: S2006 ULS_ISH

Total depth: 1.03 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



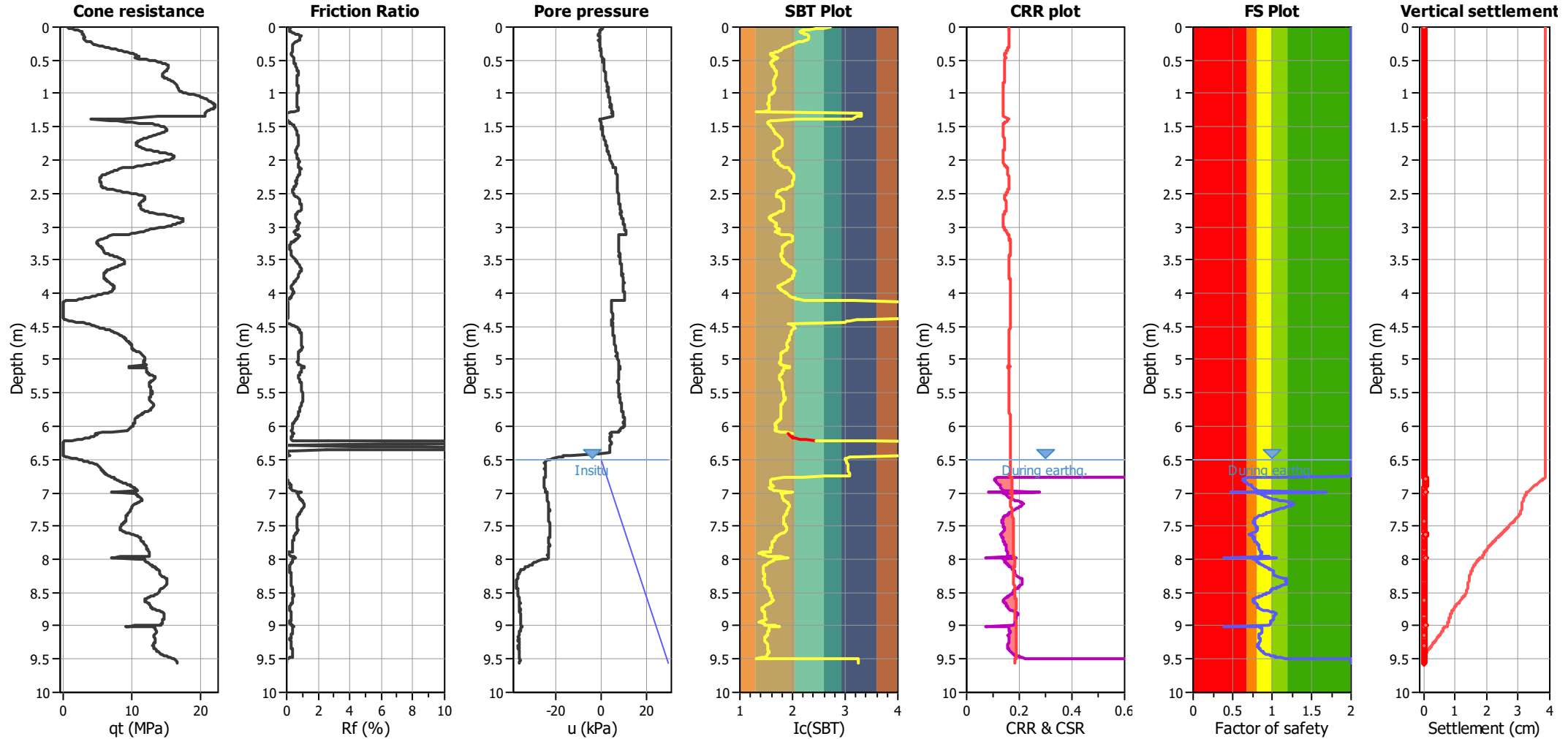
Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2001 IE_ISH

Total depth: 9.55 m



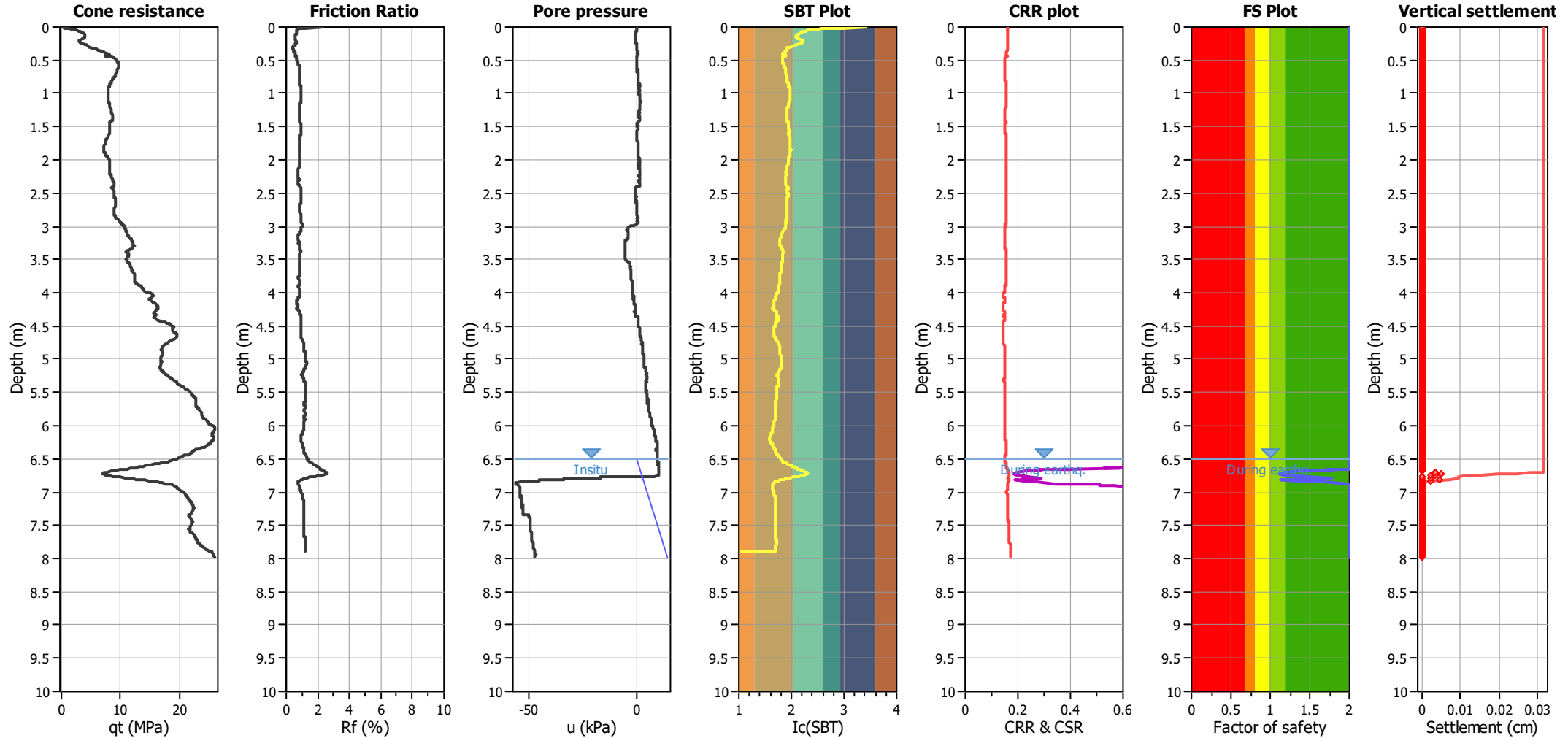
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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2002 IE_ISH

Total depth: 7.97 m



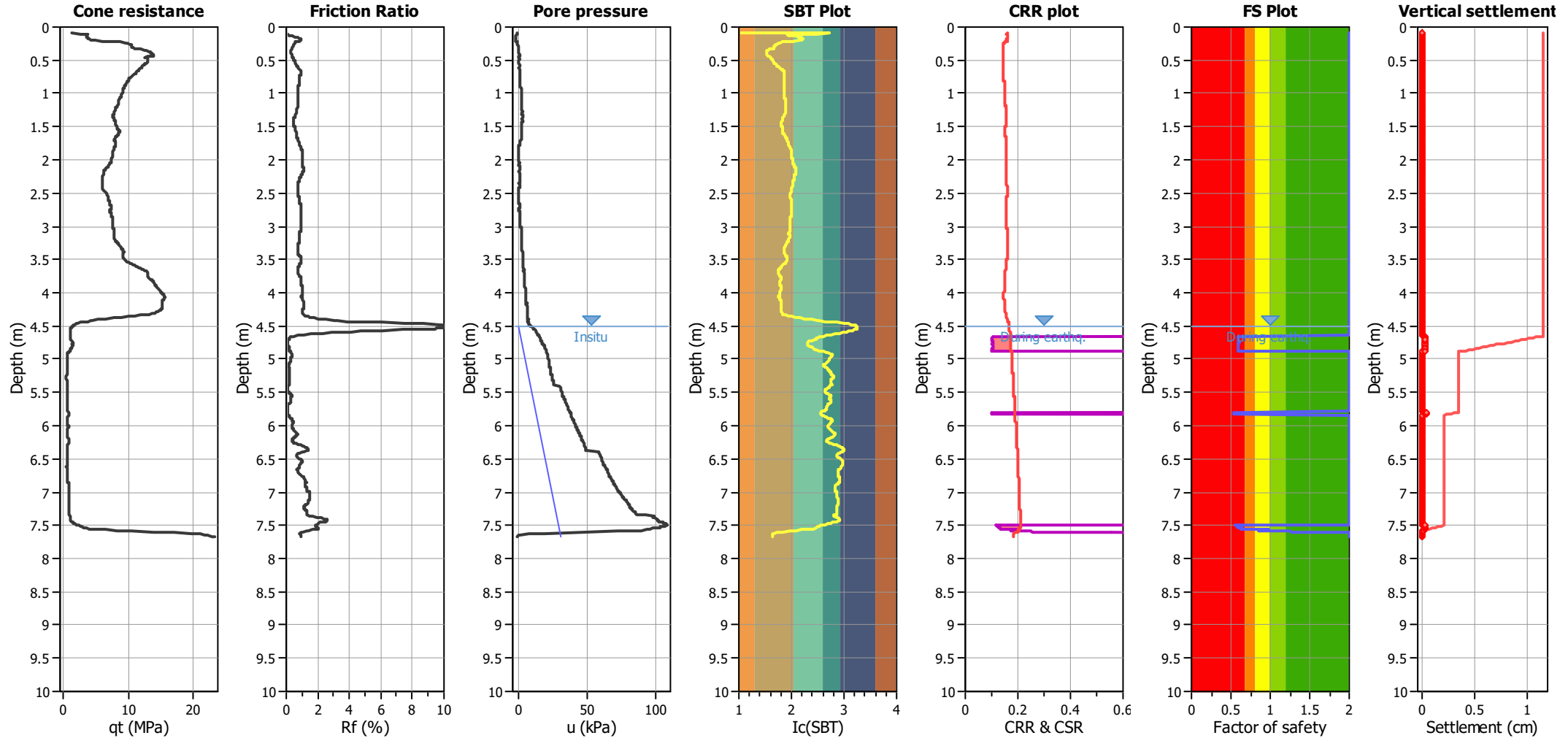
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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

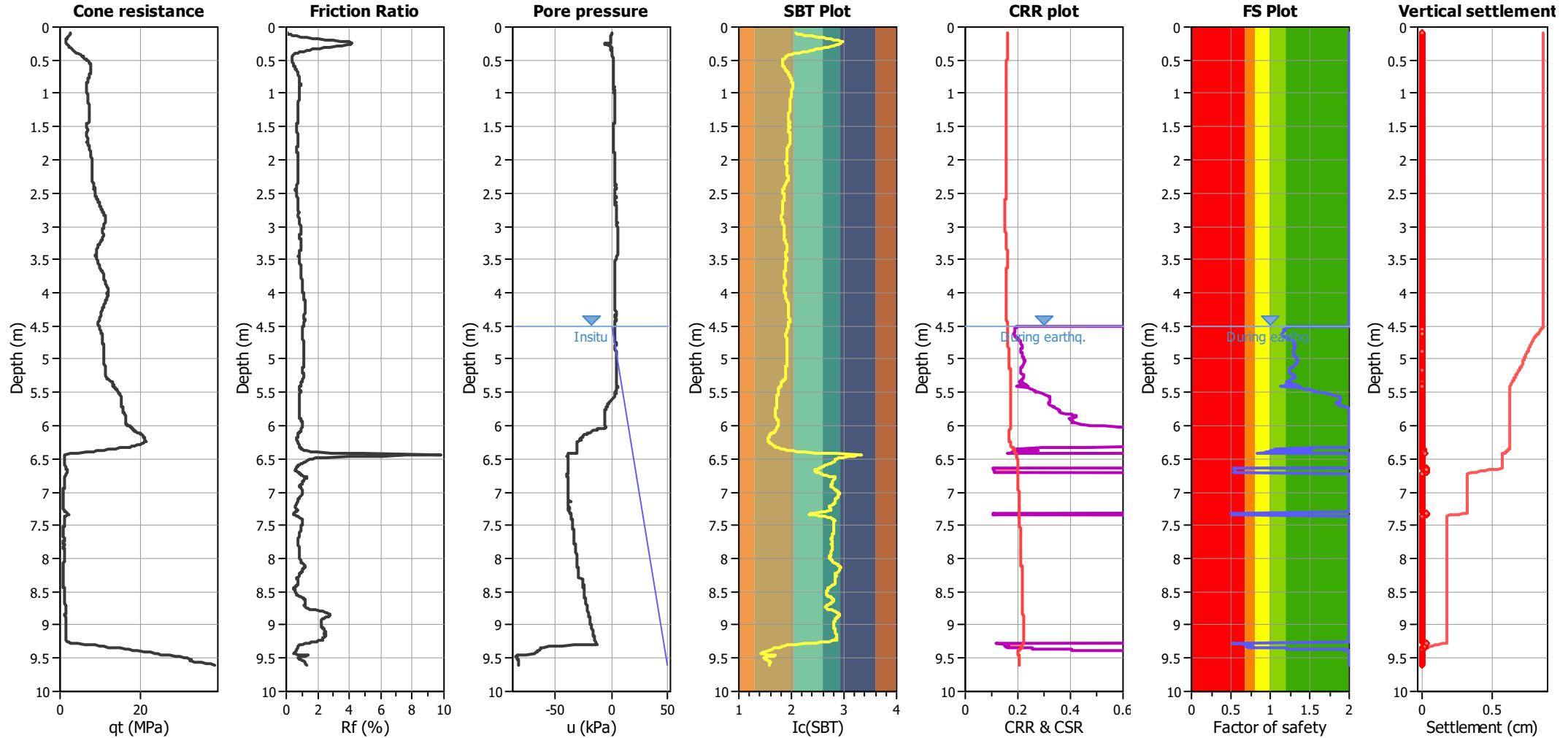
Location:

CPT: S2003 IE_ISH

Total depth: 7.67 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



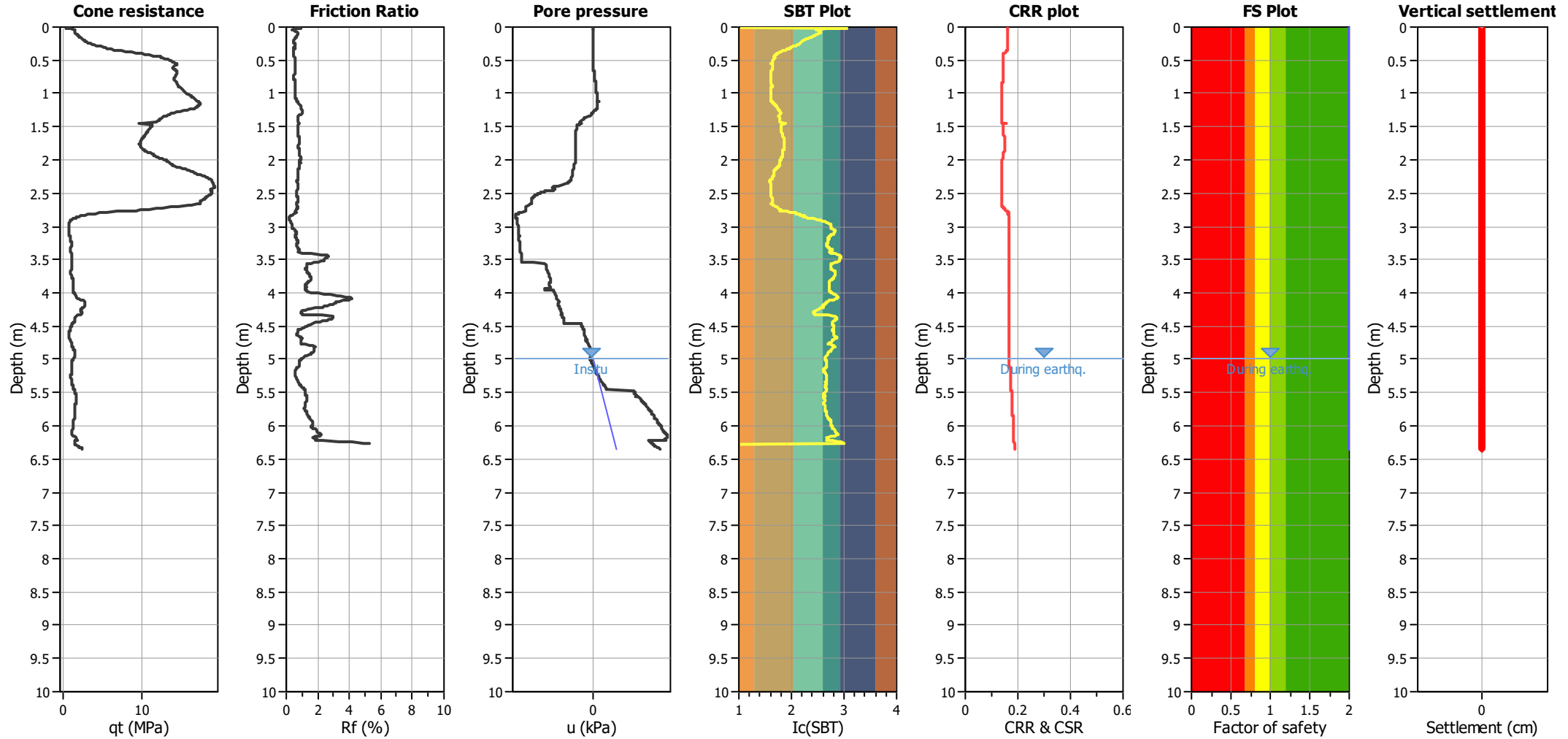
Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2005 IE_ISH

Total depth: 6.35 m



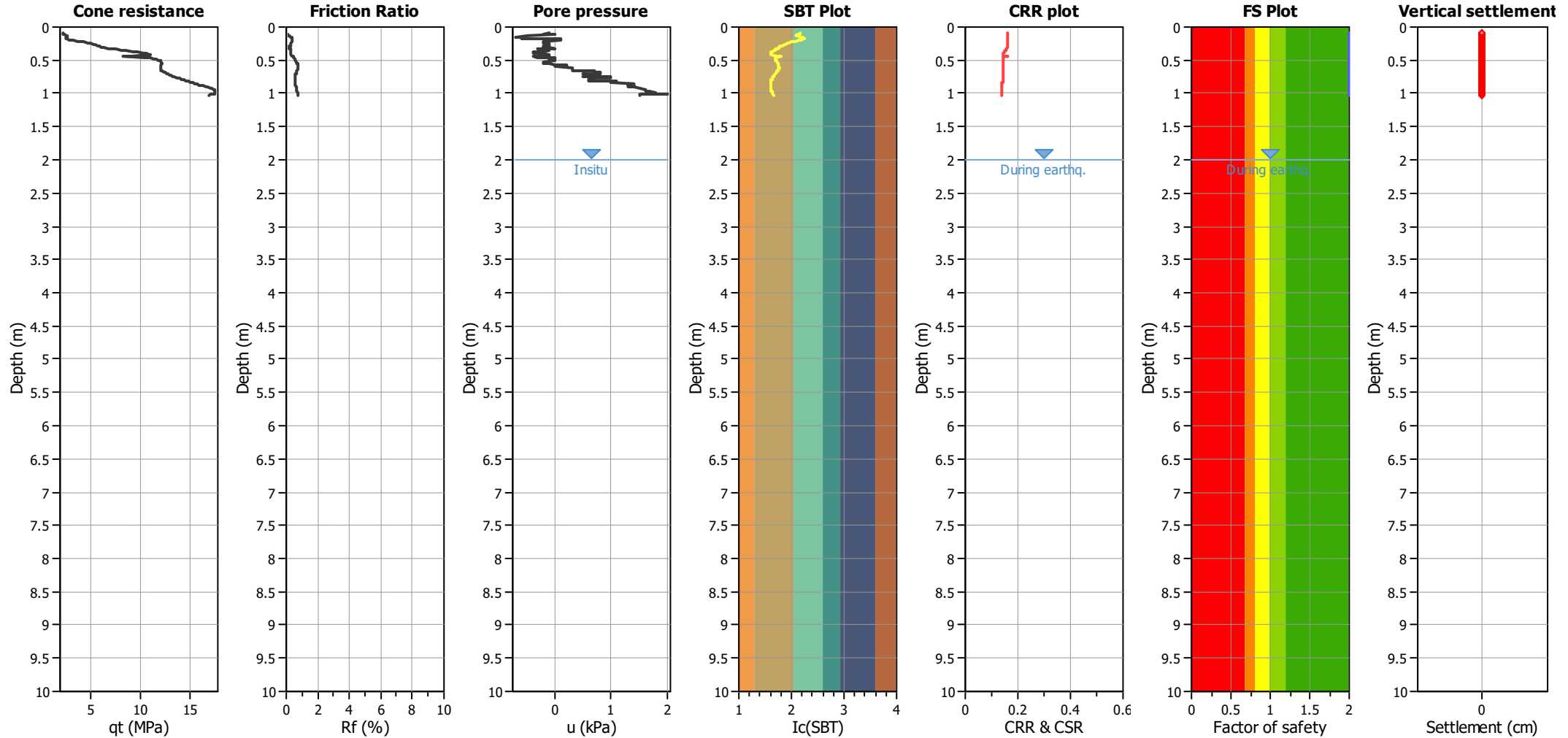
Analysis method:	B&I (2014)	G.W.T. (in-situ):	5.00 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.00 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2006 IE_ISH

Total depth: 1.03 m



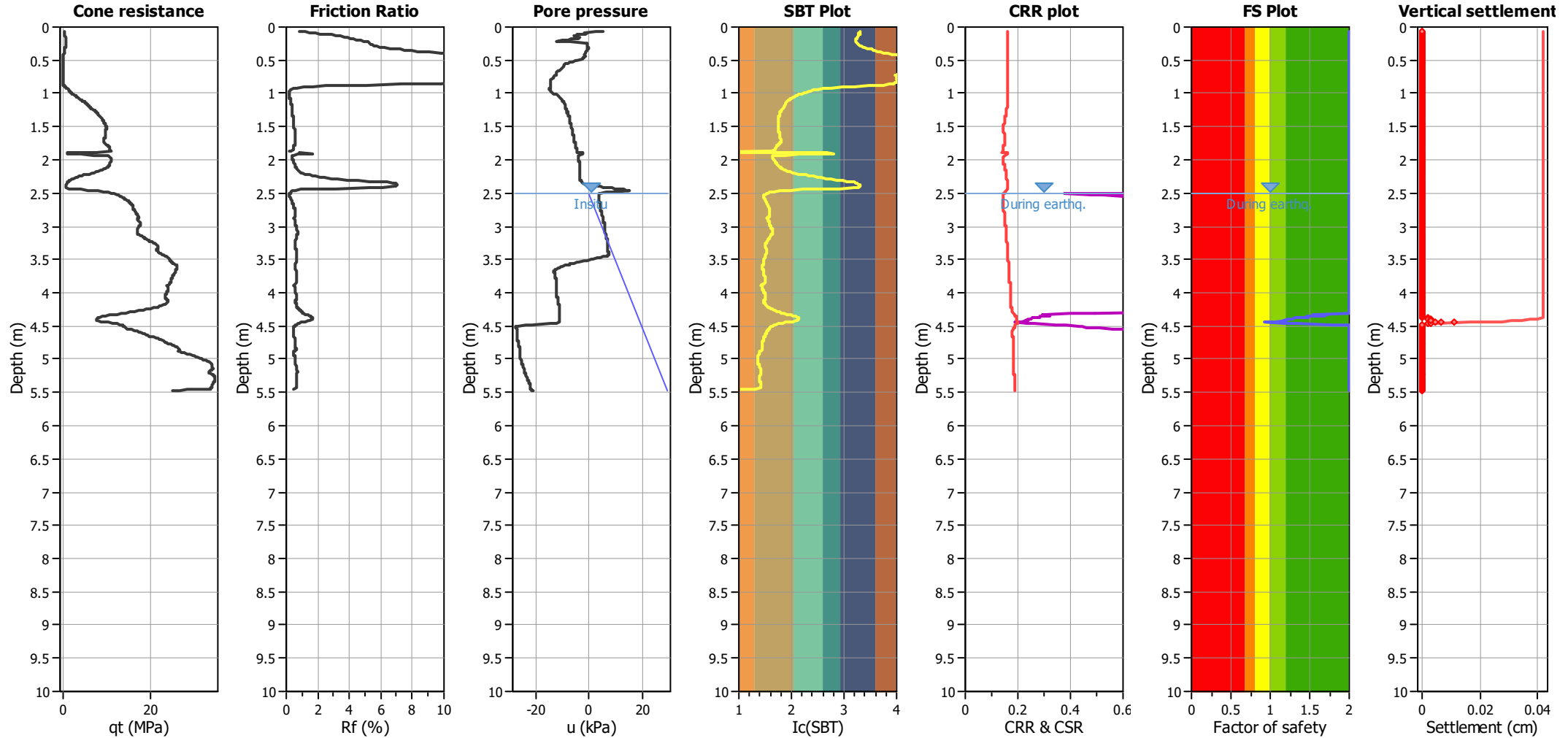
Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

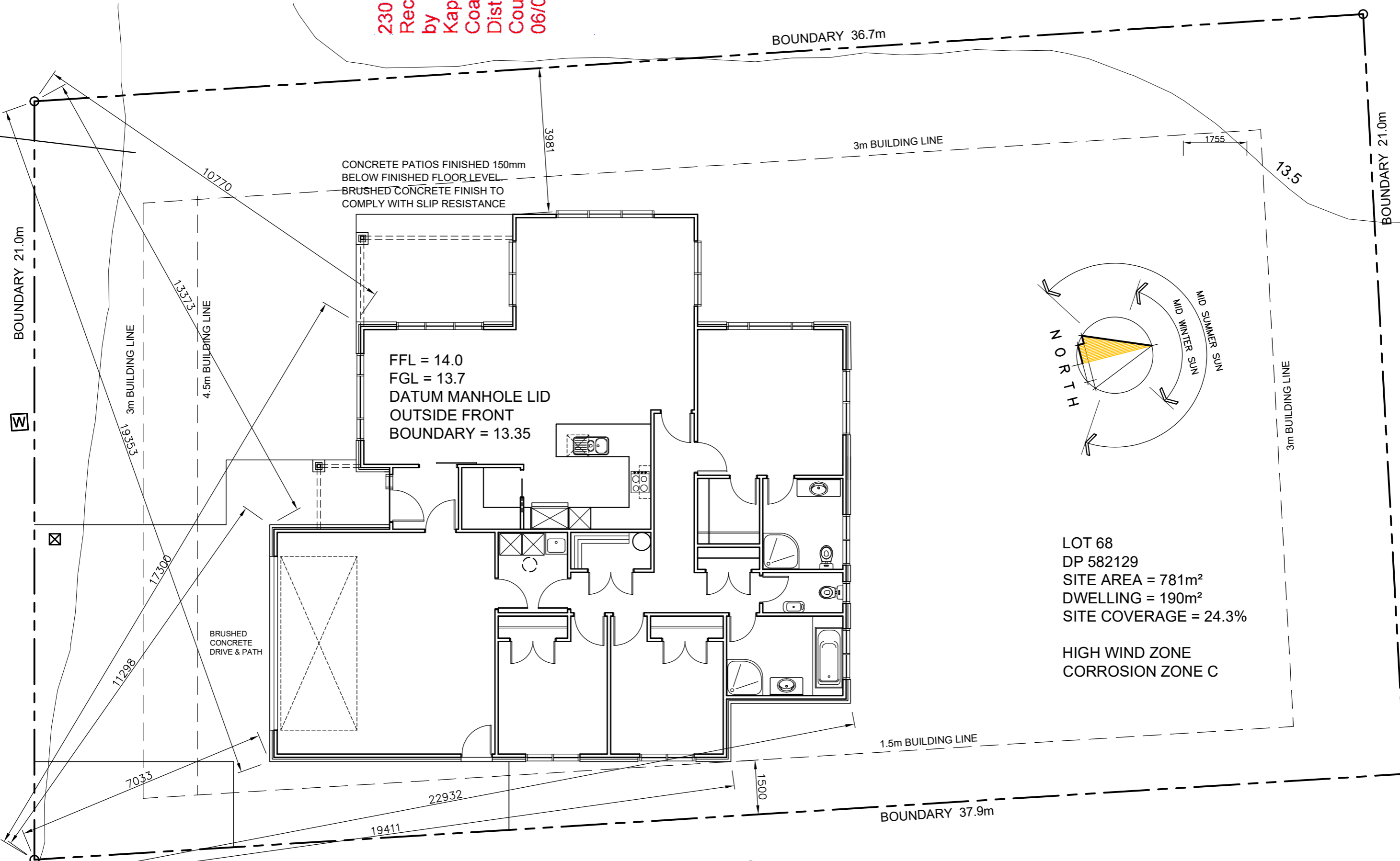
CPT: S5007 IE_ISH

Total depth: 5.48 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

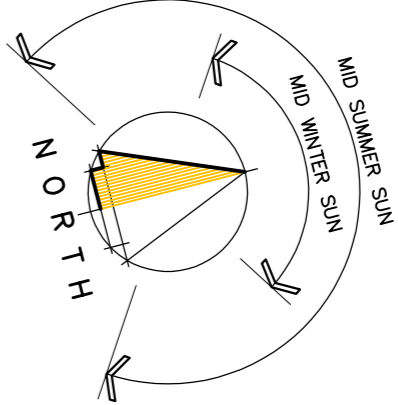
230147
Received
by Kapiti
Coast
District
Council
06/03/23



CONCRETE PATIOS FINISHED 150mm
BELOW FINISHED FLOOR LEVEL.
BRUSHED CONCRETE FINISH TO
COMPLY WITH SLIP RESISTANCE

FFL = 14.0
FGL = 13.7
DATUM MANHOLE LID
OUTSIDE FRONT
BOUNDARY = 13.35

BRUSHED
CONCRETE
DRIVE & PATH




LOT 68
DP 582129
SITE AREA = 781m²
DWELLING = 190m²
SITE COVERAGE = 24.3%

HIGH WIND ZONE
CORROSION ZONE C

SITE PLAN

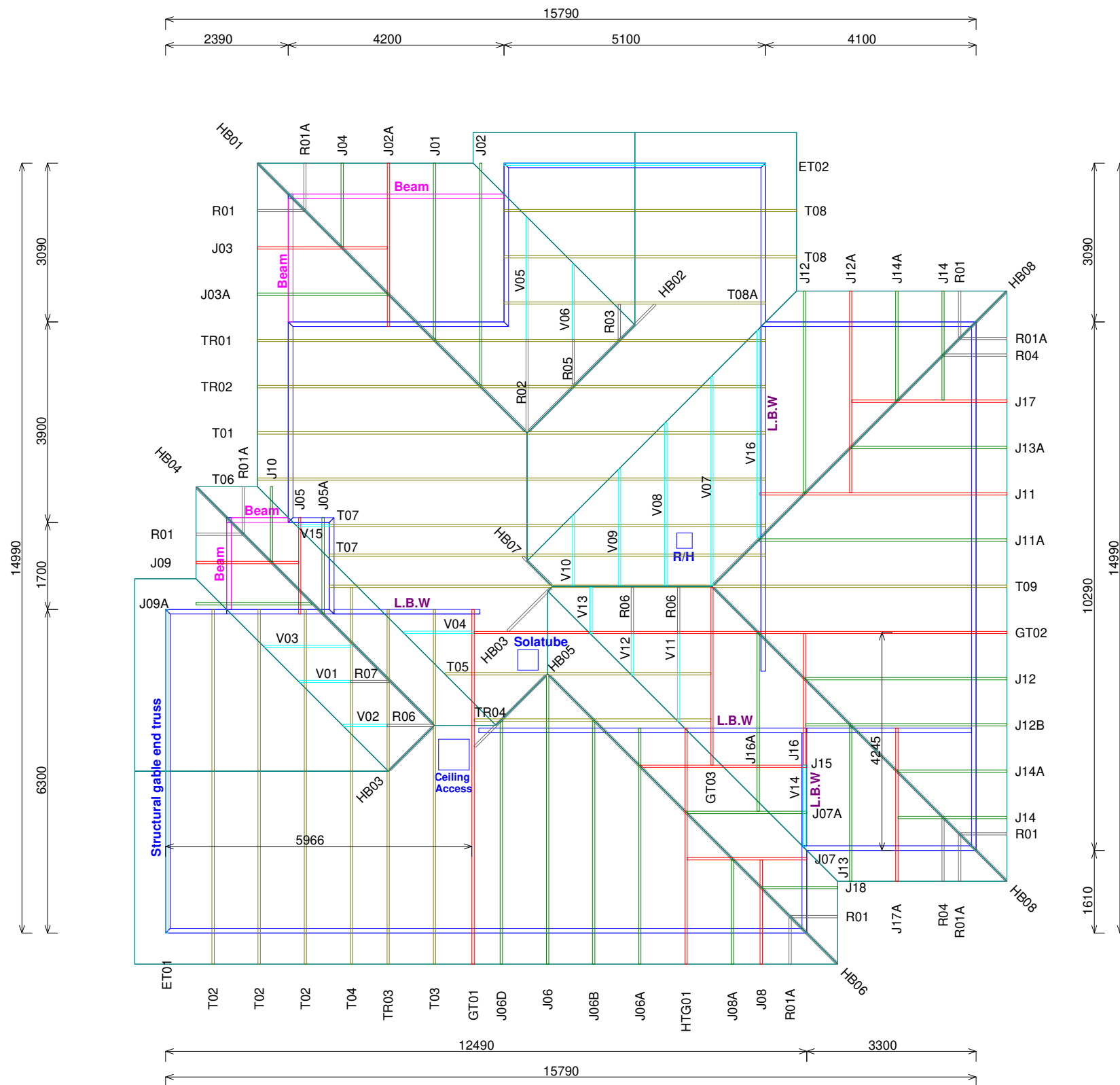
SCALE 1:100

All work shall be in accordance with the NZBC. If in doubt ASK. The Contractor must verify all dimensions on the job before commencing any work or shop drawings. Figured dimensions are to be used, scaled dimensions must be verified. This drawing and concept are copyright of Coastal Architecture Ltd. The recipient of this document is prohibited from disclosing its content for any purpose without the prior written consent of Coastal Architecture Ltd

Revisions: DECEMBER 2022 rev A MARCH 2023 rev B	Project: NEW DWELLING	Drawing Title: PARSONS	Drawing Title: SITE PLAN	Designer: COASTAL ARCHITECTURE LTD. 11 Epiha Street Paraparaumu New Zealand Tel: 027 2499 519 e-mail : coastarchdesign@gmail.com	Design: BF	Drawn: BF	
					Job: 334	Page of: 1	

Layout is null and void if trusses not supplied by PlaceMakers

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Site Address :
Parsons
Lot 68 Stage 2- Manu Park,
Waikanae,
Kapiti Coast.

Sheet Title :
**For Building Consent
Buildable Truss Layout**
Date : Dec 19,2022
Scale : 1:100
Drawn : Phung Tran
System : MiTek 20/20

Job Details:
Roof Pitch : 25.000 Deg
Roof Material : Metal Tiles
Ceiling Material : Gib Board 13mm
Wind Zone : High
Roof Snow Load : 0.000 kPa

Truss Centres : 900 mm
Roof Live Load : 0.250kPa
Floor Live Load : kPa
Wind Speed : 44.0 m/s

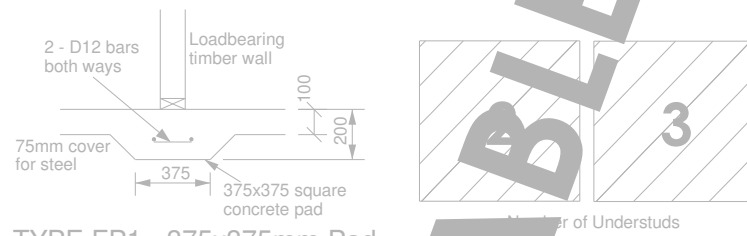


Job Title :
BL232330
Sheet :
1
Revision Number :

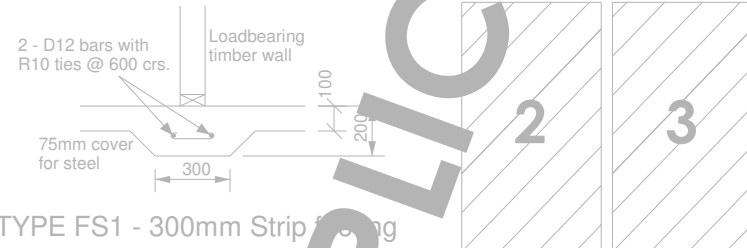
Slab Thickening Details

Layout is null and void if trusses not supplied by PlaceMakers

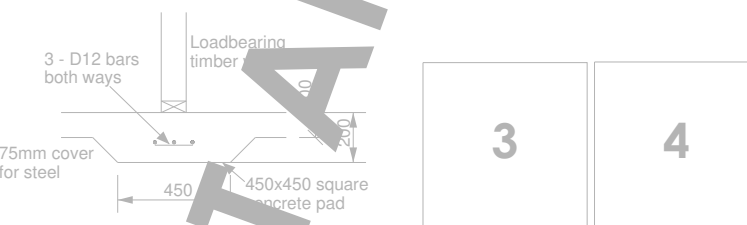
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Received
by Kapiti
Coast
District
Council
06/03/23



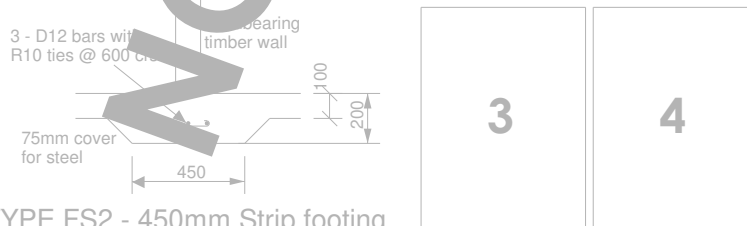
TYPE FP1 - 375x375mm Pad



TYPE FS1 - 300mm Strip Footing



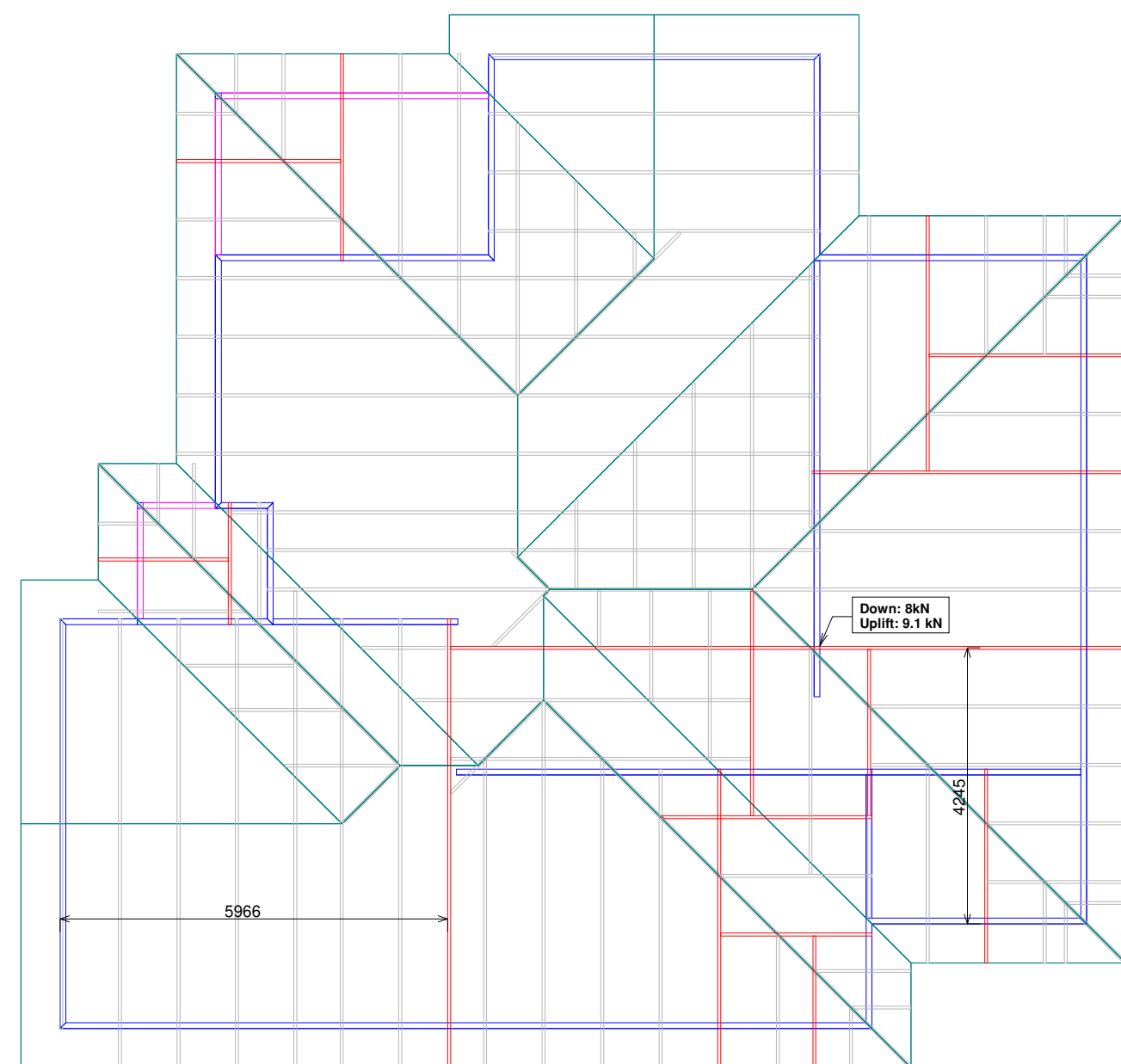
TYPE FP2 - 450x450mm Pad



TYPE FS2 - 450mm Strip footing

NOT APPLICABLE

NOTES:
All point loads exceeding 8.0kN are indicated.
All walls shown to be considered load bearing.
Refer to Rib-raft floor design for slab thickening.



Site Address :
Parsons
Lot 68 Stage 2-Manu Park,
Waikanae,
Kapiti Coast.

Sheet Title :
For Building Consent
Slab Thickening

Date : Dec 19,2022	Drawn : Phung Tran
Scale : 1:100	System : MiTek 20/20

Job Details:
Roof Pitch : 25.000 Deg
Roof Material : Metal Tiles
Ceiling Material : Gib Board 13mm
Wind Zone : High
Roof Snow Load : 0.000 kPa

Truss Centres : 900 mm
Roof Live Load : 0.250kPa
Floor Live Load : kPa
Wind Speed : 44.0 m/s



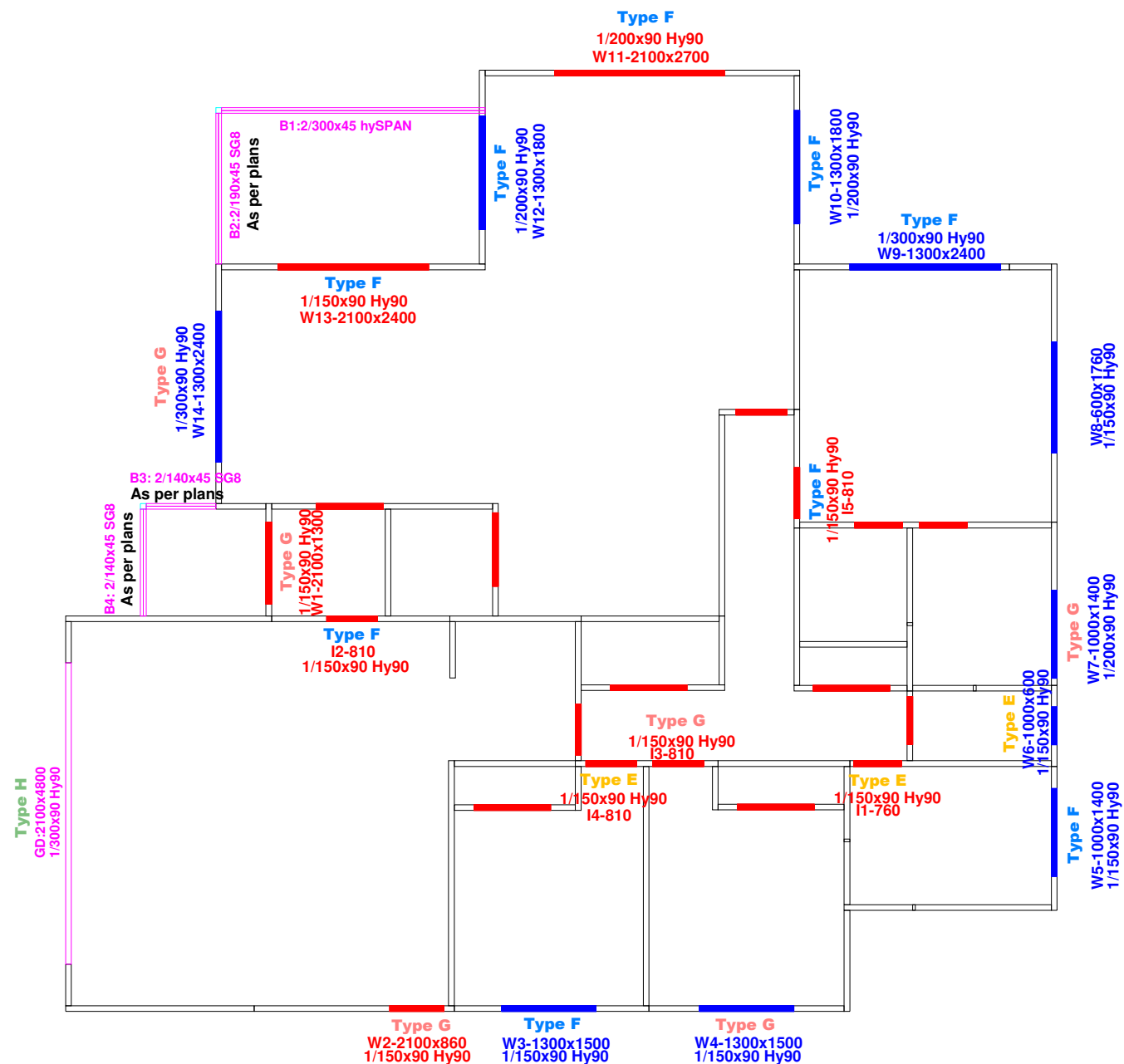
Job Title :
BL232330
Sheet :
2
Revision Number :

Lintel Fixing Details

- TYPE E
1.4kN
- TYPE F
4.0kN
- TYPE G
7.5kN
- TYPE H
13.5kN

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NOTES:
Refer to:
Lintel Fixing Schedule 01/2018
pages 73 & 74, Structural Fixings
On-site Guide for Building Code
Compliance 2018 Edition

(Alternative to NZS 3604:2011
Table 8.14 & Figure 8.12)



Site Address :
Parsons
Lot 68 Stage 2-Manu Park,
Waikanae,
Kapiti Coast.

Sheet Title :
**For Building Consent
Lintel Fixing**

Date : Dec 19,2022
Scale : 1:100
Drawn : Phung Tran
System : MiTek 20/20

Job Details:
Roof Pitch : 25.000 Deg
Roof Material : Metal Tiles
Ceiling Material : Gib Board 13mm
Wind Zone : High
Roof Snow Load : 0.000 kPa

Truss Centres : 900 mm
Roof Live Load : 0.250kPa
Floor Live Load : kPa
Wind Speed : 44.0 m/s



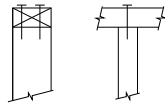
Job Title :
BL232330
Sheet :
3
Revision Number :

Stud to top plate fixing details

Type A is minimum fixing required unless specified otherwise

FIXING TYPE A
0.7kN

2/90x3.33 plain steel wire nails driven vertically into stud.

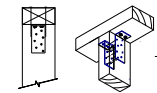


FIXING TYPE B
4.7kN

2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.

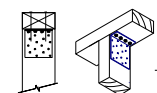
Plus 2x LUMBERLOK CPC40

AND



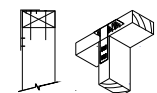
OR

Plus LUMBERLOK 6 kN Stud Anchor (CPC80)



OR

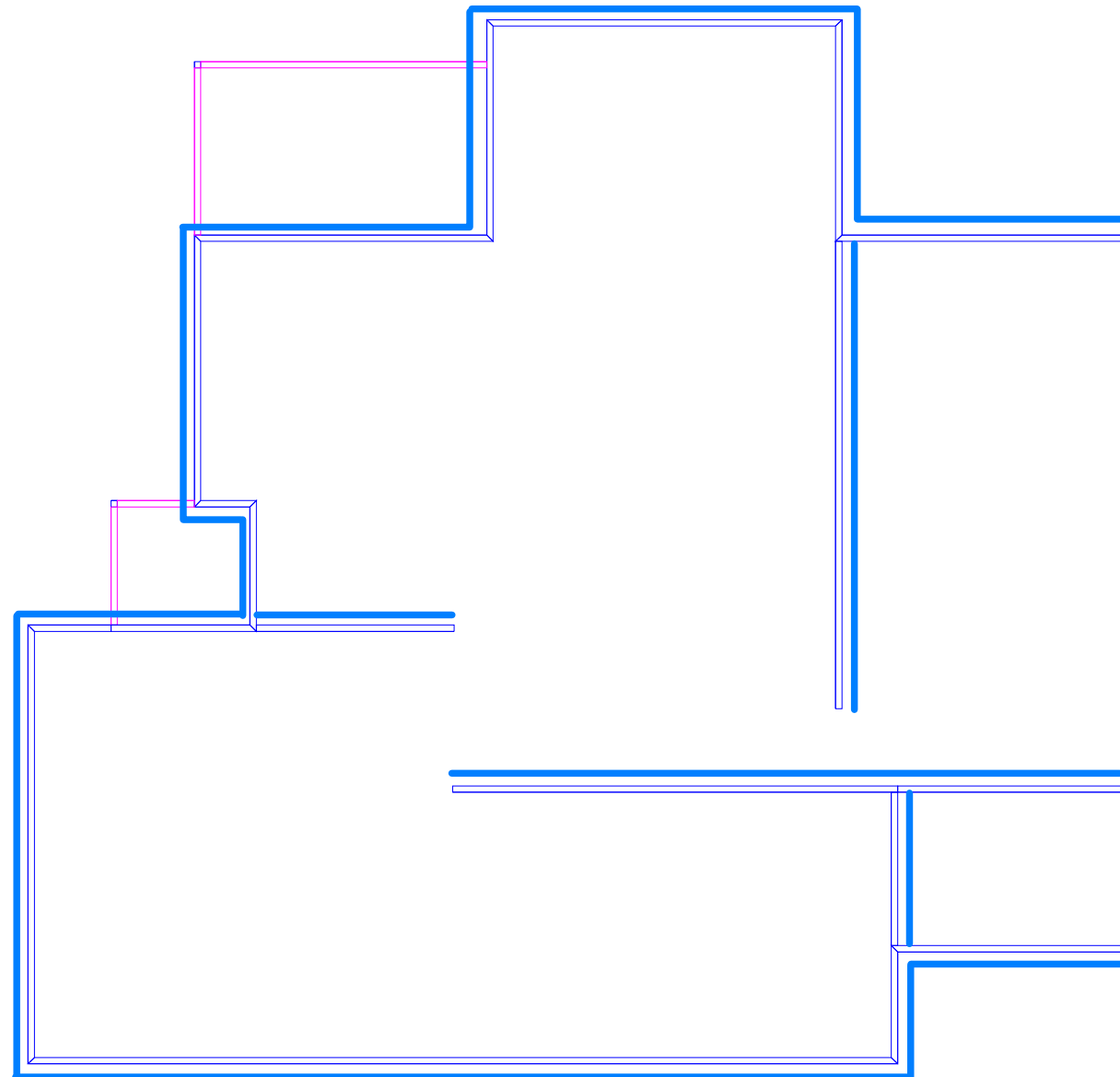
Plus LUMBERLOK Stud Strap (One face only)



Recommended for internal wall options to avoid lining issues.

Layout is null and void if trusses not supplied by PlaceMakers

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NOTES:

Refer to:
LUMBERLOK Wall Fixing Chart - Stud to Top Plate Fixing Schedule 09/2011

(Alternative to NZS3604:2011 Table 8.18)

PrimeCad v4.7.346



Site Address :
Parsons
Lot 68 Stage 2-Manu Park,
Waikanae,
Kapiti Coast.

Sheet Title :
**For Building Consent
Stud To Top Plate Fixing**

Date : Dec 19,2022	Drawn : Phung Tran
Scale : 1 : 100	System : MiTek 20/20














Job Details:
Roof Pitch : 25.000 Deg
Roof Material : Metal Tiles
Ceiling Material : Gib Board 13mm
Wind Zone : High
Roof Snow Load : 0.000 kPa

Truss Centres : 900 mm
Roof Live Load : 0.250kPa
Floor Live Load : kPa
Wind Speed : 44.0 m/s



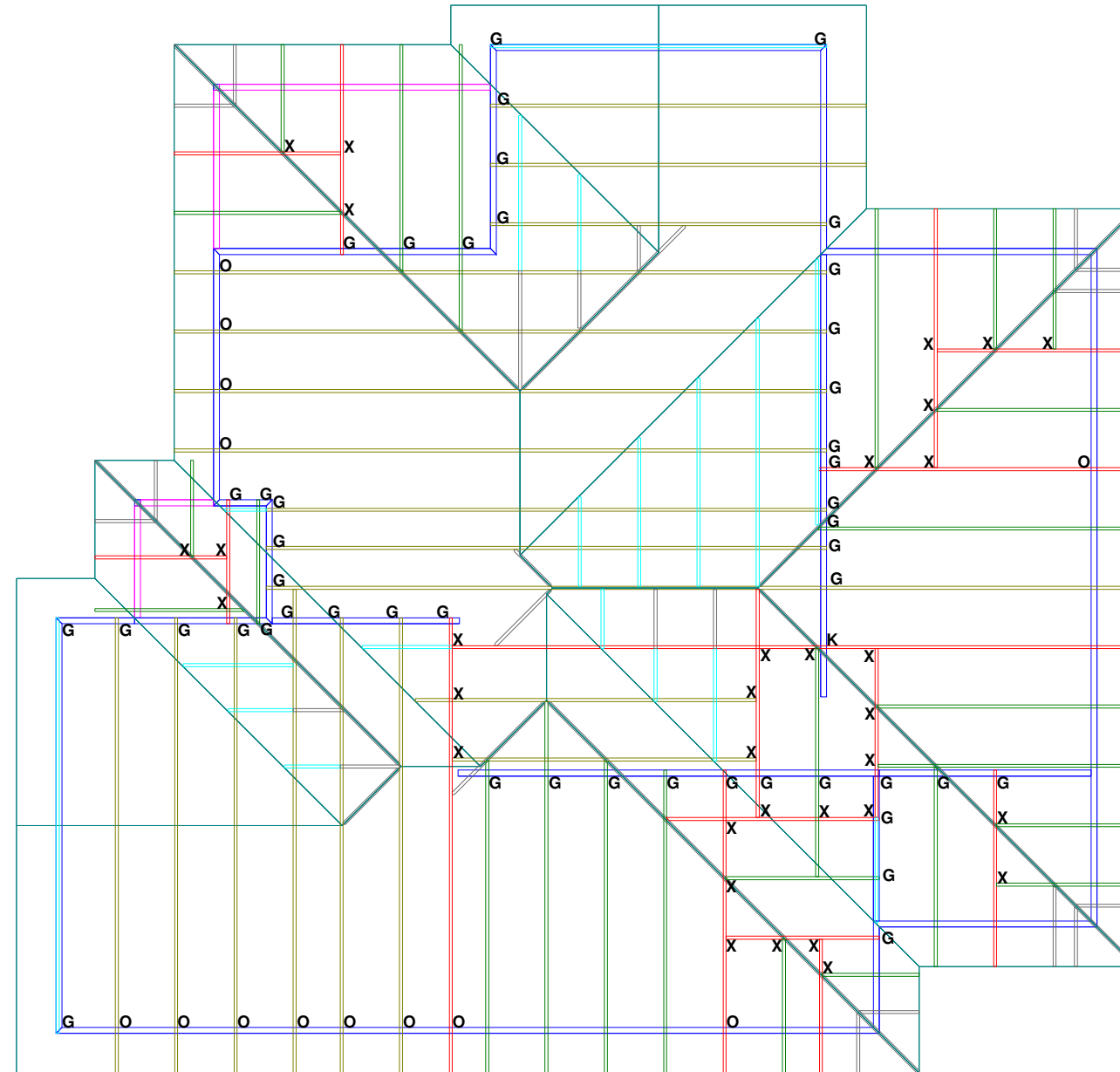
Job Title :
BL232330
Sheet :
4
Revision Number :

Truss Fixings

-  X - LUMBERLOK JH47x90 Joist Hanger
-  Z - LUMBERLOK JH47x120 Joist Hanger
-  P - LUMBERLOK JH47x190 Joist Hanger
-  E - LUMBERLOK JH95x165 Joist Hanger
-  O - Pair of LUMBERLOK CT200 Ceiling Ties
-  H - LUMBERLOK CT400 Cyclone Tie
-  B - LUMBERLOK CT600 Cyclone Tie
-  M - Pair of LUMBERLOK Multi Grips
-  NP - LUMBERLOK Nailon Plate
-  N - LUMBERLOK N21 Diagonal Cleat
-  W - Pair of LUMBERLOK CPC40 Cleats
-  K - LUMBERLOK TTP 16kN Truss to Top Plate set
-  G - LUMBERLOK TTP 9kN Truss to Top Plate set

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NOTES:

All other areas must have at the minimum 2/ 90x3.15mm skew nails + 2 wire dogs (4.7kN) for truss to top plate connections.

Refer to:
LUMBERLOK Timber Connectors Characteristic Loadings Data brochure 03/4

PrimeCad v4.7.346



Site Address :
Parsons
Lot 68 Stage 2-Manu Park,
Waikanae,
Kapiti Coast.

Sheet Title :
**For Building Consent
Truss Fixings**

Date : Dec 19,2022	Drawn : Phung Tran
Scale : 1 : 100	System : MiTek 20/20

Job Details:

Roof Pitch	: 25.000 Deg
Roof Material	: Metal Tiles
Ceiling Material	: Gib Board 13mm
Wind Zone	: High
Roof Snow Load	: 0.000 kPa

Truss Centres	: 900 mm
Roof Live Load	: 0.250kPa
Floor Live Load	: kPa
Wind Speed	: 44.0 m/s



Job Title :
BL232330

Sheet :
5

Revision Number :



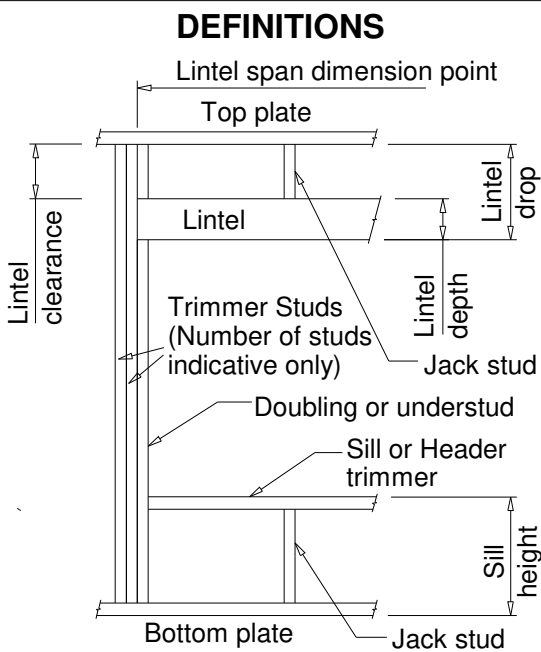
LINTEL FIXING SCHEDULE
ALTERNATIVE TO TABLE 8.14 & FIGURE 8.12
NZS 3604:2011

NOTE:

- ★ All fixings are designed for vertical loads only. Dead loads include the roof weight and standard ceiling weight of 0.20 kPa.
- ★ Refer to Table 8.19 NZS 3604:2011 for nailing schedule to resist horizontal loads.
- ★ These fixings assume the correct choice of rafter/truss to top plate connections have been made.
- ★ All fixings assume bottom plate thickness of 45mm maximum. Note: TYLOK options on timber species.
- ★ Wall framing arrangements under girder trusses are not covered in this schedule.
- ★ All timber selections are as per NZS 3604:2011

SELECTION CHART FOR LINTEL FIXING

Lintel Span	Loaded Dimension (See Fig. 1.3 NZS 3604:2011)	Light Roof Wind Zone				Heavy Roof Wind Zone				
		L	M	H	VH/EH	L	M	H	VH/EH	
1.0	2.0	E	E	E	F	F	E	E	E	F
	3.0	E	F	F	F	F	E	E	F	F
	4.0	E	F	F	F	G	E	E	F	F
	5.0	E	F	F	G	G	E	E	F	F
	6.0	E	F	F	G	G	E	E	F	F
1.2	2.0	E	E	F	F	F	E	E	F	F
	3.0	E	F	F	F	F	E	E	F	F
	4.0	E	F	F	G	G	E	E	F	F
	5.0	E	F	F	G	G	E	E	F	F
	6.0	F	F	G	G	H	E	E	F	G
1.5	2.0	E	F	F	F	F	E	E	F	F
	3.0	E	F	F	F	G	E	E	F	F
	4.0	E	F	F	G	G	E	E	F	F
	5.0	F	F	G	H	H	E	E	F	G
	6.0	F	F	G	H	H	E	E	F	G
2.0	2.0	E	F	F	F	F	E	E	F	F
	3.0	E	F	F	F	G	E	E	F	F
	4.0	F	F	G	G	H	E	E	F	G
	5.0	F	F	G	H	H	E	E	F	G
	6.0	F	F	G	H	H	E	E	F	G
2.4	2.0	E	F	F	G	G	E	E	F	G
	3.0	F	F	G	G	H	E	E	F	G
	4.0	F	F	G	H	H	E	E	F	G
	5.0	F	G	H	H	-	E	F	G	H
	6.0	F	G	H	H	-	E	F	G	H
3.0	2.0	E	F	F	G	G	E	E	F	G
	3.0	F	F	G	H	H	E	E	F	G
	4.0	F	G	H	H	-	E	F	G	H
	5.0	F	G	H	H	-	E	F	G	H
	6.0	F	G	H	-	-	E	F	H	-
3.6	2.0	F	F	G	H	H	E	E	F	G
	3.0	F	F	G	H	H	E	E	F	G
	4.0	F	G	H	H	-	E	F	G	H
	5.0	F	G	H	-	-	E	F	G	H
	6.0	G	H	H	-	-	E	F	H	-
4.2	2.0	F	F	G	H	H	E	E	F	G
	3.0	F	G	H	H	-	E	F	G	H
	4.0	F	G	H	-	-	E	F	G	H
	5.0	G	H	H	-	-	E	F	H	-
	6.0	G	H	-	-	-	E	F	H	-
4.5	2.0	F	F	G	H	H	E	E	F	G
	3.0	F	G	H	H	-	E	F	G	H
	3.4	F	G	H	H	-	E	F	G	H
	4.0	F	G	H	-	-	E	F	G	H
	5.0	G	H	-	-	-	E	F	H	-
4.8	2.0	F	F	G	H	H	E	E	F	G
	3.0	F	G	H	H	-	E	F	G	H
	3.2	F	G	H	H	-	E	F	G	H
	4.0	F	G	H	-	-	E	F	H	-
	5.0	G	H	-	-	-	E	F	H	-
5.1	2.0	F	F	G	H	H	E	E	F	G
	3.0	F	G	H	H	-	E	F	G	H
	3.5	F	G	H	-	-	E	F	G	H
	4.0	G	H	H	-	-	E	F	H	-
	5.0	G	H	-	-	-	E	F	H	-
5.4	2.0	F	F	G	H	H	E	E	F	G
	2.8	F	G	H	H	-	E	F	G	H
	3.0	F	G	H	-	-	E	F	G	H
	4.0	G	H	H	-	-	E	F	H	-
	5.0	G	H	-	-	-	E	F	H	-
6.0	G	H	-	-	-	E	F	H	-	



Lintel Supporting Girder Trusses:

Roof Tributary Area	Light Roof Wind Zone			Heavy Roof Wind Zone		
	L, M, H	VH	EH	L, M, H	VH	EH
8.6 m ²	G	G	H	G	G	H
11.6 m ²	G	H	H	G	G	H
12.1 m ²	G	H	H	G	H	H
15.3 m ²	H	H	-	G	H	H
19.1 m ²	H	-	-	G	H	-
20.9 m ²	H	-	-	H	H	-
21.8 m ²	H	-	-	H	-	-
34.3 m ²	-	-	-	H	-	-

- Notes:
- 1) Roof Tributary Area = approx. 1/2 x (Total roof area on girder and rafter trusses supported by Lintel)
 - 2) Assumed girder truss is at mid-span or middle third span of lintel
 - 3) Use similar fixings for both ends of lintel
 - 4) All other cases require specific engineering design.

LINTEL FIXING OPTIONS

TYPE E 1.4kN

4 x 90mm x 3.15 dia. nails
2 x 90mm x 3.15 dia. nails directly below lintel

90mm x 3.15 dia. nails Trimmer to understud at 250mm crs.

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

Tylok 2T4 one side

TYPE F 4.0kN

6 x 90mm x 3.15 dia. nails Tylok 4T5 one side
2 x 90mm x 3.15 dia. nails directly below lintel

90mm x 3.15 dia. nails Trimmer to understud at 250mm crs.

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

2 x Tylok 2T4 for Radiata Pine
2 x Strap Nail for Douglas Fir

TYPE G 7.5kN

6 x 90mm x 3.15 dia. nails
200mm Sheet Brace Strap to one side
2 x 90mm x 3.15 dia. nails directly below lintel (typical)

6 x 30mm x 3.15 dia. nails each end
90mm x 3.15 dia. nails at 250 crs. trimmer to understud (typical)

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

TYPE H 13.5kN

8 x 90mm x 3.15 dia. nails
400mm Sheet Brace Strap to both sides

6 x 30mm x 3.15 dia. nails each end of each strap

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

90mm x 3.15 dia. nails @ 250mm crs. both sides (typical)
Max. 100mm (typical)
Min. 75mm into concrete floor (typical)
2 x 6kN Stud Anchor (CPC80)
BOWMAC Screw Bolt M10 x 140mm with 50 x 50 x 3mm square washer into concrete floor or timber joist/bearer

6 x 30mm x 3.15 dia. nails to each side of stud
3 x 30mm x 3.15 dia. nails to each side of bottom plate
400mm Sheet Brace Strap wrap around bottom plate and up the other side
BOWMAC Screw Bolt M10 x 140mm with 50 x 50 x 3mm square washer into concrete floor or timber joist/bearer

8 x 90mm x 3.15 dia. nails
Tylok 10T10 to both sides
60mm (Two rows of teeth into understud)

Stud numbers indicative only. Refer Table 8.5 NZS 3604:2011

2 x Tylok 2T4 to both sides for Radiata Pine
2 x Strap Nail to both sides for Douglas Fir
GIB HandiBrac
400mm Sheet Brace Strap to one side
6 x 30mm x 3.15 dia. nails to stud
3 x 30mm x 3.15 dia. nails to bottom plate

Proprietary screw bolt

2 x 400mm Sheet Brace Strap to one side
6 x 30mm x 3.15 dia. nails each end to stud
3 x 30mm x 3.15 dia. nails to bottom plate
6 x 30mm x 3.15 dia. nails each end to timber joist/bearer

2 x 400mm Sheet Brace Strap to one side
6 x 30mm x 3.15 dia. nails each end to stud
3 x 30mm x 3.15 dia. nails to bottom plate
6 x 30mm x 3.15 dia. nails each end to timber joist/bearer

230147 Received by Kapiti Coast District Council 06/03/23



230147
 Received by
 Kapiti Coast District Council
 06/03/23

MiTek New Zealand Limited

Correspondence from : **AUCKLAND**
 40 Neales Road, East Tamaki 2013
 PO Box 58-014, Botany 2163
 Phone: 09 274 7109
 Fax: 09 274 7100

CHRISTCHURCH
 14 Pilkington Way, Wigram 8042
 PO Box 8387, Riccarton 8440
 Phone: 03 348 8691
 Fax: 03 348 0314

MiTek 20/20 Engineering 4.7.346.0

www.mitek.nz.co.nz

Printed: 18:20:11 19 Dec 2022

PRODUCER STATEMENT for MiTek 20/20[®] TRUSS DESIGN - Version 4.7

ISSUED BY: **MiTek New Zealand Limited**

TO: **Placemakers National Estimating Unit (NEU)**

IN RESPECT OF: **MiTek[®] Truss Designs**

This producer statement covers the MiTek 20/20[®] truss design and the structural performance of the GANG-NAIL[®] connector plate for the job reference **BL232330** and may be used by a Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

The MiTek 20/20[®] truss design program has been developed by MiTek New Zealand Limited for the design of MiTek[®] timber roof, floor and attic trusses in New Zealand. The truss designs computed by MiTek 20/20[®] are prepared using sound and widely accepted engineering principles, and in accordance with compliance documents of the New Zealand Building Code and Verification Method B1/VM1; and internationally accepted standard ANSI/TPI 1 - 2002 as an alternative solution, to satisfy the requirements of Clause B1 of the New Zealand Building Code.

On behalf of MiTek New Zealand Limited, and subject to:

- i) All proprietary products meeting their performance specification requirements
- ii) The provision of adequate roof bracing and overall building stability
- iii) Correct selection and placement of GANG-NAIL connector plates
- iv) Correct input of Truss Design Data as shown in the Fabricator Design Statement for this job
- v) The design being undertaken by the accredited fabricator under the terms of the software licence
- vi) Timber is graded to the requirements of NZS 3603:1993
- vii) Minimum timber treatment for these MiTek[®] trusses shall be in accordance with B2/AS1 Table 1A and the relevant sections of NZS 3602:2003

I believe on reasonable grounds that the trusses, if constructed in accordance with the MiTek 20/20[®] truss design and shop drawings, will comply with the relevant provisions of the New Zealand Building Code.

MiTek New Zealand Limited holds a current policy of Professional Indemnity Insurance no less than \$500,000.

On behalf of MiTek New Zealand Limited,

Date: Monday, 19 December 2022

In Ling Ng, BE (Hons), CPEng, IntPE, MIPENZ (ID: 146585)
TECHNICAL SERVICES MANAGER, MiTek New Zealand Limited

Placemakers National Estimating Unit (NEU)

Job: BL232330

Client: Little & Parsons
Phone:

Site: Parsons
Lot 68 Stage 2- Manu Park,
Waikanae,
Kapiti Coast.

Description:
Building Consent No.:
MITek 20/20 Engineering 4.7.346.0

MITek New Zealand Limited

Phone:

Printed: 18:20:11 19 Dec 2022

MITEK FABRICATOR DESIGN STATEMENT

This statement is issued by MiTek accredited fabricator **Placemakers National Estimating Unit (NEU)**, being licensed to use the MiTek 20/20® software, to the client listed above and may be used by the Building Consent Authority to assist in determining compliance with the New Zealand Building Code.

MITek 20/20® TRUSS DESIGN DATA

The MiTek 20/20® computer design for this job is based on the following design parameters entered into the program. The Fabricator shall ensure that these job details are current and relevant to the project for the design of the MiTek® trusses.

Job Details

Importance Level : 2

Design Working Life : 50 years

Roof Truss

Timber Group: NEU-H1.2

Pitch: 25.000 deg

Nominal Overhang: 600 mm

Roof

Material: Metal Tiles
Dead Load: 0.210 kPa
Restraints: 400 mm centres
Live Load: Qur = 0.250 kPa
Qc = 1.100 kN

Ceiling

Material: Gib Board 13mm
Dead Load: 0.200 kPa
Restraints: 600 mm centres
Live Load: Qc = 1.400 kN

Wind

Area: High (44.0 m/s)
Pressure Coeff: Cpe = varies; Cpi = -0.30, 0.20

The minimum timber treatment for these MiTek® trusses shall be in accordance with B2/AS1 Table 1A and the relevant sections of NZS 3602:2003. The timber for these MiTek® trusses shall be graded to the requirements of NZS 3603:1993. Proprietary fixings and timber connectors shall be selected in accordance with NZS3604:2011 Section 4 - Durability.

MiTek® Truss List

Legend: * = detail only, ? = input only, † = failed design, Ø = non certified, Unmarked trusses = designed successfully, LB = lateral bracing required
GB = gable brace required

Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)	Truss	Qty	Span (mm)	Pitch (deg)	Spacing (mm)
ET01	1	6300	25.000	900	J14A	2	1522	25.000	900	V05	1	2355	25.000	900
ET02	1	5100	25.000	900	J16A	1	2560	25.000	900	V06	1	1455	25.000	900
*HB01	1	7393	18.249	900	J18	1	864	25.000	900	V08	1	3156	25.000	900
*HB02	1	3511	18.249	900	*R01	5	913	25.000	900	V09	1	2256	25.000	900
*HB03	2	1210	18.249	900	*R01A	5	913	25.000	900	V10	1	1356	25.000	900
*HB04	1	6537	18.249	900	*R02	1	1801	25.000	900	V11	1	1706	25.000	900
*HB05	1	1988	18.249	900	*R03	1	696	25.000	900	V12	1	805	25.000	900
*HB06	1	7959	18.249	900	*R04	2	1235	25.000	900	V13	1	900	25.000	900
*HB07	1	796	18.249	900	*R05	1	869	25.000	900	V14	1	1595	25.000	900
*HB08	2	8093	18.249	900	*R06	3	901	25.000	900	V15	1	628	25.000	900
J01	1	2490	25.000	900	*R07	1	771	25.000	900	V16	1	4023	25.000	900
J02	1	2580	25.000	900	T01	1	9300	25.000	900	GT03	1	2560	25.000	900
J03A	1	1927	25.000	900	T02	3	6300	25.000	900	J03	1	1927	25.000	900
J04	1	1027	25.000	900	T03	1	6300	25.000	900	J08	1	1427	25.000	900
J05A	1	1880	25.000	900	T04	1	6733	25.000	900	J09	1	1399	25.000	900
J06	1	3990	25.000	900	T05	1	4612	25.000	900	J16	1	2560	25.000	900
J06A	1	3990	25.000	900	T06	1	9300	25.000	900	J17	1	2422	25.000	900
J06B	1	3990	25.000	900	T07	2	8500	25.000	900	J17A	1	2380	25.000	900
J06D	1	3990	25.000	900	T08	2	5100	25.000	900	V07	1	4056	25.000	900
J07A	1	2327	25.000	900	T08A	1	5100	25.000	900	GT02	1	9779	25.000	900
J08A	1	1427	25.000	900	T09	1	12600	25.000	900	J02A	1	2580	25.000	900
J09A	1	1399	25.000	900	TR01	1	9300	25.000	900	J05	1	1880	25.000	900
J10	1	850	25.000	900	TR02	1	9300	25.000	900	J07	1	2327	25.000	900
J11A	1	4222	25.000	900	TR03	1	6300	25.000	900	J12A	1	3322	25.000	900
J12	2	3322	25.000	900	TR04	1	4612	25.000	900	J15	1	2327	25.000	900
J12B	1	3322	25.000	900	V01	1	988	25.000	900	GT01	1	6300	25.000	900
J13	1	2380	25.000	900	V02	1	845	25.000	900	HTG01	1	3990	25.000	900
J13A	1	2422	25.000	900	V03	1	1668	25.000	900	J11	1	4222	25.000	900
J14	2	1522	25.000	900	V04	1	1364	25.000	900					

Total quantity : 106

230147
Received by
Kapiti Coast District Council
06/03/23

The computer design input has been carried out by:

Signed: 

Date: ...Monday, 19 December 2022....

Name of Detailer: Phung Tran.....

Qualifications and Title:

Placemakers National Estimating Unit (NEU)

Bearings Exceeding 8kN Report : Page 1

Job: BL232330

Client: Little & Parsons
Phone:Site: Parsons
Lot 68 Stage 2- Manu Park,
Waikanae,
Kapiti Coast.Description:
Building Consent No.:
MITek 20/20 Engineering 4.7.346.0

MITek New Zealand Limited

Phone:

Printed: 18:20:15 19 Dec 2022

TRUSS BEARINGS EXCEEDING 8KN REPORT -
Ultimate Limit State LoadsMiTek® Truss List

Legend: ? = input only, ✕ = failed design, Ø = non certified, Unmarked trusses = designed successfully

Critical Trusses	Qty	Span (mm)	Joint	Bearing Reactions (kN)	
				Down	Uplift
GT02	1	9779	O	7.997	9.080

230147
Received by
Kapiti Coast District Council
06/03/23

Note:

1) Select appropriate Slab Thickening Detail from the MiTek 'Internal Load Bearing On Concrete Floor Slabs' brochure.

DESIGN CERTIFICATE

Technical basis for structural design methodology contained in designIT for houses - New Zealand.

designIT for houses, New Zealand has been developed by experienced timber engineers to assist designers in selecting appropriate sizes of structural laminated veneer lumber products manufactured by Carter Holt Harvey LVL Limited (including hySPAN, hy90, hyONE and hyJOIST) and other generic stress grades of timber, to be used as structural elements for the construction of buildings that fall within the scope of NZS 3604.

The design methodology used for the software complies with the loading and general design requirements contained within AS/NZS 1170 and with timber structural design in accordance with NZS 3603:1993 including Amendment 4 (Verification method B1/MM1, 6.1).

designIT relies on the accurate input of span and loading information by the user. Where accurate inputs are submitted the product and/or stress grade and the size given will comply with the structural requirements of the New Zealand Building Code (NZBC), provided the installation is in accordance with the installation requirements provided by designIT and/or in product literature and/or NZS 3604, or specific engineering design, as appropriate.

Futurebuild LVL and SG8 components, when used and treated to the required treatment levels prescribed in NZS 3602 and NZS 3604, as modified by Acceptable Solution B2/AS1, will comply with the requirements of the NZBC (Acceptable Solution B2/AS1, 3.2).

References:

1. NZS 3603:1993 Timber Structures Standard.
2. NZS 3604:2011 Timber-framed buildings.
3. AS/NZS 1170:2002 Structural design actions, Parts 0 and 1.
4. AS/NZS 1170:2011 Structural design actions, Part 2: Wind actions.
5. AS/NZS 1170:2003 Structural design actions, Part 3: Snow and ice actions.
6. AS 1720.1:2010 Timber structures. Part 1: Design methods.
7. AS 1720.3:2016 Timber structures. Part 3: Design criteria for timber-framed residential buildings.

This Design Certificate, and any associated warranty/certification, is void where there has been substitution of alternate products not detailed within the Member Specification.

Version date: 29 September, 2022

For further information or advice contact:

Carter Holt Harvey LVL Limited,
173 Captain Springs Road, Onehunga. Auckland
Telephone: 0800 808 131
Email: designit@futurebuild.co.nz
Web: <https://futurebuild.co.nz/>

Specifier details:

Specifier:	Phung Tran
Business name:	PlaceMakers
Email:	neuadmin@placemakers.co.nz

Project & site details:

Project:	BL232330
Site address:	68 Stage 2- Manu Park, , Kapiti Coast
For (owner/s):	Kapiti Coast
Design wind zone	High
Snow loading	Design snow zone: N0

MEMBER DESIGN DETAILS

Member 1

- | | |
|--------------------------------|---|
| 1) Member code and description | GD - Lintels - In single or upper storey load bearing walls |
| 2) Date prepared | 19 December 2022 |
| 3) Serviceability criteria | AS 1720.1: 2010 and AS 1720.3: 2016 |

4) Design inputs

Span	4.8 m
Roof load width 'RLW'	0.9 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 300 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	10.0 mm	3.6 mm (long term)	2.7
Live load - $\Psi_S Q$	15.0 mm	0.8 mm	19.3
Wind load - W_s	24.0 mm	2.4 mm	10.2

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.8
1.2G + 1.5Q	0.80	-2.4
1.2G + W_u + $\Psi_c Q$	1.00	-3.2
0.9G + W_u	1.00	1.5

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 2**1) Member code and description**

W1 - Lintels - In single or upper storey load bearing walls

2) Date prepared

19 December 2022

3) Serviceability criteria

AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	1.3 m
Roof load width 'RLW'	4.7 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
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Long term load - $G + \Psi_L Q^*$	4.3 mm	0.8 mm (long term)	5.1
Live load - $\Psi_S Q$	5.2 mm	0.3 mm	20.2
Wind load - W_s	6.5 mm	0.8 mm	8.4

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-2.6
1.2G + 1.5Q	0.80	-4.0
1.2G + W_u + $\Psi_c Q$	1.00	-5.7
0.9G + W_u	1.00	3.7

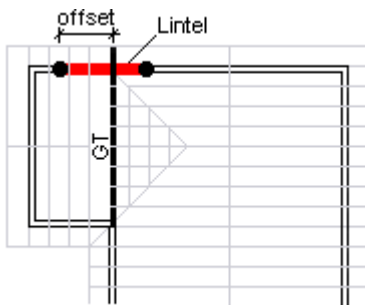
8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 3

1) Member code and description

W2 - Lintels - Supporting girder truss / truncated girder truss



2) Date prepared

19 December 2022

3) Serviceability criteria

AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Roof type	Light roof and ceiling - 40 kg/m ²
Roof pitch	25.0 °
Truss spacing	900 mm
Eaves overhang	600 mm
Common truss span	4566 mm
GT span	6300 mm
GT offset	801 mm
Lintel span	860 mm
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ_{LQ}^*	2.9 mm	0.1 mm (long term)	25.8
Live load - $\Psi_s Q$	3.4 mm	0.0 mm	103.2
Wind load - W_s	4.3 mm	0.1 mm	42.7

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-5.7
1.2G + 1.5Q	0.80	-9.0
1.2G + W_u + $\Psi_c Q$	1.00	-12.8
0.9G + W_u	1.00	8.4

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 4

- 1) Member code and description** W3 - Lintels - In single or upper storey load bearing walls
- 2) Date prepared** 19 December 2022
- 3) Serviceability criteria** AS 1720.1: 2010 and AS 1720.3: 2016
- 4) Design inputs**
- | | |
|------------------------|---|
| Span | 1.5 m |
| Roof load width 'RLW' | 2.9 m |
| Roof type and mass | Light roof and ceiling - 40 kg/m ² |
| Nominal wall thickness | 90 mm |
- 5) Member specification**
- | | |
|----------------------------|---|
| Size, stress grade/product | Use 150 x 90 hy90 |
| Material type | Structural Laminated Veneer Lumber to AS/NZS 4357 |

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ_{LQ}^*	5.0 mm	0.8 mm (long term)	6.1
Live load - $\Psi_s Q$	6.0 mm	0.2 mm	24.6
Wind load - W_s	7.5 mm	0.7 mm	10.2

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.8
1.2G + 1.5Q	0.80	-2.7
1.2G + W_u + $\Psi_c Q$	1.00	-3.9

0.9G + W _u	1.00	2.5
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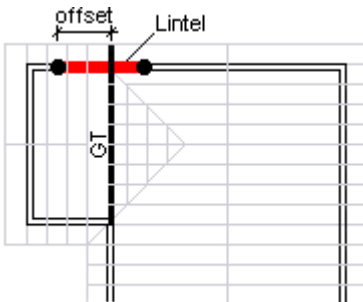
8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 5

1) Member code and description

W4 - Lintels - Supporting girder truss / truncated girder truss



2) Date prepared

19 December 2022

3) Serviceability criteria

AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Roof type	Light roof and ceiling - 40 kg/m ²
Roof pitch	25.0 °
Truss spacing	900 mm
Eaves overhang	600 mm
Common truss span	2327 mm
GT span	3990 mm
GT offset	1433 mm
Lintel span	1500 mm
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ LQ*	5.0 mm	0.7 mm (long term)	6.8
Live load - Ψ _s Q	6.0 mm	0.2 mm	27.7
Wind load - W _s	7.5 mm	0.7 mm	11.5

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-3.0
1.2G + 1.5Q	0.80	-4.6

1.2G + W _u + Ψ _c Q	1.00	-6.5
0.9G + W _u	1.00	4.2

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 6

1) Member code and description	W5 - Lintels - In single or upper storey load bearing walls
2) Date prepared	19 December 2022
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	1.4 m
Roof load width 'RLW'	1.5 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm
5) Member specification	
Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ _L Q [*]	4.7 mm	0.4 mm (long term)	13.0
Live load - Ψ _S Q	5.6 mm	0.1 mm	54.6
Wind load - W _s	7.0 mm	0.3 mm	22.6

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-0.9
1.2G + 1.5Q	0.80	-1.4
1.2G + W _u + Ψ _c Q	1.00	-1.9
0.9G + W _u	1.00	1.2

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 7

1) Member code and description	W6 - Lintels - In single or upper storey load bearing walls
2) Date prepared	19 December 2022
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	0.6 m
Roof load width 'RLW'	1.0 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	2.0 mm	0.0 mm (long term)	109.4
Live load - $\Psi_S Q$	2.4 mm	0.0 mm	446.3
Wind load - W_s	3.0 mm	0.0 mm	184.8

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

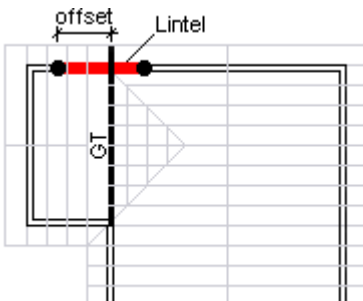
Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-0.4
1.2G + 1.5Q	0.80	-0.7
1.2G + W_u + $\Psi_c Q$	1.00	-0.9
0.9G + W_u	1.00	0.6

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 8**1) Member code and description**

W7 - Lintels - Supporting girder truss / truncated girder truss

**2) Date prepared**

19 December 2022

3) Serviceability criteria

AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Roof type	Light roof and ceiling - 40 kg/m ²
Roof pitch	25.0 °
Truss spacing	900 mm

Eaves overhang	600 mm
Common truss span	2560 mm
GT span	9779 mm
GT offset	529 mm
Lintel span	1400 mm
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 200 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	4.7 mm	0.8 mm (long term)	5.8
Live load - $\Psi_S Q$	5.6 mm	0.2 mm	22.7
Wind load - W_S	7.0 mm	0.7 mm	9.4

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-3.6
1.2G + 1.5Q	0.80	-5.7
1.2G + W_u + $\Psi_c Q$	1.00	-8.0
0.9G + W_u	1.00	5.2

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 9

1) Member code and description	W8 - Lintels - In single or upper storey load bearing walls
2) Date prepared	19 December 2022
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	1.8 m
Roof load width 'RLW'	2.0 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm
5) Member specification	
Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
-----------	---	---	-----------------------------

Long term load - $G + \Psi_L Q^*$	6.0 mm	1.0 mm (long term)	5.9
Live load - $\Psi_S Q$	7.2 mm	0.3 mm	24.8
Wind load - W_s	9.0 mm	0.9 mm	10.3

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.5
1.2G + 1.5Q	0.80	-2.3
1.2G + W_u + $\Psi_c Q$	1.00	-3.2
0.9G + W_u	1.00	2.0

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 10

1) Member code and description	W9 - Lintels - In single or upper storey load bearing walls
2) Date prepared	19 December 2022
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	3.3 m
Roof load width 'RLW'	2.5 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm
5) Member specification	
Size, stress grade/product	Use 300 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - $G + \Psi_L Q^*$	10.0 mm	2.0 mm (long term)	5.1
Live load - $\Psi_S Q$	13.2 mm	0.5 mm	24.8
Wind load - W_s	16.5 mm	1.6 mm	10.3

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-2.8
1.2G + 1.5Q	0.80	-4.2
1.2G + W_u + $\Psi_c Q$	1.00	-5.8
0.9G + W_u	1.00	3.4

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 11

1) Member code and description	W10 - Lintels - In single or upper storey load bearing walls
2) Date prepared	19 December 2022
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	1.8 m
Roof load width 'RLW'	3.5 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm
5) Member specification	
Size, stress grade/product	Use 200 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	6.0 mm	0.8 mm (long term)	7.9
Live load - $\Psi_S Q$	7.2 mm	0.2 mm	32.4
Wind load - W_S	9.0 mm	0.7 mm	13.4

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-2.4
1.2G + 1.5Q	0.80	-3.7
1.2G + W_u + $\Psi_c Q$	1.00	-5.2
0.9G + W_u	1.00	3.3

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 12

1) Member code and description	W11 - Lintels - In single or upper storey load bearing walls
2) Date prepared	19 December 2022
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	2.7 m

Roof load width 'RLW'	1.0 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 200 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	9.0 mm	1.2 mm (long term)	7.7
Live load - $\Psi_S Q$	10.8 mm	0.3 mm	37.8
Wind load - W_S	13.5 mm	0.9 mm	15.6

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.1
1.2G + 1.5Q	0.80	-1.5
1.2G + W_u + $\Psi_c Q$	1.00	-2.1
0.9G + W_u	1.00	1.2

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 13**1) Member code and description** W12 - Lintels - In single or upper storey load bearing walls**2) Date prepared** 19 December 2022**3) Serviceability criteria** AS 1720.1: 2010 and AS 1720.3: 2016**4) Design inputs**

Span	1.8 m
Roof load width 'RLW'	2.8 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 200 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	6.0 mm	0.6 mm (long term)	9.7
Live load - $\Psi_S Q$	7.2 mm	0.2 mm	40.4

Wind load - W_s	9.0 mm	0.5 mm	16.7
-------------------	--------	--------	------

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.9
1.2G + 1.5Q	0.80	-3.0
1.2G + W_u + $\Psi_c Q$	1.00	-4.2
0.9G + W_u	1.00	2.6

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 14

1) Member code and description W13 - Lintels - In single or upper storey load bearing walls

2) Date prepared 19 December 2022

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	2.4 m
Roof load width 'RLW'	1.4 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	8.0 mm	1.8 mm (long term)	4.4
Live load - $\Psi_s Q$	9.6 mm	0.5 mm	19.9
Wind load - W_s	12.0 mm	1.5 mm	8.3

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.3
1.2G + 1.5Q	0.80	-2.0
1.2G + W_u + $\Psi_c Q$	1.00	-2.8
0.9G + W_u	1.00	1.7

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 15

- 1) **Member code and description** W 14 - Lintels - In single or upper storey load bearing walls
- 2) **Date prepared** 19 December 2022
- 3) **Serviceability criteria** AS 1720.1: 2010 and AS 1720.3: 2016
- 4) **Design inputs**
- | | |
|------------------------|---|
| Span | 2.4 m |
| Roof load width 'RLW' | 5.8 m |
| Roof type and mass | Light roof and ceiling - 40 kg/m ² |
| Nominal wall thickness | 90 mm |
- 5) **Member specification**
- | | |
|----------------------------|---|
| Size, stress grade/product | Use 300 x 90 hy90 |
| Material type | Structural Laminated Veneer Lumber to AS/NZS 4357 |

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	8.0 mm	0.9 mm (long term)	8.7
Live load - $\Psi_S Q$	9.6 mm	0.3 mm	36.3
Wind load - W_s	12.0 mm	0.8 mm	15.0

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-4.5
1.2G + 1.5Q	0.80	-6.9
1.2G + W_u + $\Psi_c Q$	1.00	-9.7
0.9G + W_u	1.00	6.1

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 16

- 1) **Member code and description** I1 - Lintels - In single or upper storey load bearing walls
- 2) **Date prepared** 19 December 2022
- 3) **Serviceability criteria** AS 1720.1: 2010 and AS 1720.3: 2016
- 4) **Design inputs**
- | | |
|-----------------------|---|
| Span | 0.8 m |
| Roof load width 'RLW' | 1.0 m |
| Roof type and mass | Light roof and ceiling - 40 kg/m ² |

Nominal wall thickness 90 mm

5) Member specification

Size, stress grade/product Use 150 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ_{LQ} *	2.7 mm	0.0 mm (long term)	60.4
Live load - $\Psi_s Q$	3.2 mm	0.0 mm	251.0
Wind load - W_s	4.0 mm	0.0 mm	104.0

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1 ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-0.5
1.2G + 1.5Q	0.80	-0.8
1.2G + W_u + $\Psi_c Q$	1.00	-1.1
0.9G + W_u	1.00	0.7

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 17

1) Member code and description I2 - Lintels - In single or upper storey load bearing walls

2) Date prepared 19 December 2022

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span 0.8 m
Roof load width 'RLW' 3.5 m
Roof type and mass Light roof and ceiling - 40 kg/m²
Nominal wall thickness 90 mm

5) Member specification

Size, stress grade/product Use 150 x 90 hy90
Material type Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ_{LQ} *	2.7 mm	0.1 mm (long term)	18.2
Live load - $\Psi_s Q$	3.2 mm	0.0 mm	71.7
Wind load - W_s	4.0 mm	0.1 mm	29.7

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.7
1.2G + 1.5Q	0.80	-2.6
1.2G + W_u + $\Psi_c Q$	1.00	-3.7
0.9G + W_u	1.00	2.4

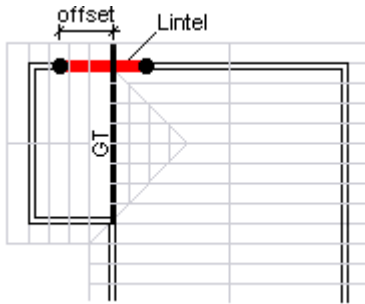
8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 18

1) Member code and description

I3 - Lintels - Supporting girder truss / truncated girder truss



2) Date prepared

19 December 2022

3) Serviceability criteria

AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Roof type	Light roof and ceiling - 40 kg/m ²
Roof pitch	25.0 °
Truss spacing	900 mm
Eaves overhang	600 mm
Common truss span	2327 mm
GT span	3990 mm
GT offset	768 mm
Lintel span	810 mm
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	2.7 mm	0.0 mm (long term)	86.5
Live load - $\Psi_S Q$	3.2 mm	0.0 mm	375.6
Wind load - W_s	4.1 mm	0.0 mm	155.5

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-2.4
1.2G + 1.5Q	0.80	-3.8
1.2G + W_u + $\Psi_c Q$	1.00	-5.3
0.9G + W_u	1.00	3.5

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 19

1) Member code and description I4 - Lintels - In single or upper storey load bearing walls

2) Date prepared 19 December 2022

3) Serviceability criteria AS 1720.1: 2010 and AS 1720.3: 2016

4) Design inputs

Span	0.8 m
Roof load width 'RLW'	2.9 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm

5) Member specification

Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	2.7 mm	0.1 mm (long term)	21.9
Live load - $\Psi_s Q$	3.2 mm	0.0 mm	86.6
Wind load - W_s	4.0 mm	0.1 mm	35.8

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-1.4
1.2G + 1.5Q	0.80	-2.2
1.2G + W_u + $\Psi_c Q$	1.00	-3.1
0.9G + W_u	1.00	2.0

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 20

1) Member code and description	I5 - Lintels - In single or upper storey load bearing walls
2) Date prepared	19 December 2022
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	0.8 m
Roof load width 'RLW'	7.0 m
Roof type and mass	Light roof and ceiling - 40 kg/m ²
Nominal wall thickness	90 mm
5) Member specification	
Size, stress grade/product	Use 150 x 90 hy90
Material type	Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + Ψ LQ [*]	2.7 mm	0.3 mm (long term)	9.2
Live load - Ψ sQ	3.2 mm	0.1 mm	35.9
Wind load - W _s	4.0 mm	0.3 mm	14.9

^{*}Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k ₁ ¹	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-3.3
1.2G + 1.5Q	0.80	-5.2
1.2G + W _u + Ψ cQ	1.00	-7.4
0.9G + W _u	1.00	4.8

8) Installation requirements

- Provide at least 30 mm bearing at end supports

Member 21

1) Member code and description	B1 - Verandah beams
2) Date prepared	19 December 2022
3) Serviceability criteria	AS 1720.1: 2010 and AS 1720.3: 2016
4) Design inputs	
Span	4.2 m - single span
Roof mass	40 kg/m ²
Roof load width 'RLW'	2.1 m
5) Member specification	
Size, stress grade/product	Use 2/300 x 45 hySPAN

Material type

Structural Laminated Veneer Lumber to AS/NZS 4357

6) Serviceability

Load case	Limit ³ on average deflection ²	Estimated average deflection ²	Rigidity ratio ⁴
Long term load - G + $\Psi_L Q^*$	10.0 mm	3.3 mm (long term)	3.0
Live load - $\Psi_S Q$	12.0 mm	0.8 mm	14.9
Wind load - W_s	21.0 mm	3.5 mm	6.0

*Critical serviceability load case

See 'Notes for interpretation of serviceability data' at the end of this report

7) Reactions

Load case	k_1^1	Limit States Design Reaction ^{2,3}
		End kN ⁴
1.35G	0.60	-3.3
1.2G + 1.5Q	0.80	-4.7
1.2G + W_u + $\Psi_c Q$	1.00	-8.1
0.9G + W_u	1.00	5.7

8) Installation requirements

- Provide at least 30 mm bearing at end supports
- Vertical lamination in accordance with Detail H1.

Notes for interpretation of serviceability data

1. 'average deflection' is an engineering concept based upon a notional estimated load, notional member rigidity and, in some cases, an approximate model of material response to environmental conditions. These parameters are, 'standardised' in AS 1170 and AS 1720.
2. Deflection is the flexural response to load 'out-of-level' measurements of installations are not necessarily deflections and can incorporate 'initial out-of-straightness', whether intended or not. Furthermore, loads can be higher/lower than the notional estimate and in any comparison with measured levels, material variability needs to also be considered. AS 1720 gives the following basis for estimation of upper bound deflections for various materials.

No 1 Framing – visually graded to NZS 3631	Average + 100%
SG grades - mechanically graded to AS/NZS 1748	Average + 43%
GL grades for glulam to AS 1328	Average + 33%
LVL to AS/NZS 4357 (includes hySPAN and hyJOIST)	Average +18%

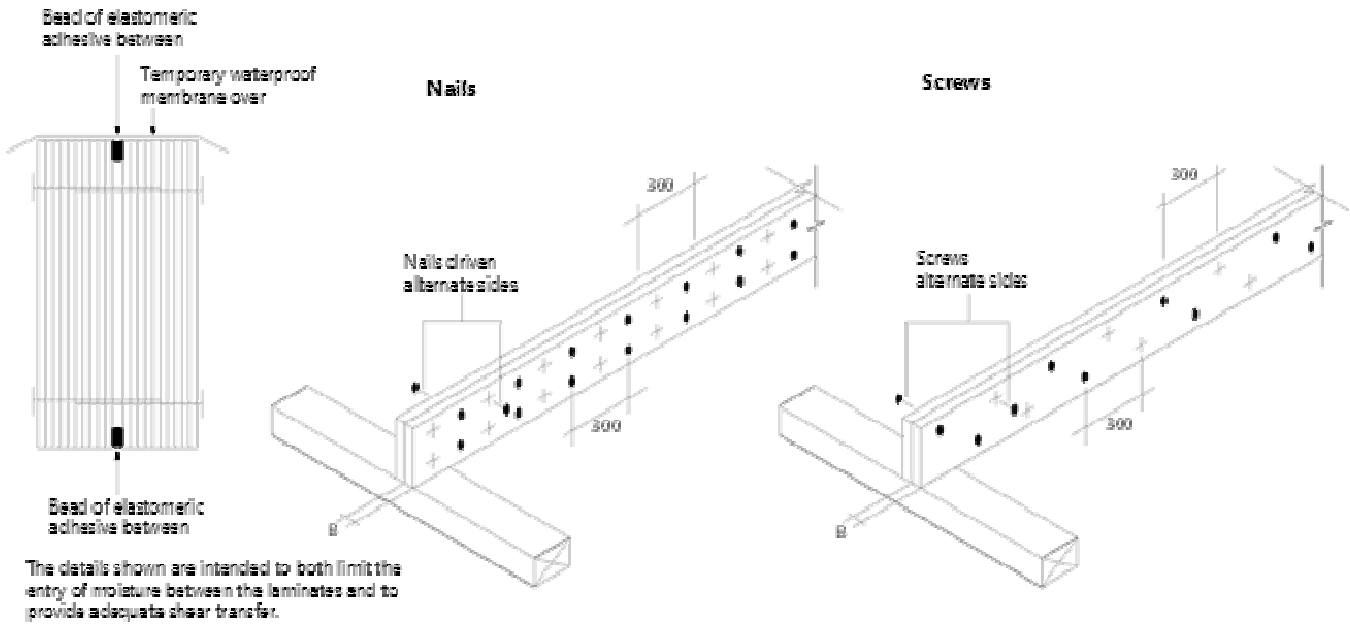
As can be seen, comparison of the 'average deflection' for different materials, even if calculated on the same basis, does not give the whole picture!

3. The limits referred are those specified in AS 1720.3 for the stated load case.
4. 'Rigidity ratio' expresses the rigidity of the specified beam relative to the rigidity of a notional beam just meeting the serviceability requirements detailed.

Notes for interpretation of reaction data

1. Duration of load factor 'k1' for strength as per NZS 3603:1993
2. Negative (-) reactions relate to the 'gravity' or 'downwards' force on the support
3. Positive reactions relate to the 'upwards' forces or 'tie-down' requirement on the support
4. End reaction includes allowance for overhang/cantilever where one has been designed

Detail H1: Vertical Lamination - Two Pieces



Section Size 'B'	Minimum Nail Diameter	Minimum Nail Length	Minimum Screw Gauge	Minimum Screw Length
35	3.06 mm	75 mm	-	-
45	3.30 mm	90 mm	14 g	75 mm
63	3.30 mm	100 mm	14 g	100 mm
90	-	-	14 g	150 mm

Producer Statement - PS1 - Design

Issued by: Carter Holt Harvey LVL Limited
To: Kapiti Coast
To be supplied to: PlaceMakers
Site address: 68 Stage 2- Manu Park, , Kapiti Coast
In respect of Member structural design using designIT for houses – Series 6.5

This Producer Statement covers the structural design of Futurebuild Laminated Veneer Lumber (LVL) and Structural Grade timber SG8 members determined using designIT® for houses in respect of the requirements of Clauses B1 and B2 of the Building Code for the proposed work identified in the Design Certificate and drawings. designIT® for houses is provided to designers, architects and engineers to assist in the specification of our Engineered and sawn timber products, to be used as structural elements for the construction of buildings that fall within the scope of NZS 3604:2011, Timber-framed buildings (NZS 3604). In conjunction with a site specific Design Certificate, this Producer Statement may be used by a Building Consent Authority to assist in determining compliance with the New Zealand Building Code (NZBC).

designIT® for houses software has been prepared in accordance with soundly based and widely recognised structural engineering principles. The design methodology used for the software complies with the loading and general design requirements contained within AS/NZS 1170 series and with timber structural design in accordance with NZS 3603:1993, Timber Structures Standard (NZS 3603), including Amendment 4 (Verification method B1/VM1, 6.1). This design methodology uses the most up to date information available from joint Australian/New Zealand standards to determine specified performance levels.

Futurebuild LVL and SG8 members, when used and treated to the required treatment levels prescribed in NZS 3602, Timber and Wood-based Products for Use in Building (NZS 3602), and NZS 3604, will form part of an Acceptable Solution and comply with the requirements of the NZBC (Acceptable Solution B2/AS1, 3.2).

On behalf of Carter Holt Harvey LVL Limited, and subject to:

- i. All proprietary products meeting their performance specification requirements;
- ii. The designer having knowledge of common building practice and terminology applied in NZS3604 and using designIT® for houses in accordance with the terms of the software licence;
- iii. Correct and accurate input of span and loading information by the designer;
- iv. Adequate overall building stability and robustness; and
- v. Products being treated to the requirements of NZS 3602 and/or Acceptable Solution B2/AS1,

I believe on reasonable grounds that, provided installation is in accordance with the installation requirements provided in the Design Certificate and/or relevant product literature, NZS 3604 or specific engineering design, the product and/or product stress grade and size given by designIT® for houses will comply with the requirements of the New Zealand Building Code, specified above.

Carter Holt Harvey LVL Limited holds a current policy of Professional Indemnity Insurance of no less than \$ 200,000.

For and on behalf of Carter Holt Harvey LVL Limited, Date: 29 September, 2022



Signed by: Cameron Rodger, BE(Hons), MIEAust, CMEngNZ, IntPE, CPEng (Registration Number: 1017839)

Note: The total maximum amount of damages payable arising from this statement, whether in contract, tort or otherwise (including negligence) is limited to the sum of \$200,000.

Demand Calculation Sheet

Job Details

Name: Parsons
 Street and Number: Stage 2 Manu Park
 Lot and DP Number: Lot 68
 City/Town/District: Waikanae
 Designer: BF
 Company: Coastal Architecture Ltd
 Date: Friday, 25 November 2022

230147
 Received by
 Kapiti Coast District Council
 06/03/23

Building Specification

Number of Storeys 1
 Floor Loading 2 kPa
 Foundation Type Slab

Single

Cladding Weight Heavy
 Roof Weight Light
 Room in Roof Space No
 Roof Pitch (degrees) 25
 Roof Height above Eaves (m) 2.9
 Building Height to Apex (m) 5.3
 Ground to Lower Floor (m) 0.3

Average Stud Height (m) 2.4
 Building Length (m) 15.8
 Building Width (m) 15.0
 Building Plan Area (m²) 184

Building Location

Wind Zone = High

Earthquake Zone 3

Soil Type D & E (Deep to Very Soft)
 Annual Prob. of Exceedance: 1 in 500 (Default)

Bracing Units required for Wind

	Along	Across
Single Level	837	963

Bracing Units required for Earthquake

	Along & Across
Single Level	1502

Single Level Along Resistance Sheet

Job Name: Parsons

									Wind	EQ
									Demand	
									837	1502
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	2239 268%	2358 157%
A	1	1.20		2.4	EP1 1.2	Ecoply	144	162		
	2	1.20		2.4	EP1 1.2	Ecoply	144	162		
									288 OK	324 OK
B	1	1.00		2.4	EP1 0.6	Ecoply	95	105		
	2	0.80		2.4	EP1 0.6	Ecoply	76	84		
	3	0.80		2.4	EP1 0.6	Ecoply	76	84		
	4	0.90		2.4	EP1 0.6	Ecoply	86	95		
									333 OK	368 OK
C	1	0.80		2.4	EP1 0.6	Ecoply	76	84		
	2	1.60		2.4	GS1-N	GIB®	110	96		
	3	1.30		2.4	GS1-N	GIB®	90	78		
									276 OK	258 OK
D	1	2.40		2.4	EP1 1.2	Ecoply	288	324		
	2	3.50		2.4	GS1-N	GIB®	242	210		
	3	2.20		2.4	GS1-N	GIB®	152	132		
									681 OK	666 OK
E	1	2.40		2.4	EP1 1.2	Ecoply	288	324		
	2	0.90		2.4	EP1 0.6	Ecoply	86	95		
	3	2.40		2.4	EP1 1.2	Ecoply	288	324		
									662 OK	743 OK

Single Level Across Resistance Sheet

Job Name: Parsons

									Wind	EQ
									Demand	
									963	1502
									Achieved	
Line	Element	Length (m)	Angle (degrees)	Stud Ht. (m)	Type	Supplier	Wind (BUs)	EQ (BUs)	1530 159%	1596 106%
M	1	0.75		2.4	EP1 0.6	Ecoply	71	79		
	2	0.75		2.4	EP1 0.6	Ecoply	71	79		
									143 OK	158 OK
N	1	0.75		2.4	EP1 0.6	Ecoply	71	79		
	2	0.75		2.4	EP1 0.6	Ecoply	71	79		
									143 OK	158 OK
O	1	0.70		2.4	EP1 0.6	Ecoply	67	74		
	2	1.70		2.4	GS1-N	GIB®	117	102		
	3	3.10		2.4	GS1-N	GIB®	214	186		
									398 OK	362 OK
P	1	0.70		2.4	EP1 0.6	Ecoply	67	74		
	2	1.80		2.4	GS1-N	GIB®	124	108		
	3	1.60		2.4	EP1 1.2	Ecoply	192	216		
									383 OK	398 OK
Q	1	1.20		2.4	EP1 1.2	Ecoply	144	162		
	2	2.20		2.4	EP1 1.2	Ecoply	264	297		
	3	0.60		2.4	EP1 0.6	Ecoply	57	63		
									465 OK	522 OK

Custom Wall Elements

Supplier	System	Min. Length m	Wind BUs/m	EQ BUs/m
Ecoply	EP1 0.4	0.4	80	95
Ecoply	EP1 0.6	0.6	95	105
Ecoply	EP1 1.2	1.2	120	135
Ecoply	EPG 0.4	0.4	100	115
Ecoply	EPG 1.2	1.2	150	150
RAB Board	JHD 0.4	0.4	83	107
RAB Board	JHD 0.6	0.6	99	107
RAB Board	JHD 1.2	1.2	154	140
RAB Board	JHD 2.4	2.4	135	150
Egger RAB	OSB 0.6	0.6	90	101
Egger RAB	OSB 1.2	1.2	131	118
Egger RAB	OSB 2.4	2.4	141	116
HomeRab	HPg 0.4	0.4	90	98
HomeRab	HPg 0.6	0.6	127	136
HomeRab	HPg 1.2	1.2	164	138



230147
 Received by
 Kapiti Coast District Council
 06/03/23



ECOPLY® SPECIFICATION & INSTALLATION GUIDE

OCTOBER 2021

INCLUDING OCTOBER 2021 TECHNICAL NOTE '19mm ECOPLY JUST GOT AN UPGRADE'
 AND MINOR AMENDMENTS

CHH PLY

Information contained within is specific to Ecoply® structural plywood products and must not be used with any other plywood products, no matter how similar they may appear.



19mm ECOPLY JUST GOT AN UPGRADE

INTRODUCTION

As part of process improvement and product development, Carter Holt Harvey Plywood Ltd (CHH Ply) is proud to introduce an improved veneer layup/construction for the 19mm Ecoply Structural Plywood range (including F1 I/F8 Longspan flooring, F8 flooring, Carpet grade flooring and Ecoply square edge).

This Technical Note details the changes and application of 19mm Ecoply with 19-38-5 construction in lieu of the previous 19-30-7 construction, including Section Properties, Product Identification and Specification & Installation requirements.

SECTION PROPERTIES

Table 1. Section Properties of 19mm Ecoply Structural Plywood, denotes the section properties for the new 19-38-5 construction, together with the section properties of the previous 19-30-7 construction. 19-38-5 demonstrates improved structural properties in the parallel to the grain direction, whilst exhibiting reduced structural properties in the perpendicular direction. For Specific Engineering Design (SED) projects, engineers will need to confirm the suitability of the 19-38-5 plywood as appropriate for their design.

Table 1: Section Properties of 19mm Ecoply® Structural Plywood

Nominal plywood thickness ¹	ID code ²	Mass	Section properties per mm width					
			Parallel to the face grain			Perpendicular to the face grain		
			Parallel Moment of Inertia	Section Modulus	Shear Constant	Perpendicular Moment of Inertia	Section Modulus	Shear Constant
(mm)		(kg/m ²)	(mm ⁴)	Z (mm ³)	I/Q (mm ²)	I (mm ⁴)	Z (mm ³)	I/Q (mm ²)
+9	19-30-7	10.6	451.0	46.9	13.7	157.0	23.8	10.7
19	19-38-5	10.6	456.3	47.7	14.8	132.5	20.9	9.2

¹ Actual thickness of Ecoply sheets manufactured to thickness tolerances stated in AS/NZS 2269

² Identification code: panel thickness – outermost veneer thickness × 10 – number of plies

³ I/Q values for rolling shear are for stress at the neutral axis calculated as in NZS 3603

PRODUCT IDENTIFICATION

In accordance with AS/NZS 2269, Ecoply structural plywood sheets have the following information marked on the back:

- Brand name: e.g. ECOPLY
- Face grade, back grade: e.g. CD
- Intended application: e.g. STRUCTURAL
- Glue bond: e.g. A BOND
- Formaldehyde emission class: E0 for A Bond Ecoply
- Australasian Standard: e.g. AS/NZS 2269
- Treatment Standard (if applicable): e.g. AS/NZS 1604.3:2012
- Stress grade: e.g. F11/F8
- Nominal Thickness: e.g. 19-
- The values of second moment of area (moment of inertia) (I) and section modulus (Z) in the grain orientations to which the properties are declared: e.g. 456.3,47.7/132.5,20.9
- Date and time of manufacture: e.g. 01/12/15 12:23:45
- The Engineered Wood Products Association of Australasia (EWPPAA) brand and mill number: e.g. 911 (Tokoroa mill)

Example

ECOPLY CD STRUCTURAL A BOND E0
AS/NZS 2269.0:2012
19-(456.3,47.7/132.5,20.9)
OPERATOR/DATE/TIME F11/F8



SPECIFICATION & INSTALLATION

19-38-5 Ecoply Structural Plywood shall be specified and installed in accordance with the product specific usage requirements for nominal 19mm plywood as detailed in the Ecoply® Specification and Installation Guide and/or NZS 3604, Timber framed buildings, as appropriate. Where the 19mm plywood solution is part of SED, refer to structural engineer's details.ils.

CONCLUSION

19mm Ecoply Structural Plywood products manufactured by CHH Ply from October 2021 will have a veneer layup corresponding with an ID Code of 19-38-5. The span tables and installation requirements detailed in the Ecoply® Specification and Installation Guide remain applicable for this alternate veneer layup.

For SED projects, engineers will need to confirm the suitability of the 19-38-5 plywood as appropriate for their design.

REFERENCES

- Ecoply® Specification & Installation Guide
- NZS 3604:2011, Timber framed buildings

LIMITATIONS

The information contained in this document is current as at October 2021 and is based on data available to CHH Ply at the time of going to print. CHH Ply reserves the right to change the information contained in this document without prior notice. It is important that you visit www.chhply.co.nz or call 0800 326 759 to confirm that you have the most up to date information available.

CHH Ply has used all reasonable endeavours to ensure the accuracy and reliability of the information contained in this document. However, to the extent permitted by law CHH Ply will not be liable for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.



ECOPLY® SPECIFICATION & INSTALLATION GUIDE

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1.0 ECOPLY® PRODUCT RANGE

Manufactured in New Zealand by Carter Holt Harvey Plywood, the Ecoply® portfolio represents a range of structurally rated plywood products.

Ecoply is manufactured under a third party audited quality control programme to monitor compliance with AS/NZS 2269 Plywood Structural. All Ecoply products carry Engineered Wood Products Association of Australasia (EWPA) Joint Accreditation System - Australia and New Zealand (JAS-ANZ) certification.

For information relating to Shadowclad® panels and plywood used as an exterior cladding, refer to the current Shadowclad Specification & Installation Guide for Cavity Construction. For information relating to Ecoply Barrier used as a rigid air barrier refer to the current Ecoply Barrier Specification & Installation Guide. Both of these documents can be downloaded from www.chhply.co.nz.

Ecoply products must be competently installed in accordance with good building practices and sound design principles to satisfy the requirements of the Building Act 2004, the New Zealand Building Code (NZBC), and applicable New Zealand Standards. This is the responsibility of building owners and the design professionals and builders that they engage. This document contains information, limitations, and cautions regarding the properties, handling, installation, usage, and the maintenance of Ecoply products. However, to the maximum extent permitted by law, Carter Holt Harvey Plywood assumes no legal liability to you in relation to this information.

1.1 TECHNICAL INFORMATION AND CAD DETAILS

When specifying or installing any Ecoply® plywood products visit www.chhply.co.nz or call 0800 326 759 to ensure you have current specification material and any relevant technical notes.

The information contained in this document is current as at October 2021. It is your responsibility to ensure you have the most up to date information available.

The information contained in this publication relates specifically to Ecoply structural plywood products manufactured by Carter Holt Harvey Plywood and must not be used with any other plywood manufacturer's product no matter how similar they may appear.

Alternative plywood products can differ in a number of ways which may not be immediately obvious and substituting them for Ecoply structural plywood products is not appropriate, and could in extreme cases lead to premature failure and/or buildings which do not meet the requirements of the NZBC.

1.2 PRODUCT DESCRIPTION AND RANGE

Ecoply structural plywood panels are manufactured from radiata pine wood veneers. The veneers are placed at right angles to each other for maximum strength and stability then bonded together with synthetic phenolic (PF) resin to form a strong and permanent Type A bond.

The strength of Ecoply plywood is optimised for maximum performance parallel to the face grain with cross plies providing enhanced stability across the grain.

The Ecoply plywood range can be specified for:

- Surface grade (e.g. CD) - where the first letter describes the face veneer appearance and the second letter describes the back veneer of the Ecoply sheet. Surface grades are defined in AS/NZS 2269 and summarised in Tables 2A & 2B
- Stress grade - utilises the symbol F and a suffix, for example;
 - F8 as a code to apply a full suite of strength and stiffness properties to plywood products of that stress grade. F8 is the standard stress grade for Ecoply products
 - Ecoply 19 mm Longspan Flooring and 15 mm Ecoply Roofing are F11¹ stress grade (See Tables 1, 4 and 5). Other Ecoply products are also available in F11¹ upon request
- Thickness - ranging from 7 mm to 25 mm. (Thicknesses above 25 mm subject to availability)
- Length - being 2400 mm and 2700 mm with a standard nominal width of 1200 mm

- Preservative treatment - being untreated, H3.2 CCA or H3.1 LOSP Azole treated
- Edge finish - being square edge or for Ecoply Flooring and Roofing, routed on the long edges of the sheet with a polypropylene plastic tongue inserted into one side for a tongue-in-groove joint

For general installation advice refer to section 2.0: General Installation Guide.

For specification and installation advice for Ecoply used in typical applications refer to the following sections.

Typical Application	Section
Structural bracing and ceiling diaphragms	3.0
Roofs and decks	4.0
Flooring	5.0

Note: Technical notes referenced in this guide can be downloaded from www.chhply.co.nz or contact Carter Holt Harvey Plywood on 0800 326 759.

Table 1: Ecoply® Product Range

Nominal Thickness (mm)	7		9		12		15		17		19		21		25	
	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700	2400	2700
Sheet length (x 1200 mm width)																
Ecoply Structural Square Edge																
BD			●		●	●	●		●							
CD	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
DD	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ecoply Flooring (pt)																
CD								●	●	●	●	● LS	● LS	●	●	●
Ecoply Roofing (pt)																
DD								●	●	●	●					

- Available untreated only
- Available either untreated or H3.2 CCA
- Available either untreated or H3.1 LOSP

pt Machine grooves on both long edges with a plastic polypropylene tongue in one groove, 1200 mm cover

LS Ecoply 19 mm F11/F8 Longspan Flooring

- Full range may not always be available ex stock, check with your Ecoply supplier to ensure availability
- Non standard specifications, including thicker sheets may be available to special order in significant quantities
- All products are F8 stress grades
- Ecoply 15 mm/17 mm Roofing and Ecoply 19 mm Longspan Flooring are supplied as standard in F11 stress grade¹
- Other Ecoply products are also available in F11 upon request

¹ Where the stress grade F11 is referred to in all CHH Plywood literature actual stress grade properties of panels are F11 parallel to the face grain and F8 perpendicular to the face grain

1.3 SURFACE GRADES

Table 2A summarises the surface appearance grades in which Ecoply structural plywood is available with some typical applications for each surface grade.

The surface grade specifications are defined in AS/NZS 2269. Table 2B details surface appearance grades for specialty Ecoply plywood and typical applications.

Table 2A: Ecoply® Structural Square Edge Products






Face Grade B	Face Grade C	Face Grade D
		
Appearance grade with a solid sanded surface. Suitable for a higher quality finish.	Solid sanded surface with filled holes and splits, with intergrown knots. Suitable for a basic paint finish.	Non appearance grade allowing open imperfections up to 75 mm across the face veneer. Splits and knots allowable
Possible Uses:	Possible Uses:	Possible Uses:
<ul style="list-style-type: none"> • Furniture/Joinery/Signs • Interior Linings • Sheathing • Engineering components where a superior visual finish is required 	<ul style="list-style-type: none"> • Structural gussets • Stressed skin panels • Bins, boxes, crates • Hoardings • Membrane substrate 	<ul style="list-style-type: none"> • Non visual bracing • Strength critical pallets • Structural components • Portal frame gussets

Table 2B: Speciality Ecoply® Products

Flooring CD	Roofing DD
	
Solid sanded C grade surface with tongue and groove profile on long edges. Features void free second layer under the face veneer for increased protection against high point loads	Unfilled D grade surface with tongue and groove profile on long edges
Possible Uses:	Possible Uses:
<ul style="list-style-type: none"> • Substrate for flooring overlays such as linoleum, tiles and rigid coverings • Substrate for membrane roofing and decking where visible appearance is critical 	<ul style="list-style-type: none"> • Substrate for asphalt shingles • Substrate for roof systems where a smooth substrate is not required

Notes: A higher visual grade may be substituted if required. e.g. Ecoply CD can be used anywhere DD is used. Pictures shown above are scaled down versions of typical Ecoply sheets. Grain pattern and colour may vary. If sheet appearance is critical select panels individually.

I.4 PRESERVATIVE TREATMENT

Ecoply structural plywood is available untreated or treated in accordance with AS/NZS 1604.3. If treated, Ecoply structural plywood is treated with either H3.2 CCA (Copper Chrome Arsenate) or H3.1 LOSP (Azole) clear treatment. H3.1 LOSP is the standard preservative treatment for BD Structural Square Edge products and by special request for other Ecoply plywood products.

H3.2 CCA and H3.1 LOSP treated plywood in accordance with AS/NZS 1604.3 is described as suitable for: "outside, above ground, subject to periodic moderate wetting and leaching."

Ecoply plywood is envelope preservative treated. Where sheets are cut, cuts must be coated with a brush on timber preservative. Holdfast® Metalex® Concentrated Timber Preservative Clear (Holdfast® Metalex® Clear) is recommended. Failure to do so will affect the long term durability of the panel.

The characteristics of the treatments are shown in Table 3.

Table 3: Preservative Treatment

	Untreated	H3.2 CCA	H3.1 LOSP (Azole)
Preservative carrier	N/A	Water	Light organic oil (white spirits)
Colour	Natural	Green	Clear (i.e. natural)
Fungicide	Heat treated dry wood	Copper	Propiconazole and Tebuconazole
Insecticide	Heat treated dry wood	Arsenate	Permethrin
Other chemicals	N/A	Chrome (to fix preservative in wood)	Butyl Oxitol (co-solvent to assist active stability)
Mouldicide	N/A	Copper (limited efficacy)	IPBC
Notes	Plywood for dry interior use, supplied ex mill at <15% moisture content	Dried after treatment to average 18% moisture content for use in service at higher moisture contents	Solvent does not affect dimensions. Solvent smell disappears over time
Availability	Readily available	Standard treatment except for Ecoply BD	Treated to order for CD, DD, flooring and roofing products. Standard treatment for Ecoply BD
Applications (Refer NZ3602)	Interior dry protected	Exterior/Interior damp (service performance subject to detailing & coatings)	

H3.2 CCA

Ecoply structural plywood, which is H3.2 CCA treated (waterborne preservative with a green colour), is dried following treatment so that sheets may return to the correct dimensions. The moisture content after treatment with CCA and drying will be higher than the limits placed in AS/NZS 2269 on untreated product. The target is for an average moisture content of approximately 18% to provide a panel closer to the expected equilibrium moisture content for most H3.2 CCA applications.

The fillets used to separate sheets in drying may leave marks on the sheet surface. These will fade over time as the plywood weathers, and can be disguised with paint but may be visible under stain. The process of treating with H3.2 CCA and subsequent drying is likely to increase the face checking of the panel.

For more information on face checking refer to section 1.8 General Design Considerations - Aesthetics.

H3.1 LOSP

H3.1 LOSP treated Ecoply retains the wood colour and does not contain moisture so the plywood remains at the same dimensions and moisture content during treatment. However, the plywood when freshly treated may contain more than 60 litres of organic fluid per cubic metre. When coating H3.1 LOSP treated plywood, traces of residual solvent may be present on the sheet surface from the treatment process. Sheets feeling greasy to touch should be placed in a well ventilated area and allowed to flash off to ensure proper adhesion of paints and stains to the sheet surface.

The H3.1 LOSP solvent smell can be quite strong and venting is recommended until most of the solvent has evaporated. Untreated plywood is recommended for internal applications where NZS 3602 allows the use of untreated plywood

Mechanical fasteners are recommended to fix H3.1 LOSP treated Ecoply to framing. If adhesives are required, thorough venting is recommended and H3.1 LOSP tolerant adhesives should be applied according to the adhesive manufacturer's instructions. See section 2.3 Adhesives.

1.5 SECTION PROPERTIES

Table 4A: Section Properties of Ecoply® Structural Plywood

Nominal plywood thickness ²	ID code ³	Mass	Section properties per mm width					
			Parallel to the face grain			Perpendicular to the face grain		
			Parallel Moment of Inertia	Section Modulus	Shear Constant	Perpendicular Moment of Inertia	Section Modulus	Shear Constant
(mm)		(kg/m ²)	(mm ⁴)	Z (mm ³)	I/Q (mm ²)	I (mm ⁴)	Z (mm ³)	I/Q (mm ²)
7	7-24-3	4.0	30.0	8.3	5.2	2.0	1.7	2.3
9	9-30-3	5.0	58.6	13.0	6.4	4.0	2.7	2.9
12	12-24-5	6.6	115.0	19.2	9.3	33.4	9.3	5.4
15	15-30-5	8.3	225.0	29.9	11.6	65.2	14.5	6.8
17	17-24-7	9.2	285.0	33.9	12.2	122.0	20.4	9.4
17	17-24-6	9.2	273.0	32.5	12.3	134.0	22.3	9.5
19 ⁵	19-30-7	10.6	451.0	46.9	13.7	157.0	23.8	10.7
19 ⁵	19-38-5	10.6	456.3	47.7	14.8	132.5	20.9	9.2
21	21-30-7	11.6	556.0	52.9	15.2	239.0	31.9	11.8
25	25-30-9	13.5	897.0	72.9	17.8	381.0	41.0	13.9

Table 4B: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design: F8 Grade

Nominal plywood thickness ²	ID code ³	Nominal strengths (Limit States) per mm width					
		Parallel to the face grain (F8)			Perpendicular to the face grain (F8)		
		Bending Stiffness EI	Bending Moment f _{pb} Z	Rolling Shear f _{pr} I/Q	Bending Stiffness EI	Bending Moment f _{pb} Z	Rolling Shear f _{pr} I/Q
(mm)		(1000 Nmm ²)	(Nmm)	(N)	(1000 Nmm ²)	(Nmm)	(N)
12	12-24-5	1046.5	480.0	15.6	303.9	231.7	9.2
15	15-30-5	2047.5	747.5	19.5	593.3	362.5	11.4
17	17-24-7	2593.5	847.5	20.5	1110.2	510.0	15.9
17	17-24-6	2484.3	812.5	20.7	1219.4	557.5	16.0
19 ⁵	19-30-7	4104.1	1172.5	23.0	1428.7	595.0	18.0
19 ⁵	19-38-7	4161.4	1192.5	26.8	1205.8	522.5	15.6
21	21-30-7	5059.6	1322.5	25.5	2174.9	797.5	19.8
25	25-30-9	8162.7	1822.5	29.9	3467.1	1025.0	23.4

Table 4C: Nominal Strengths of Sections of Ecoply® Structural Plywood For Limit States Design: F11 Grade (Including Longspan Flooring)

Nominal plywood thickness ²	ID code ³	Nominal strengths (Limit States) per mm width					
		Parallel to the face grain (F11)			Perpendicular to the face grain (F8)		
		Bending Stiffness EI	Bending Moment f _{pb} Z	Rolling Shear f _{pr} I/Q	Bending Stiffness EI	Bending Moment f _{pb} Z	Rolling Shear f _{pr} I/Q
(mm)		(1000 Nmm ²)	(Nmm)	(N)	(1000 Nmm ²)	(Nmm)	(N)
12	12-24-5	1207.5	595.2	16.7	303.9	231.7	9.2
15	15-30-5	2362.5	926.9	20.9	593.3	362.5	11.4
17	17-24-7	2992.5	1050.9	22.0	1110.2	510.0	15.9
17	17-24-6	2866.5	1007.5	22.1	1219.4	557.5	16.0
19 ⁵	19-30-7	4735.5	1453.9	24.7	1428.7	595.0	18.0
19 ⁵	19-38-5	4801.7	1478.7	36.8	1205.8	522.5	15.6
21	21-30-7	5838.0	1639.9	27.4	2174.9	797.5	19.8
25	25-30-9	9418.5	2259.9	32.0	3467.1	1025.0	23.4

1 Where the stress grade F11 is referred to in all CHH Plywood literature actual stress grade properties of panels are F11 parallel to the face grain and F8 perpendicular to the face grain

2 Actual thickness of Ecoply sheets manufactured to thickness tolerances stated in AS/NZS 2269

3 Identification code: panel thickness – outermost veneer thickness x 10 – number of plies

4 I/Q values for rolling shear are for stress at the neutral axis calculated as in NZS 3603

5 From October 2021 CHH Plywood will shift to manufacturing 19mm plywood in a 19-38-5 construction instead of 19-30-7

Notes:

- Use Tables 4A & B values for all F8 stress grade Ecoply products
- Use Tables 4A & C values for all F11 stress grade Ecoply (including 19 mm Ecoply Longspan Flooring)
- The section properties in Tables 4A, B & C have been calculated in accordance with AS/NZS 2269
- For section properties for other thicknesses and Shadowclad® products contact CHH Plywood on 0800 326 759

Structural properties of Ecoply® plywood

The majority of Ecoply plywood is F8 grade (exceptions are identified in section 1.2: Product Description & Range) and the

characteristic values may be used in conjunction with both NZS 3603 and AS 1720 for the design of timber components. The characteristic strengths in Table 5 have been used to provide the nominal strengths in Tables 4B and 4C.

Table 5: Structural Properties of Ecoply® Plywood

Stress Grade	Characteristic Strength MPa	
	F8	F11
Bending (f_{pb})	25.0	31.0
Tension (f_{pt})	15.0	18.0
Panel shear (f_{ps})	4.2	4.5
Rolling shear (f_{pr})	1.7	1.8
Compression in plane of sheet (f_{pc})	20.0	22.0
Compression normal to the plane of the sheet (f_{pp})	9.7	12.0
Modulus of elasticity (E)	9100	10500
Modulus of rigidity (G)	455	525

Source: AS/NZS 2269

Wood is strongest when stressed parallel to the grain and weakest across the grain, so the lay up or arrangement of veneers in the panel determines the properties. Because of its cross banded construction, plywood possesses significant strength and stiffness both parallel and perpendicular to the direction of the face grain, but is generally strongest and stiffest along the direction of the face grain.

The section properties of structural plywood in Table 4A are calculated in accordance with AS/NZS 2269 to allow for the

reduced contribution of veneers perpendicular to the direction of stress. For engineering design to NZS 3603, the section properties are multiplied by stresses and 'k' and ϕ factors to determine resistances for limit states design.

Resistances and nominal strengths in Tables 4B and 4C assume all 'k' factors are equal to 1.0. Multiply tabled values by the strength reduction factor ϕ and 'k' factors for specific in-service conditions for design to a structural code such as NZS 3603.

Table 5A: Strength Reduction Factors

Structural Timber Material	Application of Structural Member		
	Category 1	Category 2	Category 3
	Structural members for houses for which failure would be unlikely to affect an area ¹ greater than 25 m ² ; OR secondary members in structures other than houses	Primary structural members in structures other than houses; OR elements in houses for which failure would be likely to affect an area ¹ greater than 25 m ²	Primary structural members in structures intended to fulfil essential services or post disaster function
	Value of Strength Reduction Factor ϕ		
Structural Plywood – AS/NZS 2269.0	0.95	0.85	0.75

¹ In this context area should be taken as plan area.

1.6 PRODUCT IDENTIFICATION

In accordance with AS/NZS 2269, Ecoply structural plywood sheets have the following information marked on the back:

- Brand name: e.g. ECOPLY
- Face grade, back grade: e.g. CD
- Intended application: e.g. STRUCTURAL
- Panel construction code: e.g. 19-30-7 (Thickness (mm)-Face veneer thickness (mm x 10)-Number of veneers)
- Glue bond: e.g. A BOND
- Formaldehyde emission class: E0 for A Bond Ecoply
- Australasian Standard: e.g. AS/NZS 2269
- Treatment Standard (if applicable): e.g. AS/NZS 1604.3:2012
- Date and time of manufacture: e.g. 01/12/15 12:23:45
- Stress grade: e.g. F8 (exceptions include Shadowclad® and Grooved Lining which are performance rated)
- The Engineered Wood Products Association of Australasia (EWPA) brand and mill number: e.g. 911 (Tokoroa mill)

Untreated example:

ECOPLY CD FLOORING STRUCTURAL
19-30-7 A BOND E0 AS/NZS 2269.0:2012
PAT 01/12/15 12:23:45 F11/F8



Treated example:

ECOPLY CD STRUCTURAL
25-30-9 A BOND E0 AS/NZS 2269.0:2012
AS/NZS 1604.3:2012 046 01 H3 E CCA
RETREAT CUTS PAT 01/12/15 12:23:45 F8/F8



Note: Performance based products like Grooved Lining and Shadowclad may include brand identification instead of visual quality, stress grade, and panel code. These panels, when accompanied with specification literature, are still deemed to comply with AS/NZS 2269

1.7 CODE COMPLIANCE

Ecoply plywood manufacture is third-party audited through the product quality control programme of the Engineered Wood Products Association of Australasia (EWPAA) which is itself audited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

CHH Plywood is licensed by the EWPAA to stamp plywood with the EWPAA/JAS-ANZ Product Certification Mark. This certifies it has been manufactured under the third party audited Joint Product Certification programme to monitor compliance with joint Australian/New Zealand Standard AS/NZS 2269 Plywood – Structural. Plywood to this standard is referenced in the NZBC Acceptable Solutions and Verification Methods through:

- NZS 3602 The Use of Timber and Wood-based products for Use in Building
- NZS 3603 Timber Structures
- NZS 3604 Timber Framed Buildings
- AS/NZS 1604.3 Specification for Preservative Treatment, Part 3:Plywood
- E2/AS1 External Moisture



WARNING: Plywood which is non-certified or is manufactured to standards other than AS/NZS 2269, such as US voluntary standard PSI-95, is not referenced in the NZBC. There can be significant differences between AS/NZS 2269 certified and non certified plywood around bond durability, structural ratings and veneer quality.

Structure B1

Design to NZS 3603 Timber Structures complies with the NZBC in Verification Method B1/VMI Clause 6.0 Timber. Plywood is the only sheet material with properties listed in NZS 3603. Ecoply structural plywood is available in F8 stress grade. Some specialty products are available F11 or with specifically designed properties for specialised applications.

1.8 GENERAL DESIGN CONSIDERATIONS

Durability (Clause B2) and exterior moisture (Clause E2)

Ecoply plywood is made from softwood solid radiata pine veneer. Designers should assess the level of exposure to biological, moisture, and other hazards and apply appropriate preservative treatment and detailing to minimise exposure to these hazards.

Information in this manual outlines suggested practices for detailing building components to exclude moisture to comply with the durability requirements of the NZBC.

Formaldehyde

Ecoply plywood is manufactured using phenol formaldehyde resins which are fully cured in the hot press. Cured resin is thermally and moisture stable and formaldehyde emissions for the glued plywood are similar to background levels for the wood by itself when tested to AS/NZS 2098.11 Determination of formaldehyde emissions for plywood. Accordingly every panel is branded with the lowest emission class (less than 0.5 mg/litre for E₀).

Actual formaldehyde emissions for Ecoply plywood have been tested and approved as having an actual formaldehyde emission level of less than 0.3 mg/ litre (equivalent to a Super E₀ emission level).

Moisture content and dimensional change

At the time of leaving the factory, the moisture content of untreated Ecoply plywood should generally be in the range of 8% to 15% as required by AS/NZS 2269. All wood products including plywood respond to changes in ambient humidity so the eventual moisture content of plywood varies according to how dry or how wet the environment is. After manufacture, the moisture content will move to equilibrium with the environment, and the veneers swell or shrink across the grain in response. The total expansion both along and across a 2400 x 1200 mm panel can be in the order of 1.5 mm to 3 mm as the plywood changes from a dry to a saturated state.

Ecoply that is treated with waterborne preservatives (e.g. H3.2 CCA) is expected to be used in applications that have higher humidity than interior dry use, so following treatment it is dried to a higher average moisture content of approximately 18%. This provides for a more stable panel in service than placing a dry (less than 15%) sheet in a higher moisture environment.

Detailing and construction must allow for movement if the plywood will be subject to cycles of moisture change. Seasonal and daily cycles can be significant depending on the end use.

Temperature

Wood will expand upon heating as do practically all solids. The thermal expansion of plywood is quite small and there is little effect on the structural performance or durability of plywood when used in temperatures below 54°C. The average co-efficient of thermal expansion of plywood is 4.5×10^{-6} mm/mm/°C. At temperatures above 55°C wood begins to deteriorate. Colours of coatings and finishes should be selected to reduce heat gain. For extreme conditions, further technical information is available by calling CHH Plywood on 0800 326 759.

The thermal resistance or insulating effectiveness of plywood panels can be calculated using NZS 4214 Methods of determining the total thermal resistance of parts of buildings. e.g. Plywood has a Conductivity (k) of 0.13 W/mK so a 12 mm panel has a thermal resistance $R = 0.012/0.13 = 0.09$.

Aesthetics

Ecopy plywood products can be selected for decorative or weather protection functions as well as structural performance. Acceptable Solution E2/AS1 - External Moisture allows plywood manufactured to AS/NZS 2269, (minimum CD appearance grade, minimum 12 mm thickness and treated as required by NZS 3602) to be used for exterior cladding. For exterior cladding applications CHH Plywood strongly recommends Shadowclad® exterior cladding rather than smooth faced plywood such as Ecopy.

Shadowclad® features a textured (bandsawn) face which reduces the visibility of face checking and other appearance related issues which can occur on smooth faced plywood if not regularly maintained by the homeowner. For more information on plywood used as an exterior cladding refer to the current Shadowclad Specification and Installation Guide for Cavity Construction.

Face checks on plywood exposed to weather

Face checks are lengthwise separations of wood fibres in the face veneer of the plywood. They result from the normal swelling and shrinking of wood as it gains and loses moisture. It is important to realise that these checks are superficial, being confined to the face veneer. They do not alter the structural integrity of the plywood in any way. If you are the specifier, it is important to discuss these issues with your client and consider the length of exterior exposure, climate conditions and protection offered by the surface coating before finalising product choice.

Durability

The durability of Ecopy structural plywood will depend on the application. Detailing, treatment and installation details need careful consideration to satisfy the requirements of the NZBC.

Normally, 50 year durability can be achieved with untreated Ecopy in dry, interior exposure. For internal environments subject to high humidity or condensation H3.2 CCA treated Ecopy should be used.

For plywood as a rigid air barrier (including rigid air barrier acting as bracing) refer to the current Ecopy Barrier Specification and Installation Guide which can be downloaded from www.chhply.co.nz.

Fire, spread of flame and smoke development

The following data on early fire hazard properties of uncoated Ecopy plywood are the result of tests carried out by Australian Wool Testing Authority AWTA to test structural plywood manufactured to AS/NZS 2269 in accordance with ISO 5660, reaction to fire tests (heat release, smoke production and mass loss rate). Part 1: Heat Release rate (cone calorimeter method).

Table 6 summarises the test configurations and associated material groups.

For plywood with decorative finish coatings or intumescent coating, performances depend on spread rates of the coating. For advice on specific coating systems and their suitability for use with Ecopy products, always refer to the coating manufacturer.

Table 6: Early Fire Hazard Properties of Ecopy® Plywood

Material	Species	Origin	Thickness	Treatment	Material groups
Plywood	Radiata Pine	New Zealand	7mm	CCA Treated	Group 3
Plywood	Radiata Pine	New Zealand	12mm	Untreated	Group 3
Plywood	Radiata Pine	New Zealand	12mm	LOSP Treated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	Untreated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	LOSP Treated	Group 3
Plywood	Radiata Pine	New Zealand	19mm	CCA Treated	Group 3

1.9 SUSTAINABILITY

Ecoply is manufactured from radiata pine. It is grown on tree farms which are tended and harvested to provide wood for plywood manufacture. The crop is managed on a sustainable basis to yield millable trees.

New Zealand plantations are managed in compliance with the New Zealand Forest Accord.

Ecoply is manufactured in New Zealand at CHH Plywood

Tokoroa plywood mill.

Ecoply is available Forest Stewardship Council® (FSC®) certified (FSC® C012019) upon request.

1.10 HEALTH & SAFETY

Ecoply should be handled in accordance with the Material Safety Data Sheets (MSDS) for untreated, H3.2 CCA and H3.1 LOSP treated Ecoply, which can be downloaded from www.chhply.co.nz.

Always wear safety glasses or non-fogging goggles when machining Ecoply panels.

If wood dust exposures are not controlled when machining (sawing, routing, planing, drilling etc) a class P1 or P2 replaceable filter or disposable face piece respirator should be worn.

Wear comfortable work gloves to avoid skin irritation and the risk of splinters. Wash hands with mild soap and water after handling panels.

1.11 STORAGE & HANDLING

Ecoply panels must be stored and handled with care to maintain good condition before use and after installation:

- The storage area must be protected from sun, rain and wind that would otherwise bring about rapid changes in temperature and humidity
- Support for the sheets must be provided at both ends and middle to avoid distortion. Ensure bearers in packs above are aligned over bearers below (to avoid inducing curves in sheets)
- The stack must be kept dry and clear of ground contact, and

placed so that it will not be exposed to mechanical damage

- The sheets must be stacked flat, NOT on edge
- Store in well-ventilated areas away from sources of heat, flame or spark
- To avoid staining, fading and surface checking, the sheets must not be exposed to the weather while awaiting installation
- Store in well-ventilated areas away from sources of heat, flames or sparks

2.0 GENERAL INSTALLATION GUIDE

The following is a general guide to be followed unless otherwise specified. For additional installation instructions for typical applications refer to sections 3, 4 and 5.

2.1 FRAMING

Use kiln dried framing e.g. Laserframe® in accordance with timber framing manufacturer's specifications and treated in accordance with NZS 3602. All timber frame sizes and set out must comply with NZS 3604 (or be specifically designed to NZS 3603). The current Laserframe Product Guide can be downloaded from www.chhwoodproducts.co.nz. Ecoply may be specified for frame spacing determined by design, or using tables in section 3 for specific product applications such as bracing, flooring and as a substrate for shingle roofs or membrane roofs and decks.

H3.1 LOSP treated framing should be vented before fixing and if construction adhesives are required (for example to screw and glue floor panels) the adhesive must be compatible with H3.1 LOSP. See section 1.4: Preservative Treatment.

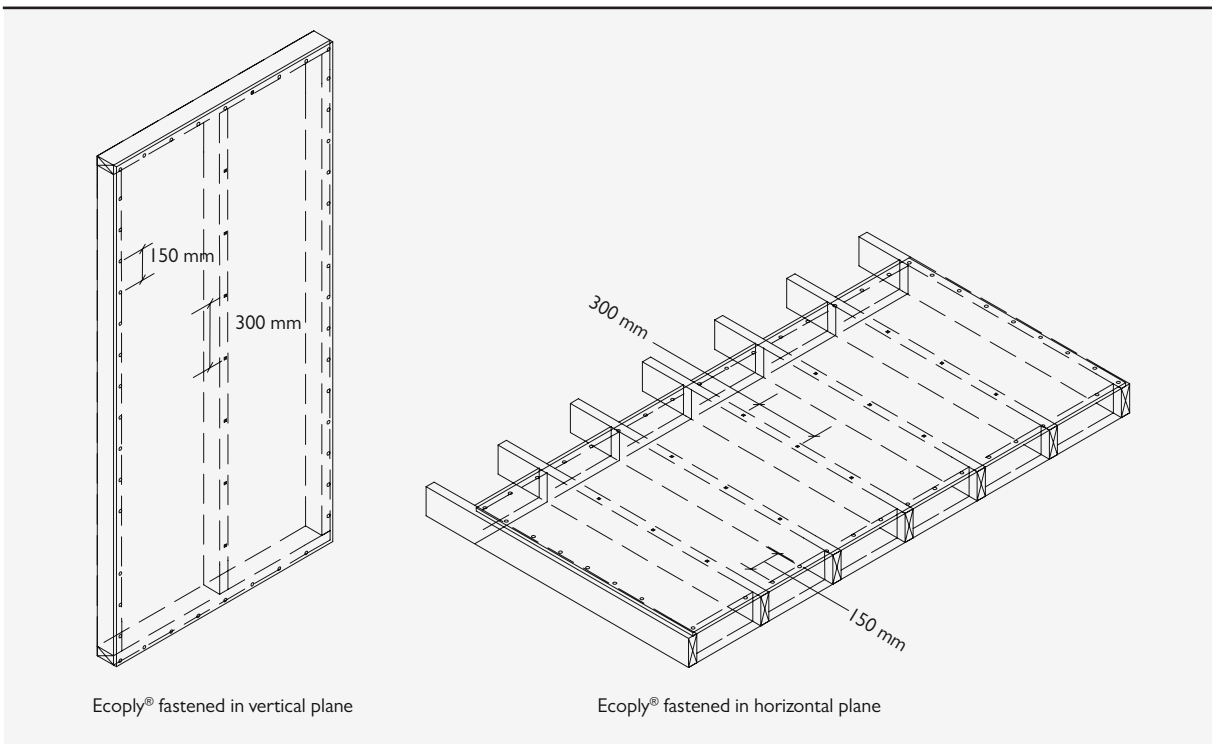
For plywood used as exterior cladding refer to the current Shadowclad® Specification & Installation Guide for Cavity Construction which can be downloaded from www.chhply.co.nz

For plywood used as a rigid air barrier refer to the current Ecoply Barrier Specification & Installation Guide which can be downloaded from www.chhply.co.nz

2.2 SHEET FASTENERS AND FIXING

- Where there is risk of panel size change due to changes in moisture levels, allow a 2 to 3 mm expansion gap between sheets
- Use only flathead nails or screws, with or without construction adhesives
- Fastener length should penetrate at least 10 nail diameters into the framing or be three times the sheet thickness, whichever is the greater. Longer or ring shank nails may be specified
- Fasteners must be at least 3 fastener diameters or 7 mm from the edge of the sheet
- For tongue and groove products such as flooring and roofing fasten 15 mm from tongue and groove edges
- Standard fixing pattern: unless otherwise specified fasten edges and ends of sheets at 150 mm centres, and within the panel at no more than 300 mm centres (see diagram below)
- Use hot dipped galvanised fasteners or corrosion resistant fasteners (i.e. stainless steel) determined by design for specific hazards
- Where using stainless steel nails, nails must be annular grooved
- Refer to Table 7 for minimum fastener sizes
- Do not overdrive power driven nails

EC001: Fastener spacings for Ecoply®



EC002: Fastener spacings from edges

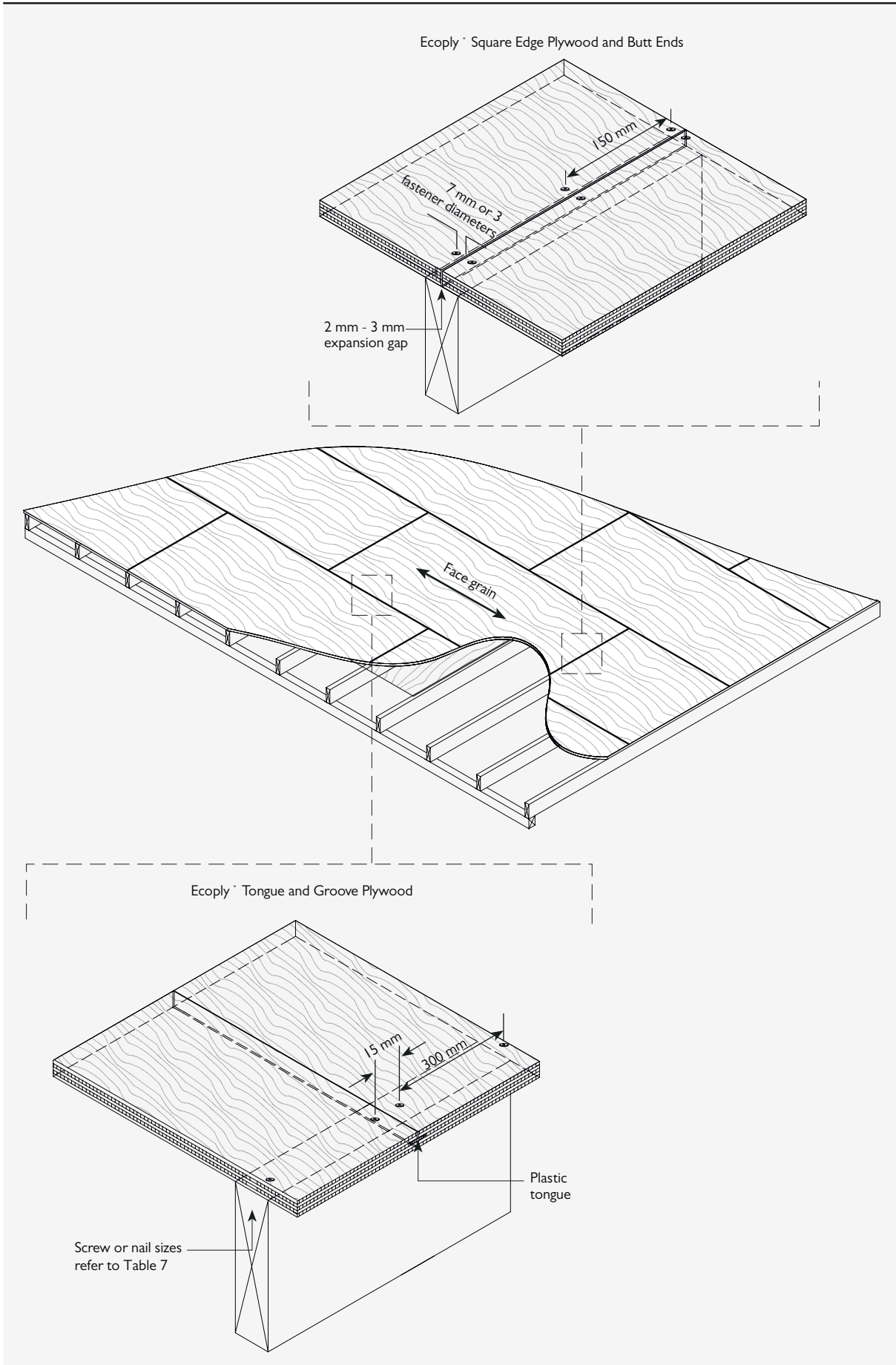


Table 7: Fasteners and Characteristic Shear Loads for EcoPLY®

Nominal Thickness (mm)	7mm		12mm		17 mm		19mm		25 mm	
	9mm	Load ¹	15 mm	Load ¹	Load ¹	Load ¹	21mm	Load ¹	Load ¹	Load ¹
Minimum nail size in timber framing²	40 x 2.5 mm	570	60 x 2.8 mm	736	60 x 2.8 mm	736	60 x 2.8 mm	736	75 x 3.15 mm	883
Screw size in timber framing²	8g x 30 mm	1230	8g x 40 mm	1230	10g x 40 mm	1650	10g x 45 mm	1650	10g x 50 mm	1650
1.15 mm steel framing²	10-24-35 ⁴	1300	10-24-40 ⁴	2000	10-16-45 ⁴	2100	10-16-45 ⁴	2100	10-16-45 ⁴	2100
Screw size in 2.80 mm steel framing²	10-24-35 ⁴	1200	10-16-40 ⁴	1200	14-20-45 ⁴	3000	14-20-45 ⁴	4000	14-20-45 ⁴	5000

1 The load is the characteristic load (N) for one fastener in single shear

2 Characteristic load based on fixing into a timber of J5 joint group or better

3 Self tapping, self countersinking screw

4 Screw Numbers indicate: Gauge – Threads per inch – Length (mm)

Notes

- Steel thickness, screw sizes, characteristic loads, refer to assemblies actually tested
- Other screw sizes may be used. Screw properties vary between screw suppliers and the suitability of a particular size should be verified by the designer for performance under changing physical conditions and cyclic loading
- Non-standard nailing may be specifically designed with NZS 3603 or similar

Fasteners for H3.2 CCA treated EcoPLY®

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to section 4 of NZS 3604 for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

Notes

H3.2 CCA treated timber should not be fixed in direct contact with light gauge steel products. Refer to the framing manufacturer for advice on fixing and treatments.

2.3 ADHESIVES

Tube applied construction adhesives

Site applied construction adhesives may be used together with nails and screws for non permanent loads, reduced fastener popping, and to lower the risk of squeaking in floors. Available types include polyurethane (e.g. Holdfast® Gorilla Nailpower®) and elastomeric (e.g. Bostik® Wallboard Gold) based adhesives.

Elastomeric adhesives should meet the requirements of APA Performance specification AFG 01 Adhesives for field gluing plywood to wood framing. Other types should have appraisal from an independent authorising body such as BRANZ or equivalent authorities for the specific applications proposed. Follow manufacturer's recommendations. In addition:

- Use a bead or daubs of adhesive as per manufacturer's recommendations
- Apply pressure using fastener patterns outlined in section 2.2: Sheet Fasteners and Fixing
- Work from the middle of the sheet outwards to develop glue line pressure
- Ensure adhesives are compatible with treatment in the framing timber, see section 1.4: Preservative Treatment

Structural adhesive joints

Structural bonds are generally only achievable in factory controlled conditions using approved structural adhesives in accordance with approved standards for glue lamination, e.g. Resorcinol formaldehyde joints made to AS/NZS 1328 Glued laminated structural timber. Site gluing is not recommended for structural plywood components. Contact CHH Plywood on 0800 326 759 for further information.

3.0 STRUCTURAL BRACING & CEILING DIAPHRAGMS

The Ecoply bracing system provides bracing resistance for walls and subfloor foundations for light timber framed buildings under wind and earthquake loading, to meet the requirements of the NZBC - BI Structure, and NZS 3604 *Timber Framed Buildings* or specifically designed to NZS 3603 *Timber Structures Standard*.

Any Ecoply structural panel may be used for bracing as long as it is 7 mm, 9 mm or 12 mm thick, has a minimum wall length as described in Table 9, treated for the specific application in accordance with NZS 3602 (summarised in Table 8) and fixed in accordance with Ecoply bracing specifications outlined in this guide.

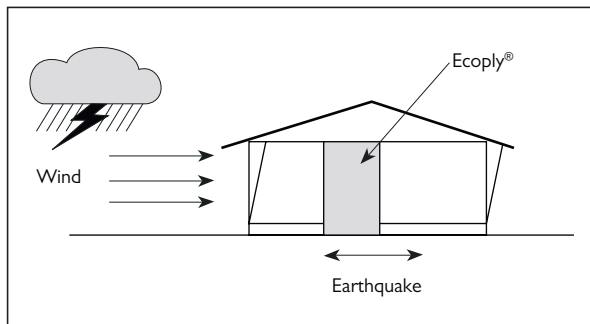
3.1 DESIGN TO COMPLY WITH THE NEW ZEALAND BUILDING CODE

Structure

Timber framed buildings to NZS 3604 *Timber Framed Buildings* is listed as an Acceptable Solution under Clause 3.0 Timber in Acceptable Solution BI/ASI Structure.

CHH Plywood have developed a range of wall bracing elements tested using P21 testing methods referenced in NZS 3604.

Specific design



Ecoply structural plywood is manufactured to AS/NZS 2269, and it is suitable for design and use in earthquake and wind bracing systems constructed in accordance with NZS 3603 and AS/NZS 1170.

Structural plywood to AS/NZS 2269 is the only sheet brace material with properties defined in a published New Zealand engineering design code, NZS 3603 *Timber Structures*, and so can be designed in compliance with Verification method BI/VM1 under Clause 6.0 Timber for use in buildings over three storeys in height.

Demand is calculated by following section 5, Bracing Design of NZS 3604 or using the GIB EzyBrace® software, downloadable from www.gib.co.nz

EP bracing systems properties can be easily loaded into the EzyBrace software by way of an Excel patch downloadable from www.chhply.co.nz together with loading instructions.

Timber Floors

When carrying out a bracing design for buildings with timber floor structures, the maximum bracing rating that can be accounted for when summing up the bracing units is 120 BUs/m. This does not exclude the installation of bracing elements that are rated higher than 120 BUs/m, however the extra bracing capacity can not be accounted for in the bracing design.

Specific design of floor and sub-floor framing is required for elements rated higher than 120 BUs/m.

Durability

Ecoply plywood is manufactured to meet the requirements of NZS 3602 *Timber and Wood based products for use in buildings*. If the product is used, handled and installed in accordance with CHH Plywood product literature it will meet the durability Clauses of the NZBC.

Table 8 summarises the applications in which Ecoply can be used as structural bracing together with the required preservative treatment and fastener material.

Table 8: Ecoply® Suitability for Bracing Applications Including Treatment Type & Fastener Material

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones as per section 4 of NZS 3604, including sea spray): E.g. Interior linings	Ecoply Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones B & C, as per section 4 of NZS 3604: E.g. Plywood bracing and/or rigid underlay (rigid air barrier), fixed to framing with/ without building paper/ wrap over, with/ without cavity battens behind cladding	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone D (sea spray), as per section 4 of NZS 3604: E.g. Plywood bracing and/or rigid underlay (rigid air barrier), fixed to framing with/without building paper/wrap over, with/ without cavity battens behind cladding	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply® Barrier Specification and Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B & C, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zones' D	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones, as per section 4 of NZS 3604 (including sea spray)	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

Note: Power driven nails are suitable for use. Do not overdrive, nails must be full round head

Rain wetting and construction bracing

Untreated Ecoply will withstand normal exposure conditions during construction for up to 3 months however aesthetically the sheet appearance will deteriorate as the level of exposure increases. Rain and exposure can cause thinner plywood panels to buckle. Plywood stability is related to the number of veneers and thickness of the panel. Where panel stability is critical, consider using thicker panels.

Humidity and condensation

In conditions where the moisture content may exceed 18% for prolonged periods, Ecoply must be H3.1 LOSP or H3.2 CCA treated to resist decay or insect hazard.

Subfloor sheet bracing

H3.2 CCA treated Ecoply can be used as sheet bracing where dampness does not allow the use of untreated plywood or other sheet materials (section 5 of NZS 3604). Where Ecoply subfloor sheet bracing is exposed to both rain and sun, it must be coated with a three coat, 100% acrylic exterior coating system with a light reflectance value of 50% or greater.

Adjustments for wall height

Use section 5 of NZS 3604 to calculate bracing values: "Adjustment of bracing capacity of walls of different heights and walls with sloping top plates shall be obtained by the following method:

- For wall bracing elements of heights other than 2.4 m, the bracing rating determined by test or from Table 9 should be multiplied by $2.4 \div \text{element height in metres}$, except that elements less than 2.4 m high shall be rated as if they are 2.4 m high.
- Walls of varying heights, should have their bracing capacity adjusted in accordance with section 5 of NZS 3604 using the average height."
- Walls with heights < 1.5m, Specific Engineering Design is required.

Joining panels for walls higher than maximum sheet length

Ecoply bracing panels must be fixed from top plate to bottom plate. For wall heights over 2.4 m, Ecoply and Shadowclad® is available in 2.7 m sheet lengths. Alternatively, a part sheet can be stacked above a full sheet, butt joined on a single row of nogs with each sheet/part sheet independently nailed off as per the nail spacing in the Ecoply bracing specifications (e.g. 2.4 m x 1.2 m sheet with a 0.3 m x 1.2 m part sheet above it to give a 2.7 m x 1.2 m bracing element).

Cladding as bracing

12 mm Ecoply (CD face grade or better) can be H3 treated to meet the requirements of Acceptable Solution E2/AS1 and will perform as a structural, durable and weathertight cladding and bracing element when installed in accordance with E2/AS1.

It should be noted smooth faced plywood such as Ecoply may be prone to appearance related issues such as face checking which occurs naturally and is not considered by CHH Plywood to be a manufacturing or product fault. For more information refer to section 1.8: General Design Considerations - Face Checks on Plywood Exposed to Weather. H3.2 CCA treated Ecoply may also have a green tinge to the wood surface and may have fillet marks on the face of the sheet.

Plywood for exterior cladding applications where a high visual appearance is desired, CHH Plywood recommends the use of Shadowclad as an exterior cladding. Shadowclad has a textured (bandsawn) face which reduces the visibility of face checking and is most commonly H3.1 LOSP treated (clear preservative treatment) which does not leave fillet marks on the panel face.

For further information on Shadowclad as an exterior cladding

refer to the current Shadowclad Specification and Installation Guide for Cavity Construction which can be downloaded from www.chhply.co.nz.

Soil

Ecoply must not be allowed to come in contact with soil. The bottom edge of the plywood sheet must be a minimum of 100 mm above decks or paved ground and a minimum of 175 mm above unprotected ground.

Service penetrations in bracing elements

Small openings (e.g. power outlets) of 90 x 90 mm or less may be placed no closer than 90 mm to the edge of the braced element, or waste pipe outlets of max. 150 mm diameter placed at no closer than 150 mm to the edge of the braced element.

3.2 ECOPLY® BRACING SPECIFICATIONS SUMMARY

CHH Plywood has a range of bracing specifications called the EP bracing series. The EP bracing series simplifies the design and construction of bracing elements using plywood, by itself or in conjunction with GIB® Plasterboard and features:

- Single sided and double sided bracing elements High performance bracing element utilising GIB® Standard plasterboard

- A single type, GIB Handibrac®, hold-down for all bracing elements
- Specifications for each bracing element type

Table 9: Summary P21 Ratings for 2.4m High Ecoply® Wall Elements

Specification No.	Minimum Wall Length	Lining Requirements	BUs/m Wind	BUs/m Earthquake
EPI	0.4 m		80	95
	0.6 m	Ecoply one side	95	105
	1.2 m		120	135
EPG	0.4 m	Ecoply one side and	100	115
	1.2 m	10 mm GIB® Standard plasterboard other side	150	150

Note: Bracing and other technical information has been specifically tested using Ecoply branded structural plywood. This information cannot be used with any other plywood brand and bracing data must be sought directly from the specific plywood manufacturer.

More information

The following pages provide a full specification of EP bracing elements. Copies of specifications can be downloaded from www.chhply.co.nz

NZS 3604 provides the method of calculating demand on a building. Calculation sheets are available from BRANZ or GIB EzyBrace® software is available as a free download from www.gib.co.nz. Information is available at www.chhply.co.nz which can be placed in the custom elements of GIB EzyBrace® for ease of calculation

Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/AS1 Structure. Testing was carried out using Ecoply manufactured by Carter

Holt Harvey and SG8 timber framing, and GIB® products manufactured by Winstone Wallboards Ltd. Substituting materials may compromise performance of the system. GIB® and GIB HandiBrac® are registered trade marks of Fletcher Building Holdings Ltd.

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3.3 ECOPLY® BRACING SPECIFICATION - EPI

Table 10: Singled Sided Structural Plywood Brace

Specification No.	Minimum Wall Length	Lining Requirements	BU's/m Wind	BU's/m Earthquake
EPI_0.4	0.4 m	Ecoply one side	80	95
EPI_0.6	0.6 m	Ecoply one side	95	105
EPI_1.2	1.2 m	Ecoply one side	120	135

Framing

Wall framing must comply with:

- NZBC B1 - Structure: ASI Clause 3 Timber (NZS 3604)
- NZBC B2 - Durability: ASI Clause 3.2 Timber (NZS 3602)

Framing dimensions and height are as determined by the NZS 3604 stud and top plate tables for load bearing and non load bearing walls. Kiln dried verified structural grade timber must be used. Machine stress graded timber, such as Laserframe® of SG8 stress grade minimum, is recommended.

Bottom plate fixing

Use GIB Handibrac® hold-down connections at each end of the bracing element. Refer to manufacturer installation instructions supplied with the connectors for correct installation instructions and bolt types to be used for either concrete or timber floors. Within the length of the bracing element, bottom plates are fixed in accordance with the requirements of NZS 3604.

Lining

One layer of 7 mm, 9 mm or 12 mm Ecoply plywood fixed directly to framing. If part sheets are used, ensure nailing at required centres is carried out around the perimeter of each sheet or part sheet. A 2-3 mm expansion gap should be left between sheets.

Fastening the Ecoply® panels

Fasten with 50 x 2.8 mm hot dipped galvanised or stainless steel flat head nails for direct fix. Place fasteners no less than 7 mm or 3 fastener diameters from sheet edges. Screws cannot be used. Power driven nails are suitable. Do not overdrive, nails must be full round head.

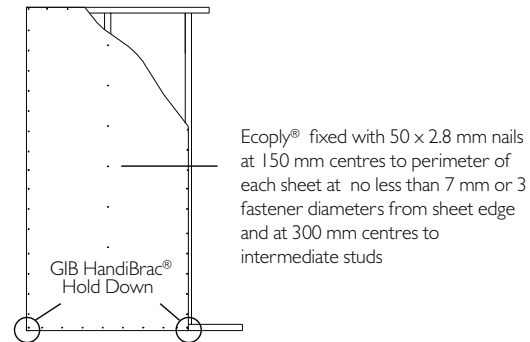
Fasteners for H3.2 CCA treated Ecoply® panels

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised.

In certain circumstances stainless steel fasteners may be required. Refer to Table 8 of the Ecoply Specification and Installation Guide for these circumstances and further fastener selection advice. Where stainless steel nails are required, annular grooved nails must be used.

Fastening centres

Fasteners are placed at 150 mm centres around the perimeter of each sheet and 300 mm centres to intermediate studs. Where more than one sheet forms the brace element each sheet must be nailed off independently.



Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/ASI Structure. Testing was carried out using Ecoply manufactured by Carter

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Table 11: Ecoply® Suitability For Bracing Applications Including Treatment Type and Fastener Material*

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones as per section 4 of NZS 3604, including sea spray):	Ecoply Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones B & C, as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone D (sea spray), as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply Barrier Specification & Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B & C, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zones D, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones (including sea spray), as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

* Refer to Table 8, page 16 of Ecoply Specification & Installation Guide.

Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/AS1 Structure. Testing was carried out using Ecoply manufactured by Carter

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3.4 ECOPLY® BRACING SPECIFICATION – EPG

Table 12: Structural Plywood Brace with Plasterboard Other Side

Specification No.	Minimum Wall Length	Lining Requirements	BU/s/m Wind	BU/s/m Earthquake
EPG_0.4	0.4 m	Ecoply one side and 10 mm	100	115
EPG_1.2	1.2 m	GIB® Standard plasterboard other side	150	150

Framing

Wall framing must comply with:

- NZBC B1 - Structure: AS1 Clause 3 Timber (NZS 3604)
- NZBC B2 - Durability: AS1 Clause 3.2 Timber (NZS 3602)

Framing dimensions and height are as determined by the NZS 3604 stud and top plate tables for load bearing and non load bearing walls. Kiln dried verified structural grade timber must be used. Machine stress graded timber, such as Laserframe® of SG8 stress grade minimum, is recommended.

Bottom plate fixing

Use GIB HandiBrac® hold-down connections at each end of the bracing element. Refer to manufacturer installation instructions supplied with the connectors for correct installation instructions and bolt types to be used for either concrete or timber floors. Within the length of the bracing element, bottom plates are fixed in accordance with the requirements of NZS 3604.

Lining

Side 1: One layer of 7 mm, 9 mm or 12 mm Ecoply plywood exterior wall cladding fixed directly to framing. If part sheets are used, ensure nailing at required centres is carried out around the perimeter of each sheet or part sheet. A 2-3 mm expansion gap should be left between sheets.

Side 2: One layer of 10 or 13 mm GIB® Standard plasterboard vertically or horizontally fixed. Sheet joints are touch fitted and fastener heads and joints stopped in accordance with the GIB® Site Guide.

Fastening the Ecoply® panels

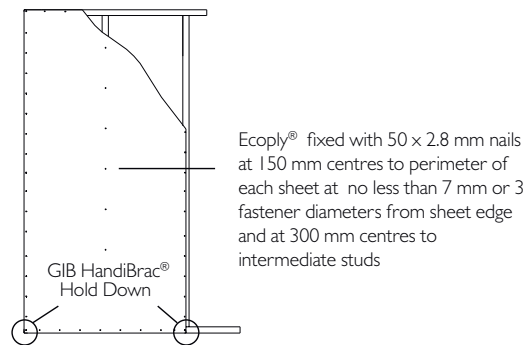
Fasten with 50 x 2.8 mm hot dipped galvanised or stainless steel flat head nails for direct fix. Place fasteners no less than 7 mm or 3 fastener diameters from sheet edges. Screws cannot be used. Power driven nails are suitable. Do not overdrive, nails must be full round head.

Fasteners for H3.2 CCA treated Ecoply®

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to Table 8 of the Ecoply Specification and Installation Guide for these circumstances and further fastener selection advice. Where stainless steel nails are required, annular grooved nails must be used.

Fastening centres

Fasteners are placed at 150 mm centres around the perimeter of each sheet and 300 mm centres to intermediate studs. Where more than one sheet forms the brace element each sheet must be nailed off independently.



Ecoply® Bracing Systems are designed to meet the requirements of the NZBC and have been tested and analysed using the P21 method referenced in NZS 3604:2011 listed as an acceptable solution B1/AS1 Structure. Testing was carried out using Ecoply manufactured by Carter

Holt Harvey and SG8 timber framing, and GIB® products manufactured by Winstone Wallboards Ltd. Substituting materials may compromise performance of the system. GIB® and GIB HandiBrac® are registered trade marks of Fletcher Building Holdings Ltd.

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Fastening the GIB® Plasterboard

32 mm x 6 g GIB® Grabber® Screws or 35 mm GIB® Nails

Fastening centres

Fasten 50, 100, 150, 225 and 300 mm from each corner and 150 mm thereafter around the perimeter of the bracing element. For vertical fixing place fasteners at 300 mm centres at intermediate sheet joints. For horizontal fixing place single fasteners in the tapered edge where sheets cross studs.

Place fasteners 12 mm from paper bound edges and 18 mm from cut sheet edges. GIB® plasterboard must be treated in every respect in accordance with relevant GIB® literature.

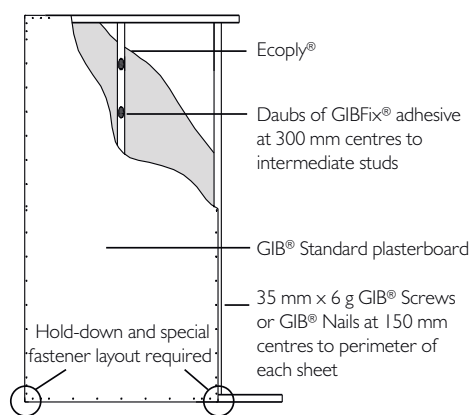


Table 13: Ecoply® Suitability For Bracing Applications Including Treatment Type and Fastener Material*

Application	Plywood Treatment	Fastener Material
Plywood bracing in interior spaces with no risk of exposure to weather or moisture penetration conducive to decay (all exposure zones including sea spray, as per section 4 of NZS3604):	Ecoply Untreated	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zones I B & C, as per section 4 of NZS 3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Hot dipped galvanised or better
Plywood bracing in enclosed spaces (protected from the weather) but with a risk of moisture penetration conducive to decay in exposure zone I D (sea spray), as per section 4 of NZS3604:	Ecoply H3.1 LOSP/H3.2 CCA treated Ecoply Barrier (rigid air barrier)	Stainless steel
Rigid Air Barrier	Refer to Ecoply Barrier Specification & Installation Guide	
Bracing on framing exposed to ground atmosphere in exposure zones B & C, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Hot dipped galvanised or better
Bracing on framing exposed to ground atmosphere in exposure zone D, as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel
Bracing in wet process buildings in all exposure zones (including sea spray), as per section 4 of NZS 3604	Ecoply H3.1 LOSP/H3.2 CCA treated	Stainless steel

* Refer to Table 8, page 16 of Ecoply Specification & Installation Guide.

3.5 GIB HANDIBRAC® – RECOMMENDED INSTALLATION METHOD

Developed in conjunction with MiTek®, the GIB HandiBrac® has been tested for use as the hold-down in all EP bracing elements.

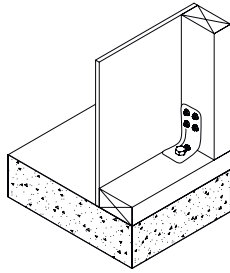
- The GIB HandiBrac® registered design provides for quick and easy installation
- The GIB HandiBrac® provides a flush surface for the wall linings because it is fitted inside the framing. There is no need to

check in the framing as recommended with conventional straps

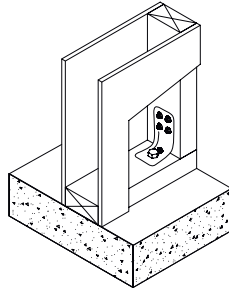
- The GIB HandiBrac® is suitable for both new and retrofit construction
- The design also allows for installation and inspection at any stage prior to fitting internal linings

Concrete Floor

External Walls



Internal Walls



Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate

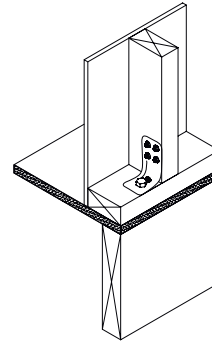
Position GIB HandiBrac® at the stud/plate junction

Hold-down fastener requirements

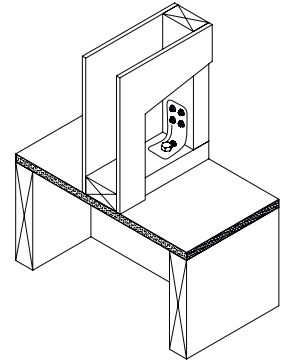
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or screw bolt supplied with the bracket

Timber Floor

External Walls



Internal Walls



Position GIB HandiBrac® in the centre of the perimeter joist or bearer

Position GIB HandiBrac® in the centre of the floor joist or full depth solid block

Hold-down fastener requirements

M12 x 150 mm galvanised coach screw

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3.6 STRUCTURAL CEILING DIAPHRAGMS

Diaphragms are used to transfer lateral loads to braced walls and allow for greater spacing between bracing lines. Diaphragms do not have a BU rating themselves.

Plywood diaphragms are an acceptable solution as described in section 13 of NZS 3604 13.5.2 which allows for plywood not less than 6 mm thick and a minimum of three ply for:

- Diaphragms not steeper than 25 degrees to the horizontal and not exceeding 12 metres long under light or heavy roofs and;
- Diaphragms not steeper than 45 degrees to the horizontal and not exceeding 7.5 metres long under light or heavy roofs

Plywood ceiling diaphragms required to comply with NZS 3604 must be constructed as follows:

- The length of diaphragm shall not exceed twice its width measured between supporting walls
- The ceiling lining must consist of plywood over the entire area of the diaphragm
- Complete sheets with a minimum size of 1800 x 900 must be used
- Framing size and spacing must comply with NZS 3604
- Fastener size should comply with Table 7 of this guide. E.g. 40 mm x 2.5 mm flat head nails for 7 mm and 9 mm Ecoply
- Fastening is at 150 mm centres around the perimeter of each sheet and at 300 mm centres to intermediate framing
- Fixings are no closer than 10 mm from sheet edges
- Perimeter ceiling framing must be connected to wall framing by a perimeter 140 mm x 35 mm ribbon plate nailed to the top of the top plate or alternative such as a 0.55 mm thick steel angle or proprietary steel channel
- Sheets must be laid in a staggered pattern
- The basic shape of a ceiling diaphragm should be rectangular. Protrusions are permitted but cut-outs are not (see Figure 13.4 NZS 3604)

4.0 ROOFS AND DECKS

The section below covers the use of Ecoply plywood used as a substrate for flexible membrane and tile systems in roofing and decking applications. The information below should be considered as supplementary to system specifications from roofing and decking suppliers.

Further guidance on installation and detailing factors can be found in the EWPA Technical Note; Plywood Roofing and Flooring: Installation and Detailing Factors. This can be downloaded from www.ewp.asn.au

Ecoply is not recommended as a substrate for exterior decks without a properly detailed barrier material such as butyl rubber, vinyl or E.P.D.M to protect the surface from weathering.

Always refer to the roofing and decking system supplier for installation, plywood selection and surface preparation requirements for specific roofing and decking products.

4.1 FLEXIBLE MEMBRANE SYSTEMS

- Roofing and decking membranes may comprise synthetic rubber sheeting glued to the Ecoply, or torch welded bitumen membranes
- Always ensure Ecoply is dry and free of imperfections such as surface dust and blemishes as membranes coatings will telegraph any substrate imperfections
- Use Ecoply Flooring or Structural Square Edge (CD Grade)
- Where Ecoply Flooring is used consider the use of a small daub of glue or nail in the Tongue & Groove of each sheet if potential movement of the plastic tongue joint is not acceptable
- For trafficable decks use a minimum 17 mm thickness, refer to Table 15A and 15C for specification
- Use countersunk stainless steel screws and adhesive on framing to avoid head popping. Apply adhesive between screw locations
- Use kiln dried timber framing such as Laserframe® or appropriate LVL framing from the Futurebuild® range
- Consult the membrane manufacturer regarding use of bond breaker tapes over joints to allow elongation with natural plywood movement
- Where treatment is required use only H3.2 CCA treated Ecoply. Do not use H3.1 LOSP treated Ecoply (solvent based carrier). It is not compatible with most membrane systems. If there is evidence of treatment salt crystals on the Ecoply surface remove by scrubbing with a small amount of water and allow the surface to dry prior to laying the membrane system

Plywood substrates, face checking and flexible membrane systems

All natural wood based products (including Ecoply) have the potential to develop natural surface face checks when exposed to external environmental conditions. The degree of face checking is dependent on a number of factors including the length of time and level of exposure to weather during construction which is outside the manufacturing control of CHH Plywood. For more information see section 1.8: General Design Considerations - Face Checking on Plywood Exposed to Weather.

Face checks, while typically not present after manufacture, do not affect structural performance of the sheet and are acceptable under AS/ NZS 2269. They are not a manufacturing fault.

Designers and membrane suppliers must carefully consider the

suitability of plywood as a substrate for the membrane system in question if the potential of telegraphing of face checks onto the membrane surface is not acceptable.

The risk of telegraphing can be reduced by protecting the plywood surface from weather and moisture during the construction process.

Where the potential of face checking in the plywood substrate is not acceptable designers should consult the membrane supplier for a more suitable membrane or an alternative substrate.

Allowing for moisture expansion of plywood under roof and floor coverings

Membrane suppliers have held different views on the requirements for plywood substrates. The fixing instructions within this guide are the starting point but designers must detail joints that allow for expansion in accordance with practices recommended by the chosen membrane supplier.

CHH Plywood' view, and the recommendation of a number of suppliers here and in North America is that expansion and contraction at sheet edges should be allowed for by loosely butting tongue and grooved edges so that the tongues can absorb movement and providing a small gap (2 to 3 mm) between square sawn edges. Use a bond breaking tape over these joints to spread elongation in the membrane over a longer distance than the narrow gap in the joint itself. This tape can double as a rain seal over the sheet edges during construction.

Other membrane suppliers believe that sheets should be tightly butted and glued and screwed hard up to each other. This practice constrains movement at the small joint between sheets, but over a wider area requires significant allowance for movement around the perimeter of a roof segment. Junctions between the roof slopes and walls need careful detailing to allow for the potential movement. Movement control joints should be provided at regular intervals following the recommendation of the membrane manufacturer, especially if this method is adopted.

4.2 ROOF TILE SYSTEMS

Most fibreglass, asphalt or wooden shingle and tile systems will tolerate DD grade surface characteristics.

- Use unsanded Ecoply Roofing (DD grade), or sanded Ecoply of the required thickness in Table 15A
- The unsanded surface provides extra grip on steeper roofs for roofers
- Fix tiles according to the tile manufacturer's specification
- Under asphalt shingles use felt underlay over the Ecoply

4.3 ROOFING & DECKING – PRODUCT SELECTION GUIDE

Table 14: Roofing and Decking Product Selection Guide

	Structural Square Edge (CD Grade)	Flooring (CD Grade)	Roofing (DD Grade)
Product Description	CD face grade sheets are available in a range of thicknesses and size	Solid sanded C grade surface with tongue and groove profile on long edges	Unfilled D grade surface with tongue and groove profile on long edges
Recommended Applications	Substrate for flexible coverings requiring a smooth substrate and where avoidance of visible surface indentations is critical. Use as a substrate for flexible roof and deck membranes and thin roofing tiles		Substrate for coverings with the ability to span holes in the D face grade (up to 75 mm in diameter) such as asphaltic roof tiles and torch welded polyester reinforce membranes. Do not use under flexible membrane coverings or where avoidance of visible surface indentation is critical
Face Grades	Front: C solid sanded Back: D unsanded		Front & Back: D unsanded
	Refer to Table 1 for range and treatment options		
Product Features	Blocking required to support all edges	Second void free layer under surface veneer for increased protection against punching through the first veneer under high point loads & increased moisture resistance. Blocking not required to support tongue and groove edges (unless otherwise specified)	15 and 17 mm thickness specifically designed for use under shingles and tiles that have a courser finish. Unsanded surface for extra strength and grip for installers on steep roofs Blocking not required to support ² tongue and groove edges (unless otherwise specified)
Thicknesses Available	12, 15, 17, 19, 21, 25 mm	15, 17, 19, 21, 25 mm	15, 17 mm
Sheet Sizes Available	2400/2700 x 1200m		
Stress Grades Available	F8 (F11 ¹ available upon request)	F8 (F11 ¹ available upon request) 19 mm Longspan supplied F11 ¹ as standard	F11 ¹
Treatment	Untreated, H3.2 CCA and H3.1 LOSP	Untreated, H3.2 CCA, (H3.1 LOSP available upon request)	
Span Capabilities	Refer to frame spacings in Tables 15A to 15C		

1 Where the stress grade F11 is referred to in all CHH Plywood literature actual stress grade properties of panels are F11 parallel to the face grain and F8 perpendicular to the face grain.

2 Where roofing products use tongue and groove CHH Plywood recommends fastening the tongue to rafters/joists at a minimum of one point

4.4 FRAME SPACINGS FOR ECOPLY® ROOFS AND DECKS

Table 15A: Roofing - Sheathing, Non Trafficable, Above 2 Degree Pitch

Application	Roof Pitch	Stress Grade	Maximum Wind Zone	Maximum frame centres (mm) for Ecoply® with face grain across framing				
				Ecoply nominal thickness (mm)				
				15	17	19	21	25
Sheathing, non trafficable roof for all roof pitches above 2 degrees Suitable for roof mass up to 30 kg/m ² (additional to Ecoply weight or 40 kg/m ² including Ecoply)	>2°	F8	Extra High	600	600	800	800	900
			High	900	900			
		F11	Very High	800	900			
			Extra High	800	800			
	>20°	F11	Very High	900	900			
			Extra High	800	800			

Suggested applications include substrates for Asphalt Shingle and Membrane type roofs. The above suggested maximum framing spans are based on the following deflection criteria:

- Under a short term 1kN point load, deflection is less than Span/130
- Under a long term self weight load, deflection is less than Span/400
- Under a short term wind gust load, deflection is less than Span/150

Table 15B: Sub-Sheathing

Application	Maximum frame centres (mm) for Ecoply® with face grain across framing					
	Ecoply nominal thickness (mm)					
	12	15	17	19	21	25
Under steel or self supporting cladding for support of building paper or lateral diaphragm action. Sag not critical.	800	1200				

Table 15C: Decking

Application	Maximum frame centres (mm) for Ecoply® with face grain across framing			
	Ecoply nominal thickness (mm)			
	17	19	21	25
1. Trafficable roof decking Limited by dynamic response of roof as floor	540	600	600	750
2. Roof decking to Clause 8.5.5.1 c) of E2/AS1	400	400	400	400

- The current requirement in E2/AS1 is extremely conservative when compared with calculations determined for other applications using VM1 Clause 6 and calibrating the spans against codes of practice from North America and Australia. CHH Plywood recommends designers consider the alternative solution in row 1 of Table 15C for membrane decking in consultation with the membrane manufacturer.

Unless otherwise stated spans apply equally to square edge or tongue and groove panels. Check Table 1 for availability of grades and lengths to match span multiples in Table 16

- Use the next lower recommended frame spacing or thicker Ecoply® where appearance is critical
- To suit trusses at 900 centres, 2700 long sheets are available. See Table 16

Table 16: Frame Set Outs to Match 2400mm and 2700mm Sheet Modules

Length (mm)	Typical Frame Spacing to Suit Sheet Length			
2400	400	480	600	800
2700	450	540	675	900

Limitation for the use of Table 16.

CHH Plywood does not have access to information about designs for specific sites. Table 16 is a guide to estimate the initial selection of a span for design. Each site should be evaluated by qualified persons to ensure all loading parameters and site conditions have been considered, and appropriate changes should be made by the building designer.

4.5 ROOFING – DESIGN CONSIDERATIONS

Durability

In general, H3.2 CCA treatment of Ecoply plywood with waterborne preservatives is recommended for roofing.

Roofing materials

Various roofing materials used over Ecoply plywood have different durability expectations, normally in excess of the 15 years required by the NZBC Clause B2. Durability of the roofing is subject to the specifications, installation and maintenance requirements of the roofing manufacturer. The durability of the Ecoply can only be assured as long as the overlying roofing and detailing excludes moisture. With good building practice and maintenance, roofing materials can be repaired or replaced at regular intervals to achieve life from the Ecoply in excess of the original roofing. The durability of Ecoply structural plywood will continue to satisfy the relevant requirements of the NZBC for 50 years, if installed in accordance with the instructions and limitations within this guide and the roof system is adequately maintained.

High humidity, condensation and solar driven moisture

Where the moisture content of wood may exceed 18% for prolonged periods, Ecoply must be H3.2 CCA treated, to resist decay hazard. This includes Ecoply used under roof coverings that may be subject to condensation, or where rain moisture soaked in the roof covering can be driven into the Ecoply by the sun. Appropriate building detailing and ventilation is recommended which can reduce the need for treatment.

Roof ventilation

Good ventilation and the avoidance of moisture are important design considerations when using H3.2 CCA treated Ecoply panels. Poorly ventilated spaces can develop very high temperature and moisture levels. The most likely source of moisture is the condensation of vapour from warm interior air on the underside of cold roofing. Good ventilation can limit the build up of excess moisture vapour in warmer climates

but in regions where winter nights are consistently colder, H3.2 CCA treated Ecoply should be used. Moisture induced decay is only one risk that needs to be managed. If incorrectly detailed, roof spaces can be very tight and the dark colour of many roofing materials means that excessive heat can build up causing distortion in plywood or even framing members. Use the suggested details or alternatives to suit. Designers must consider roofing type, seasonal conditions, wind effects and the intended use of the building.

As a minimum, CHH Plywood recommends a vent area of 1/300th of the ceiling plan area (approx 3350 mm² per square metre of ceiling) equally distributed at the eaves and ridge to allow free flow under the Ecoply, up the roof slope, and out.

Roofing material suppliers should detail vent systems suited to their specific membrane or tile roofing. Proprietary ridge capping profiles or vents are available from roofing suppliers.

Detail gaps of 25 mm in the plywood at ridges, and at walls where a roof slopes up to an upper storey. For flat roofs, natural ventilation flows may be impeded. Use proprietary roof vents. Consider forced ventilation as appropriate.

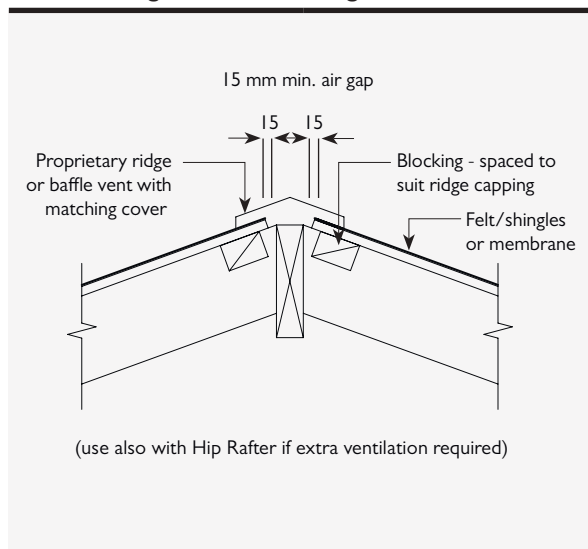
Bubbling

Plywood bubbling occurs when moisture trapped in knot holes in inner veneers expands as the temperature rises. This moisture will dissipate through the face veneer and will not affect the structural integrity of the plywood panel. As membrane coverings can prevent moisture dissipation, Ecoply Flooring and Structural Square Edge CD is recommended if the visual appearance of bubbling is not acceptable, or a high visual finish is required.

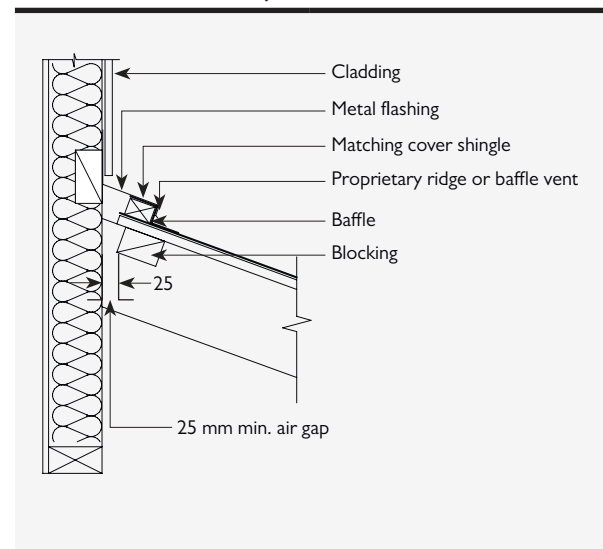
Soil

Ecoply plywood (untreated or H3.1 LOSP/H3.2 CCA treated) must not be allowed to come in contact with soil. Surfaces, flashings and gutters should be detailed to avoid trapping detritus and moisture.

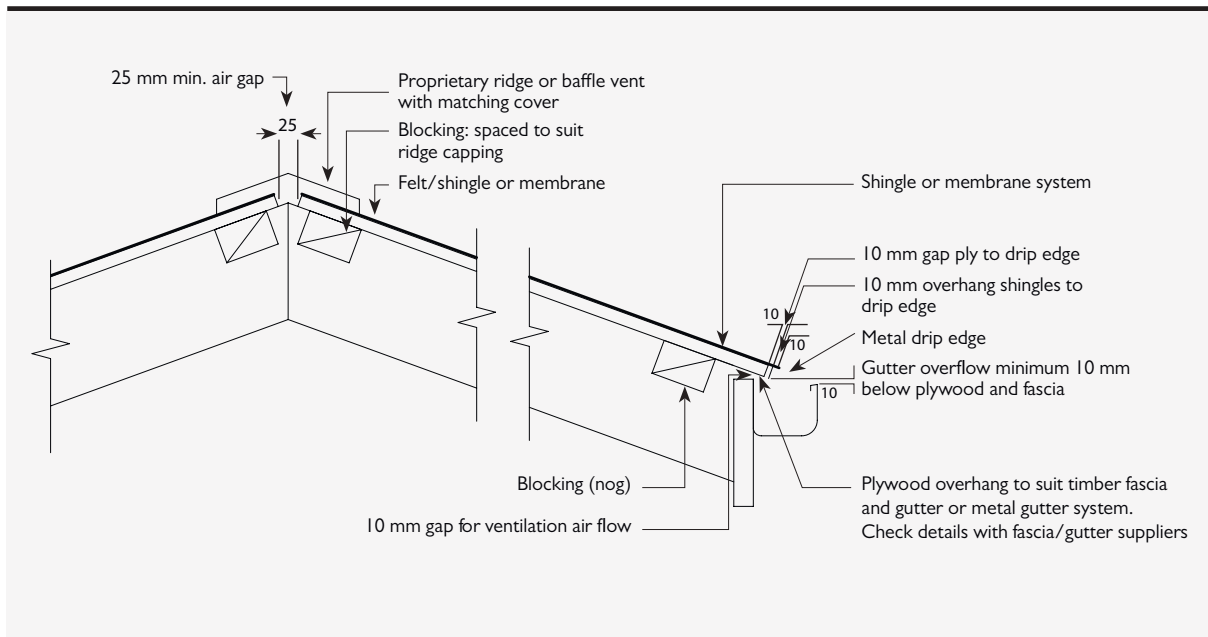
EC003: Ridge detail with ridgeboard



EC004: Roof to wall junction vent



EC005: Truss ridge detail



Rain wetting and construction time

Untreated Ecoply will withstand a reasonable amount of rain wetting and exposure during construction for up to three months. In extreme weather conditions of high temperature and/or high rainfall this period may be less. Appearance issues such as discolouration and face checking of the sheet surface can be expected if Ecoply is exposed. For roofs uncovered for longer periods use H3 treated Ecoply to lower the risk of decay. Return Ecoply to below 18% moisture content before installing moisture sensitive materials, coverings, coatings or adhesives. Where a high visual finish is desired (such as membrane roofing and decking) protect Ecoply from exterior moisture during construction. For detailed information see section 4.1 Flexible Membrane Systems.

Gutter details

Where Ecoply structural plywood sub-sheathing supports roofing at gutters, a metal drip edge must be provided with appropriate gaps to shed water. Gutters should have a front edge overflow or ends lower than the back to shed water overflow away from framing and sub-sheathing Ecoply.

H3.2 CCA treatment is recommended for Ecoply sheets that protrude into gutters, with regular maintenance to avoid leaf mould (soil) development. Untreated Ecoply must not be exposed to gutter splash or moisture.

Fastener spacing for wind suction

Wind pressure applies withdrawal loads to nails holding plywood to purlins and trusses. For the frame spacing in Table 15A designers may use the following guidelines for wind zones expressed in NZS 3604.

Note: Full penetration of fasteners into the supporting member is assumed.

The main body of the roof

For wind zones up to and including high, use 60 x 2.8 mm nails spaced at 150 mm centres on all cross framing. For very high and extra high wind zones, use 75 x 3.15 mm nails spaced at 150 mm centres on all cross framing.

Roof edges

All Ecoply structural plywood used at local pressure suction zones at the roof edges, gutters, eaves and gable ends must be supported on framing, and fixed at 75 mm centres with minimum 60 x 2.8 mm nails for regions up to, and including high wind zones (use 75 x 3.15 mm nails for very high and extra high wind zones). Local pressure zones are interpreted from AS/NZS 1170 as being within 20% of the building length, width or the average of the gutter and ridge height.

Designers and builders should review site conditions to ensure adequate fixing is applied. Buildings in exposed sites and lee zones should be specifically designed using the loading standard (AS/NZS 1170) and the timber structures standard NZS 3603. In some wind conditions, the tiles themselves may be sucked from the plywood. Use a consulting engineer to assess site conditions, calculate wind pressures for the specific site, and determine the fastening and span requirements, and to check that the truss system can resist the loads being applied through the plywood.

Fixing of roofing

Fixing methods for tile, shingle and membrane systems must be designed for the expected wind and weather exposure to protect the Ecoply substrate. Some shingle systems may not be suitable for use in very high or cyclonic wind zones.

Follow the specifications of the roofing manufacturer and refer to the appropriate BRANZ Appraisals.

4.6 ROOFING – INSTALLATION

Framing

Frames should be at spacings to suit plywood thicknesses in Table 15A, page 25. Additional requirements for roof framing are:

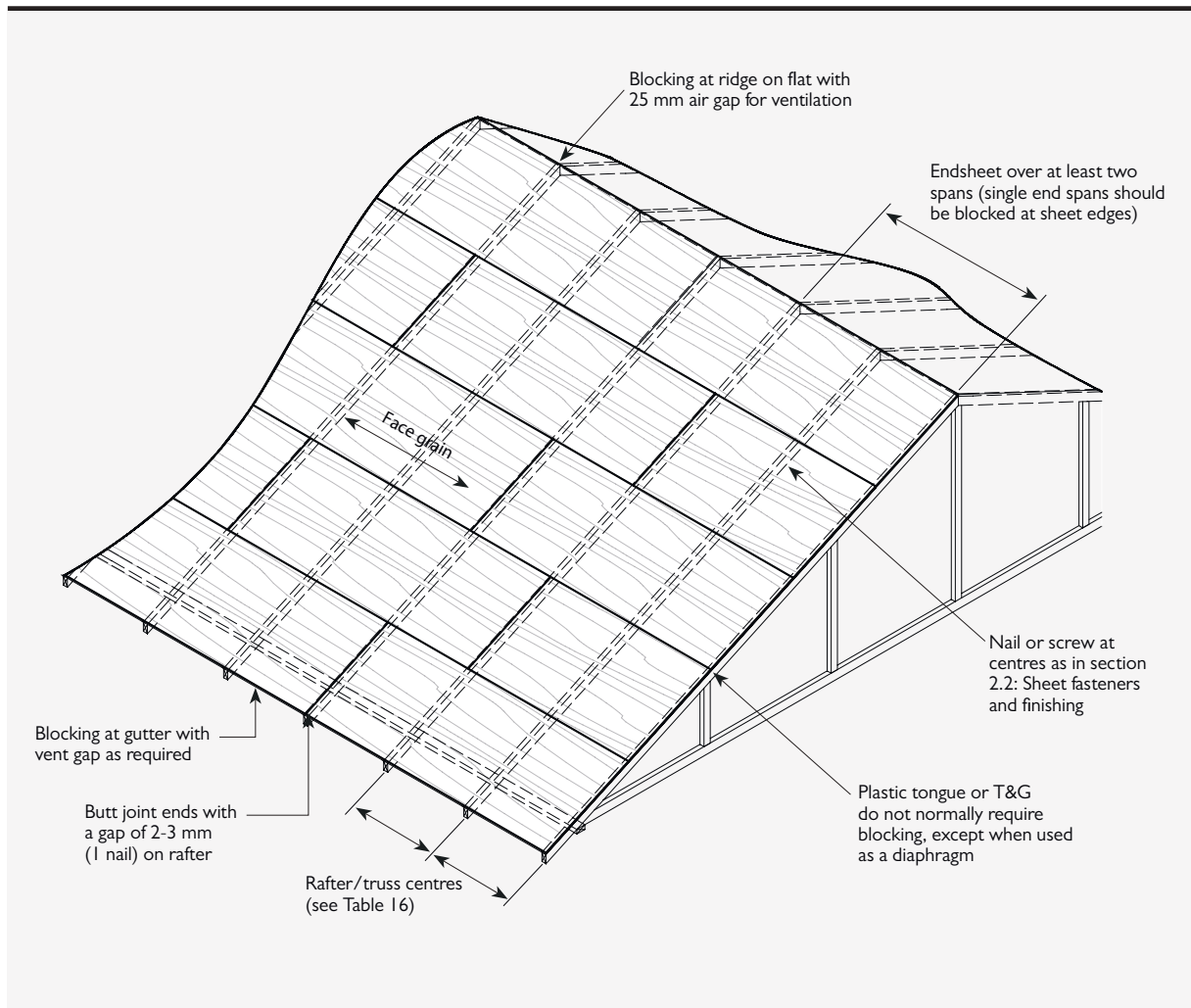
- Ensure top edges of framing are properly aligned
- Use dry Laserframe®, hyJOIST® or hySPAN® framing to lower moisture level in roof spaces, second floor spaces, and reduce differential truss, rafter or joist deflections

Blocking (nogs, dwangs)

- Block all edges of Ecoply Structural Square Edge plywood
- Block all edges at the ridge and gutter lines to prevent sag at capping or gutters

- Block for high face loads or under areas accessed for maintenance
- Blocking within the body of the roof is not required under tongue and grooved edges when using Ecoply Flooring & Roofing, unless required for framing stability or the plywood is being used as a diaphragm to resist horizontal wind or earthquake loads. In this case fixings transfer shear across the joints and details should be specified on drawings
- Use blocking on the flat to provide gaps where air flow is needed for ventilation
- Specific roofing suppliers may require blocking to suit their system

EC006: Sheet and framing layout



Sheet layout

- Ensure Ecoply sheets are dry before installation
- Place face grain at right angles to supports
- Sheets must be continuous over at least two spans (three framing members)
- Lay the sheets in a staggered pattern
- Allow sufficient clearance inside confining structure such as concrete or brick walls adjacent to the roof. Use extra allowances with large areas
- Allow clearance for ventilation as required

Fixing of sheets

Ecoply may be fixed to different types of framing with nails, screws or a combination of fasteners and construction adhesives.

Fasteners should be corrosion resistant to a level appropriate to the end use life expectancy (15 or 50 years) and expected exposure to moisture. Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners must be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to section 4 of NZS 3604 for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

The integrity of a plywood based roof system is directly related to how well the panels are fixed to the framing. Ecoply must be fixed to resist wind suction loads, and to maintain surface qualities of the overlying roof covering.

- Always refer to the roofing system supplier for system requirements
- For roofing, check the additional requirements according to wind exposure
- For very exposed sites, cyclonic conditions or roofs above 10 metres in height, carry out specific structural design to the relevant standards
- Screw fixing must be used for membrane roofing, and is preferred for all systems because of increased holding power and avoidance of head popping
- For minimum fastener spacing for wind suction, refer section 4.5 Roofing - Design Considerations - Fastener spacing for wind suction

Fixing to timber frames

- Ring shank nails or annular grooved nails or screws are recommended for additional holding power
- Use flathead nails. Do not use jolt or bullet head nails
- Stainless steel nails must be annular grooved
- Ensure fastener is compatible with the roofing cover (consult roofing system supplier)
- Staples may be used provided that the withdrawal load is equivalent to the hand driven galvanised flathead nail. A suggested minimum is a 50 mm long staple with 12 mm crown and legs 1.8 mm diameter. Space staples 20% closer than nails. Refer to the manufacturer's information for corrosion resistance and durability

Fixing to steel frames

- Fix directly to roll formed steel (up to 2 mm thick) with self-drilling, self-tapping screws. If plywood gets damp and expands, screws in thicker steel may shear. Keep Ecoply dry or use larger screws or;
- Bolt or screw battens to the steel and apply Ecoply as above for timber. Ensure that battens have adequate thickness for the minimum nail or screw length
- H3.2 CCA treated plywood must not be fixed to steel framing

5.0 FLOORING

The following section covers the use of Ecoply Flooring plywood used as a flooring substrate with flexible and rigid overlays. Ecoply Flooring is suitable as a substrate for overlays such as

carpet, tiles and some membrane products (refer to flooring manufacturer).

5.1 FLOORING – RANGE

- Ecoply Flooring features a void free second layer under the surface veneer for increased protection against moisture bubbles and punch through of the first veneer under high point loads than normal Ecoply Structural Square Edge plywood
- The tongue and groove on long sheet edges does not require support blocking under the joint (unless otherwise specified)
- Supplied in F8 stress grade (F11 available upon request)
- Ecoply 19 mm Longspan Flooring supplied as standard in F11/F8 stress grade
- Supplied standard with a sanded C grade surface with D grade back
- Sanded B grade surface is available in 19 mm thickness (untreated only) for clear finish applications. Designers must expect the surface to dent or mark more easily than hardwood flooring systems as Ecoply is manufactured from relatively soft radiata pine.
- Available untreated or H3.2 CCA treated, (H3.1 LOSP treated available upon request)
- LOSP treated plywood is not recommended for internal applications
- Refer to Table 1 for range and treatment options

5.2 FLOORING – INSTALLATION

Table 17: Flooring Frame Spacings

Application	Maximum frame centres (mm) for Ecoply® with face grain across framing				
	Ecoply nominal thickness (mm)				
	15	17	19	21	25
1. Domestic flooring 2kPa - 1.8kN	480	540	600 F11 ¹ Longspan	600	750
2. Institutional and public assembly up to 4kPa - 2.7kN		300	480	540	750
3. Institutional and crowd assembly up to 5kPa - 3.6kN			400	450	600
4. Corridors, industrial up to 5kPa - 4.5kN			300	400	540
5. Domestic garage floor** 2.5kPa - 9kN					270

** Provide blocking to all edges of the sheet.

- Use the next lower recommended frame spacing or thicker Ecoply flooring where appearance is critical
- To suit frames at 900 centres, 2700 long sheets are available. See Table 16

¹ Where the stress grade F11 is referred to in all CHH Plywood literature actual stress grade properties of panels are F11 parallel to the face grain and F8 perpendicular to the face grain. Please contact CHH Plywood for Span/360 deflection limits for internal membrane areas

Floor loads

For domestic garage floors blocking is required under all edges to control wheel loads on the tongue. Testing with 113 mm diameter load head (0.01 m²) confirms commercial floor capabilities.

Refer to Table 16 to match frame set outs with 2400 mm and 700 mm sheet modules.

Framing

- Joist spacings should be at spacings to suit plywood thicknesses in Table 17
- Use dry Laserframe®, hyJOIST® or hySPAN® framing to achieve a moisture content of 18% or less

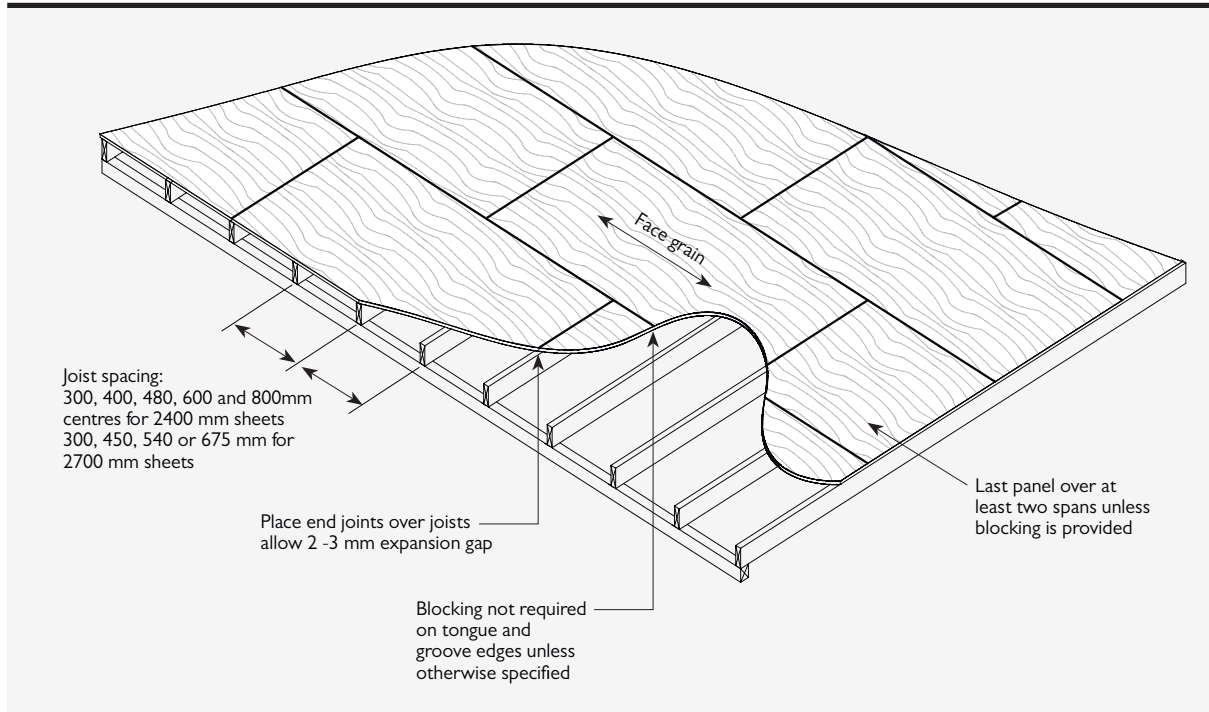
Blocking

- Blocking within the body of the floor is not required under tongue and groove edges unless otherwise specified (such as in domestic garage floors)

Sheet layout

- Ensure Ecoply sheets are dry before installation
- Place face grain at right angles to supports
- Sheets must be continuous over at least two spans (three framing members)
- For panels at floor edges where a continuous two span coverage is not possible, sheet edges must be supported by blocking
- Lay sheets in a staggered pattern
- Allow clearance for ventilation as required

EC007: Ecoply® Flooring layout



Fastener selection and treatment

Fasteners should be corrosion resistant to a level appropriate to the end use, life expectancy (15 or 50 years) and expected exposure to moisture.

Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners shall be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to section 4 of NZS 3604 for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

Fasteners and fixing of sheets

- Ecoply Flooring may be fixed with nails or screws or a combination of mechanical fasteners and construction adhesives
- For fastener specifications (including lay out and sizes) refer to section 2.2: Sheet Fasteners and Fixing
- For construction adhesive specifications refer to section 2.3: Adhesives
- Ring shank or annular grooved nails, or screws are recommended for additional holding power
- To reduce the risk of fastener popping or floor squeak the use of construction adhesives is advised.
- Do not use jolt or bullet head nails

5.3 FLOORING – FINISHING

- Overlays and coatings should be applied following the manufacturer's specifications
- Avoid heavy sanding that may remove the critically important structural face veneer
- Adhesives must be compatible with CCA (Copper Chrome Arsenic) treatment in H3.2 CCA treated sheets. Compatibility can often be improved by lightly washing, scrubbing and drying the plywood surface prior to fixing
- Where clear or stained finishes are desired, designers should select sheets and protect the floor as much as possible from the weather and construction activities
- Ecoply is made from relatively soft radiata pine and as such will dent or mark more easily than hardwood flooring systems. This is to be expected and designers must consider the long term appearance requirements of the project. Ecoply Flooring is a good substrate for harder wearing flooring overlays, and is not primarily intended for clear finishing, especially if it is exposed to moisture during construction
- For improved surface finish, floors should be protected from weather during construction as soon as possible

6.0 FREQUENTLY ASKED QUESTIONS

Q: How much space should be allowed for expansion?

A: Allow a 2 - 3mm expansion gap between square edges of Ecoply® sheets. If using Ecoply Flooring, a 5 mm expansion gap is recommended at the perimeter of the floor or deck. Check by calculation for large areas.

Q: Can power driven nails be used to fix Ecoply?

A: Paslode power driven nails have been tested for fixing Ecoply and Shadowclad® plywood products for particular bracing and cladding applications. For power driven nail specifications refer to the Paslode Special Fixing Applications document available from <http://www.paslode.co.nz/images/fix-app-CHH-woodproducts.pdf>. Use the Paslode Impulse Compact Nailers fitted with a No Mar(k) work contact element to eliminate any contact marks on the plywood. Adjust the work contact element to the flush position and fire the nail at 90° to the work surface. Hammer any nails flush which are left proud. Do not overdrive.

Q: How close to sheet edges can I nail?

A: Fixings must be at least 3 fastener diameters or 7 mm from the sheet edge.

Q: Do I have to use stainless steel nails when using Ecoply for bracing?

A: Where fasteners are in contact with H3.2 CCA treated timber or plywood, fasteners must be a minimum of hot dip galvanised. In certain circumstances stainless steel fasteners may be required. Refer to Table 8 of the Ecoply Specification and Installation Guide for these circumstances. Where stainless steel nails are required, annular grooved nails must be used.

Q: What is the weight of Ecoply?

A: Refer to Table 4A for weight (kg/m²) of different Ecoply thicknesses.

Q: What is the R-value of Ecoply?

A: The thermal resistance or insulating effectiveness of plywood panels can be calculated using NZS 4214. Plywood has a conductivity (k) of 0.13 W/mK so a 12 mm panel has a thermal resistance $R = 0.012/0.13 = 0.09$.

Q: Are there any compatibility issues when using Ecoply with other materials?

A: Adhesives for flexible rubber membranes may react with LOSP treatment and should therefore only be applied to H3.2 CCA treated Ecoply unless the membrane supplier advises differently. Check with the membrane manufacturer if in doubt. H3.2 CCA treatment is also corrosive and this must be taken into account when specifying H3.2 CCA treated plywood next to metals. For further guidance, refer to Tables 21 and 22 in Acceptable Solution E2/AS1.

Q: Can Ecoply be used as a rigid sheathing (air barrier)?

A: CHH has a specific system called Ecoply Barrier. Ecoply Barrier has been developed as a rigid air barrier. Refer to the current Ecoply Barrier Specification & Installation Guide for further information. 7mm H3.2 CCA treated Ecoply can also be used if combined with building underlay in accordance with E2/AS1 for a rigid air barrier system.

Q: What is the relevance of AS/NZS 2269?

A: Ecoply structural plywood is manufactured to AS/NZS 2269 Plywood Structural. This Standard is referenced by the NZBC Compliance Documents including NZS 3602 Timber and Wood-based Products for Use in Building, NZS 3603 Timber Structures, NZS 3604 Timber Framed Buildings, AS/NZS 1604.3 Specification for Preservative Treatment, Part 3: Plywood and Acceptable Solution E2/AS1 - External Moisture. Plywood not manufactured to AS/NZS 2269 does NOT meet the requirements of these NZBC Compliance Documents.

Q: What is the relevance of the PAA stamp?

A: Ecoply is manufactured under a third party audited, product quality control programme by the Engineered Wood Products Association of Australasia (EWPAA) to monitor compliance with AS/NZS 2269. Given that compliance with Standards is not actively policed by Standards New Zealand, this third party auditing provides important peace of mind for users and consumers of Ecoply plywood products.

Q: What is marine ply?

A: Marine plywood manufactured to AS/NZS 2272 Plywood Marine may contain species of low durability (source: BRANZ Good Practice Guide – Timber Cladding). Whilst marine plywood has a Type A glue bond, it is generally specified for its high surface appearance grade and lack of core knots as opposed to structural performance. AS/NZS 2272 limits marine plywood to a number of approved species that pass stringent property requirements for things like moisture permeability. These requirements are different from those in standards from other countries. Marine plywood is rarely treated as it is usually coated with resin, fibreglass, or a paint finish for long term durability.

Q: What should a specification for structural plywood include?

A: A specification for structural plywood should include:

Specification check list	Example
Quantity/size	20 sheets of 2400 x 1200
Thickness	12 mm
Edge finish	Square edge
Brand name	Ecoply® structural plywood
Reference to Standard	To AS/NZS 2269
Stress grade/layup	F8 (12-24-5)
Surface grade/bond type	CD A-Bond ¹
Accreditation	EWPAA product certified ³

1 Stress grades may vary between different manufacturers and products.

2 Type A-bonds are suitable for permanent exposed applications and structural applications.

3 The EWPAA JAS-ANZ Product Certification Mark certifies that Ecoply structural plywood products have been manufactured under a third party audited joint product certification programme to monitor compliance with AS/NZS 2269

Q: What are F-grades?

A: The stress grading system is a ranking system which utilises the symbol F and a suffix 8, 11 etc as a code to apply a full suite of strength and stiffness properties to plywood products of that stress grade. For plywood of a given thickness, the higher the F-grade, the further it will span. For load bearing applications (e.g. flooring, roofing) the required F-grade as well as the plywood thickness must be specified to achieve the required span. F8 is the most common structural plywood grade found in New Zealand. All Ecoply® structural products are F8. Ecoply 15 mm roofing and Ecoply 19 mm Longspan Flooring are F11/F8. Other Ecoply Flooring products are also available in F11 upon request.

Q: What are surface/appearance grades (eg CD)?

A: Appearance grades (eg BD, CD, DD) denote the appearance grade of the plywood including the number and size of knot holes as defined in AS/NZS 2269 and summarised in Table 2A & 2B of this guide. The first letter describes the appearance of the face veneer and the second letter describes the back face.

Q: How long can Ecoply be left exposed to the weather?

A: Untreated Ecoply will typically maintain its structural integrity when exposed to the weather during construction for up to 3 months. The surface colour will start to silver off and face checking will become evident. Where the finished appearance of the Ecoply is important, it should be protected during construction. Ecoply is also available H3 treated to resist decay or insect hazard. When used in accordance with this guide, it can be specified to meet the durability requirements of the NZBC, however appearance issues such as face checking may still occur dependent upon the degree of exposure to weather during construction.

Q: What treatment levels and types are used for Ecoply?

A: Ecoply is available untreated or preservative treated. Ecoply is treated to the H3 hazard class for above ground use. The standard Ecoply treatment type is H3.2 CCA (Copper Chrome

Arsenate) although H3.1 LOSP Azole (Light Organic Solvent Preservative) may also be specified where a clear treatment is required. LOSP Azole is the standard treatment type for BD, Grooved Lining and Shadowclad®. CCA treatment gives the plywood sheets a green tinge and the drying process after CCA treatment may leave fillet marks on the face of the sheet.

Q: Does Ecoply have to be treated when used as structural bracing?

A: Ecoply used as bracing must be treated unless it is installed in an interior dry situation. Note, behind exterior cladding and in cavities (even if the Ecoply is covered with building wrap) are not considered to be an interior dry situation.

Q: Do I have to re-treat cut edges of treated Ecoply?

A: It is important to re-treat any cuts and holes with a brush on remedial treatment such as Holdfast® Metalex® Clear.

Q: What type of glue is used to manufacture Ecoply?

A: Phenol formaldehyde (PF) resins are used to bond the plywood veneers. This forms a Type A (Marine) bond suitable for structural applications and exterior use. Phenol formaldehyde resins are dark red/brown in colour. Product details printed on the back of Ecoply sheets indicate the 'A Bond'.

Q: Does Ecoply emit formaldehyde?

A: Formaldehyde occurs naturally in the environment and is emitted by processes such as combustion, decay and naturally by all timber species. Ecoply and Shadowclad meets the lowest formaldehyde emission class (E₀ - less than 0.5 mg/litre). Actual formaldehyde emissions have been tested to be less than 0.3 mg/litre.

Q: How should Ecoply be installed to maximise its stiffness properties?

A: Structural plywood has greatest stiffness along the long grain of the sheet (i.e. along its length). Therefore, flooring/roofing should be laid across joists/rafters rather than parallel to them.

7.0 REFERENCES AND SOURCES OF INFORMATION

- New Zealand Building Code (NZBC)
 - CHH Plywood technical notes - downloadable from www.chhply.co.nz
 - NZS 3640:2003 "Chemical Preservation of Round and Sawn Timber"
 - NZS 3602:2003 "Timber and Wood-based products for use in Buildings"
 - NZS 3603:1993 "Timber Structures Standard"
 - NZS 3604:2011 "Timber Framed Buildings"
 - AS/NZS 1170:2011 "Structural design actions"
 - AS/NZS 2269:2012 "Plywood Structural"
 - AS/NZS 1604.3:2010 "Specification for Preservative Treatment, Part 3: Plywood"
 - AS 1684:2010 "Residential Timber Framed Construction"
 - US Product Standard PS1-95
 - Acceptable Solution 'E2/AS1 – External Moisture'
 - Acceptable Solution 'B2/AS1 – Durability'
 - BRANZ Bulletin 345: Flat membrane roofs – design and installation
 - BRANZ Bulletin 346: Flat membrane roofs – materials
 - BRANZ Bulletin 289: Asphalt shingle roofing
 - BRANZ Appraisals 307, 404, 411
 - Shadowclad® Specification & Installation Guide for Cavity Construction
 - Ecoply® Barrier Specification & Installation Guide
 - Material Safety Data Sheets
 - MSDS Azole Treated Plywood, LVL & I-Joists
 - MSDS H3 CCA Treated Plywood & I-Joist
 - MSDS Untreated Plywood
 - APA (www.buildabetterhome.org)
 - EWPA (www.ewp.asn.au)
 - Product Technical Statement for Ecoply available online (www.chhply.co.nz/product-technical-statements)
 - EWPA Technical Note - Plywood Roofing and Flooring: Installation and detail factors
- Standards can be purchased online at www.standards.co.nz
Building Code Compliance Documents can be downloaded free of charge at www.dbh.govt.nz

8.0 LIMITATIONS

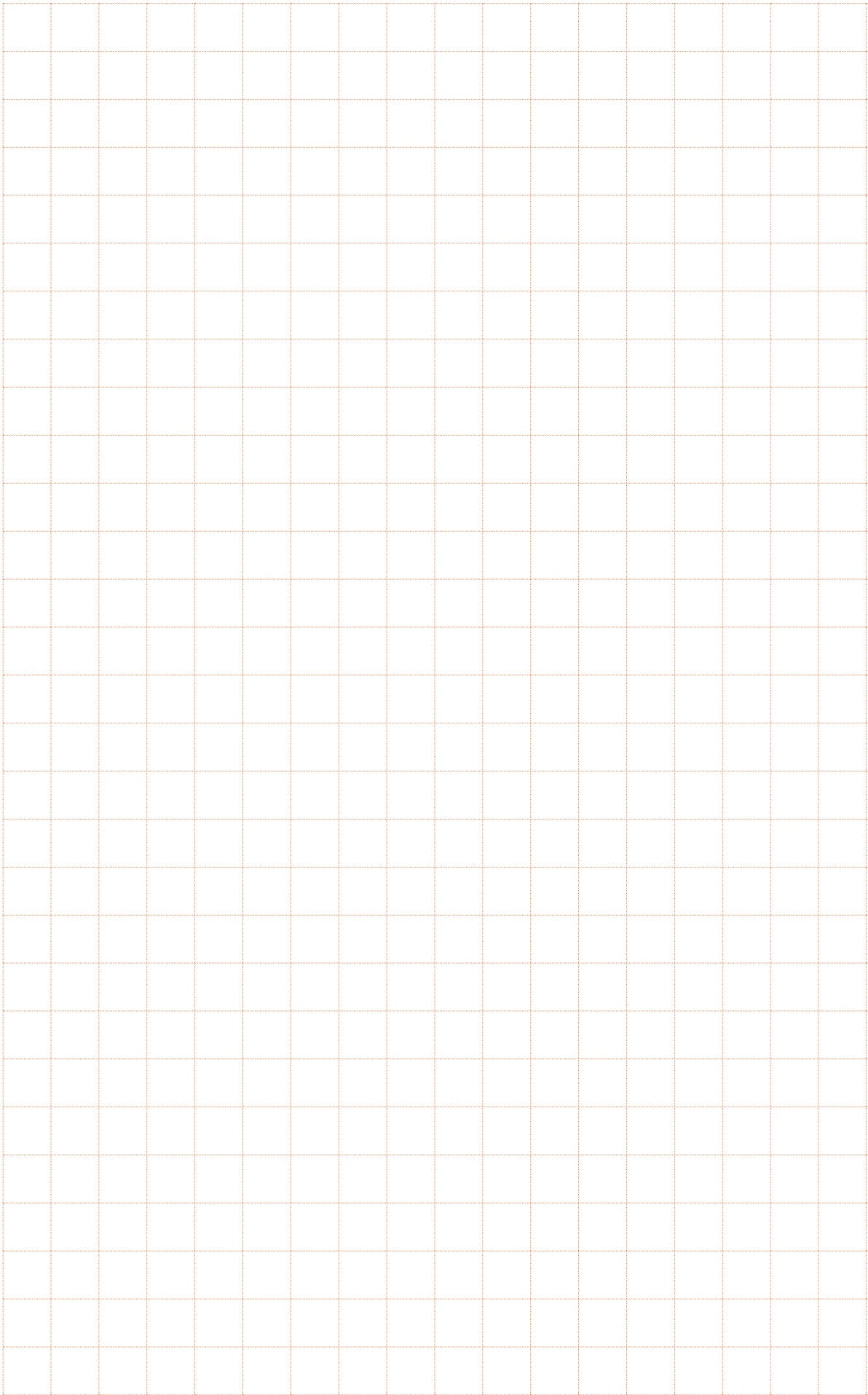
The information contained in this document is current as at October 2021 and is based on data available to CHH Plywood at the time of going to print.

All photographic images are intended to provide a general impression only and should not be relied upon as an accurate example of Ecoply products installed in accordance with this document or NZBC compliance documents.

This publication replaces all previous CHH Plywood design information and literature relating to Ecoply structural plywood products. CHH Plywood reserves the right to change the information contained in this document without prior notice.

It is your responsibility to ensure that you have the most up to date information available, including at the time of applying for a building consent. You can call toll free on 0800 326 759 or visit www.chhply.co.nz to obtain current information.

CHH Plywood has used all reasonable endeavours to ensure the accuracy and reliability of the information contained in this document. However, to the maximum extent permitted by law, CHH Plywood assumes no responsibility or liability for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.





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October 2021
Ecoply.V3.02.1021





New Zealand specification manual



Gerard Roofs specification manual

New Zealand's steel roofing system

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New Zealand's ingenious pressed steel roofing system

A Gerard roof is made up of individual lightweight pressed steel panels secured using a unique fixing system that effectively locks them together to form a single structural unit. The result is a roof **that's** stylish, copes with severe weather and lasts a very long time.

Invented in New Zealand ...

In 1957 New Zealand innovator Lou Fisher saw an opportunity to create a new kind of roof.

Disappointed with the limitations of solid tile and the utilitarian look of long-run corrugated iron roofs, he invented the steel tile roof and established a trusted brand that would grow to become Gerard Roofs.

... proven all over the world

The company continues to lead through ongoing product development and relentless attention to quality standards. Over the years Gerard Roofs' products have been fine-tuned to endure in all living situations and are now used in over 120 countries.

The Gerard roof you put over your head has not only been proven throughout New Zealand, but in some of the most extreme climates and environments on the planet

1.1 Products

1.1.1. Gerard Roof profiles

The roof has profound effect on the look of most homes

An attractive roof is a significant architectural feature. The roof usually accounts for around a third of the overall visual appearance of a home and will have a noticeable influence on its style and street appeal.

Gerard **Roofs'** profiles complement a range of styles

For many people, choosing a roof is primarily about looks. Homes are a reflection of individuality and

their roofs a prominent feature. Unlike most other roofing types Gerard offers a system of choices that enables you to determine the right 'look' rather than having to accept a pre-defined one.

Applicable to traditional or contemporary architecture

Whether you're imagining traditional style or something following the latest trends, Gerard Roofs have profiles to meet the brief. Milano, for example, is reminiscent of the enduring ridged roofs of the Mediterranean; by contrast, a profile like Rockport offers a slimmer, squarer more contemporary pattern.



Gerard Rockport



Gerard Classic



Gerard Stratos



Gerard Milano



Gerard Senator



Gerard Aspen



Gerard Alpine

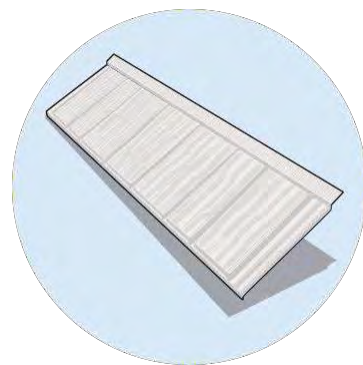


Gerard Heritage

Products and specifications

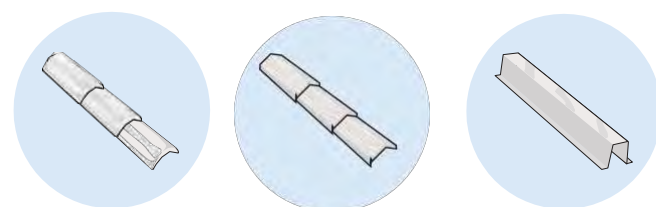
Gerard Stratos

Combining a flat plane with continuous but irregular grooves gives Gerard Stratos a recurring but slightly organic pattern that works with many styles of home.



Pitch - min./max.	15-90°
Overall length	1320 mm
Length of cover	1250 mm
Width of cover	370 mm
Upstand	27 mm
Roof cover/panel	0.46 m ²
Panels/m ²	2.2
Weight/panel Textured	3.0 kg
Weight/panel Smooth	2.1 kg
Weight/m ² Textured	6.6 kg
Weight/m ² Smooth	4.7 kg

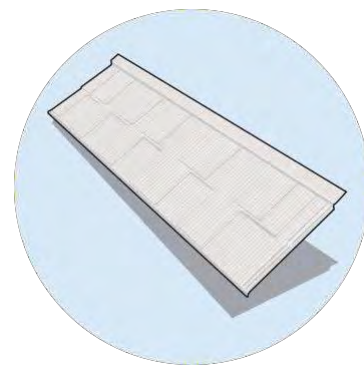
Gerard Stratos is compatible with all three Gerard trims - Barrel, Angle and Box.



Dimensions and weights given are nominal.

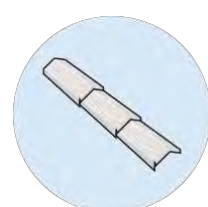
Gerard Senator

A profile with a modern look and subtle raised detailing. Senator is known for the simplicity and uniformity it brings to contemporary and traditional homes.



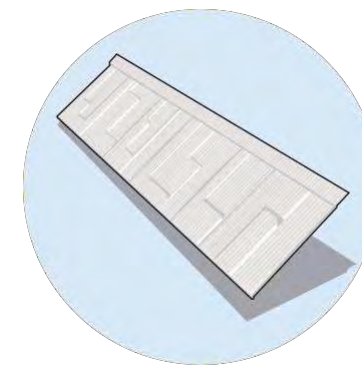
Pitch - min./max.	15-90°
Overall length	1320 mm
Length of cover	1250 mm
Width of cover	368 mm
Upstand	16 mm
Roof cover/panel	0.46 m ²
Panels/m ²	2.2
Weight/panel Textured	3.0 kg
Weight/panel Smooth	NA
Weight/m ² Textured	6.6 kg
Weight/m ² Smooth	NA

Gerard Senator is compatible with Angle trim.



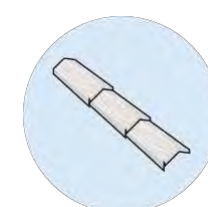
Gerard Rockport

Among Gerard's flattest profiles, Rockport lends your roof a sleek, linear look and is often used on clean, simple architecture with a modern bias.



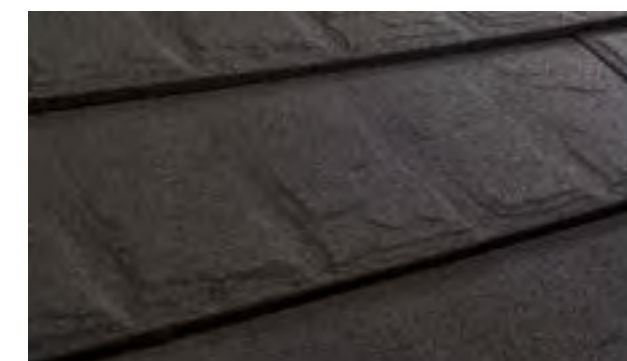
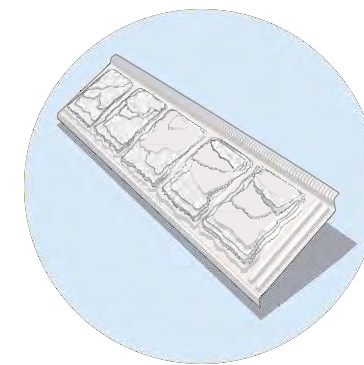
Pitch - min./max.	15-90°
Overall length	1330 mm
Length of cover	1250 mm
Width of cover	368 mm
Upstand	20 mm
Roof cover/panel	0.46 m ²
Panels/m ²	2.2
Weight/panel Textured	3.0 kg
Weight/panel Smooth	NA
Weight/m ² Textured	6.6 kg
Weight/m ² Smooth	NA

Gerard Rockport is compatible with Angle trim.



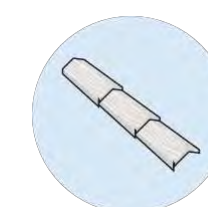
Gerard Alpine

Inspired by the look of Welsh slate the Gerard Alpine profile lends a smooth, sleek linear look while surface detailing adds a slightly rustic overtone.



Pitch - min./max.	15-90°
Overall length	1335 mm
Length of cover	1260 mm
Width of cover	368 mm
Upstand	17 mm
Roof cover/panel	0.46 m ²
Panels/m ²	2.2
Weight/panel Textured	2.9 kg
Weight/panel Smooth	NA
Weight/m ² Textured	6.4 kg
Weight/m ² Smooth	NA

Gerard Alpine is compatible with Angle trim.

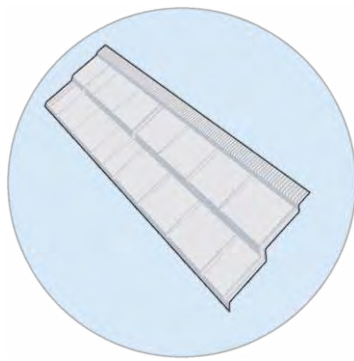


Dimensions and weights given are nominal.

Products and specifications

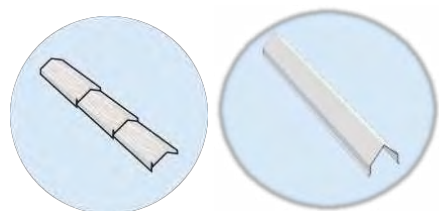
Gerard Aspen

Inspired by the smooth stone slate roofs typical of alpine regions, Aspen gives a sleek, understated look of modern sophistication.



Pitch - min./max.	15-90°
Overall length	1320 mm
Length of cover	1165 mm
Width of cover	368 mm
Upstand	18 mm
Roof cover/panel	0.43 m ²
Panels/m ²	2.3
Weight/panel Textured	2.9 kg
Weight/panel Smooth	NA
Weight/m ² Textured	6.6kg
Weight/m ² Smooth	NA

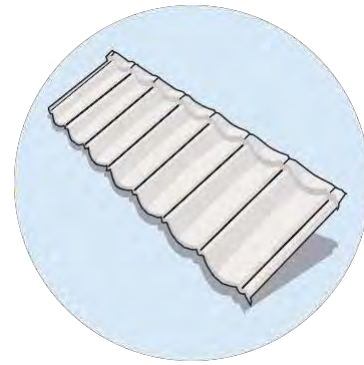
Gerard Aspen is compatible with Angle trim and long Angle trim.



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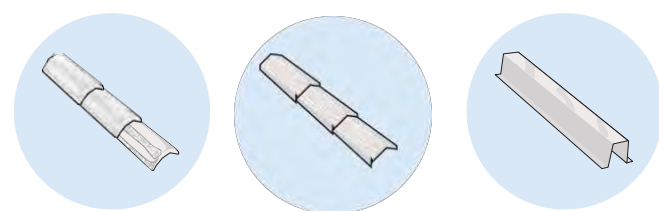
Gerard Heritage

The scalloped shapes of this profile bring a look **that's** similar to heavyweight tiles. The advantages of pressed steel mean this profile is often chosen as a substitute.



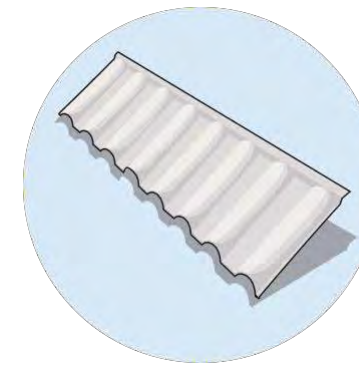
Pitch - min./max.	12-90°
Overall length	1330 mm
Length of cover	1257 mm
Width of cover	369 mm
Upstand	28 mm
Roof cover/panel	0.46 m ²
Panels/m ²	2.2
Weight/panel Textured	2.9 kg
Weight/panel Smooth	2.1 kg
Weight/m ² Textured	6.4 kg
Weight/m ² Smooth	4.7 kg

Gerard Heritage is compatible with all three Gerard trims - Barrel, Angle and Box.



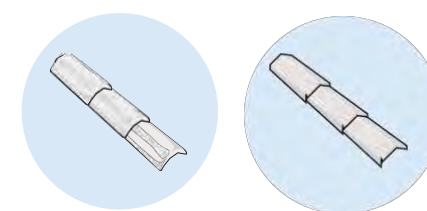
Gerard Milano

With balanced arches and flats found in traditional design, Gerard Milano is a timeless profile that creates clean, elegant and classical looking roofs.



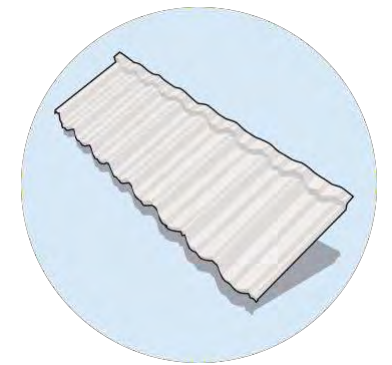
Pitch - min./max.	12-90°
Overall length	1330 mm
Length of cover	1215 mm
Width of cover	368 mm
Upstand	24 mm
Roof cover/panel	0.45 m ²
Panels/m ²	2.2
Weight/panel Textured	2.9 kg
Weight/panel Smooth	NA
Weight/m ² Textured	6.4 kg
Weight/m ² Smooth	NA

Gerard Milano is compatible with Barrel and Angle trims.



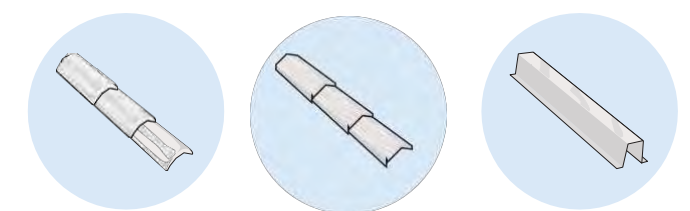
Gerard Classic

Gerard Classic is a geometric profile with shapes and angles that accentuate light and shadow to emphasise its corrugations and create a look of strength and definition.



Pitch - min /max.	12-90°
Overall length	1320 mm
Length of cover	1257 mm
Width of cover	369 mm
Upstand	28 mm
Roof cover/panel	0.46 m ²
Panels/m ²	2.2
Weight/panel Textured	2.9 kg
Weight/panel Smooth	2.1 kg
Weight/m ² Textured	6.4 kg
Weight/m ² Smooth	4.7 kg

Gerard Classic is compatible with all three Gerard trims - Barrel, Angle and Box.



Dimensions and weights given are nominal.

Products and specifications

1.1.2. Trims

Gerard Roof trims

Trim is an essential roofing element, for performance as well as appearance; roof trims create a weatherproof seal at roof junctions and are an important part of the integrity of the roofing system.

There are three types of roof trim - Angle, Barrel and Box. Each roof profile is compatible with one or more of these as shown in the chart on the right.

Gerard's roof trim component system is designed to be fully integrated. The finish of Gerard trims can be chosen to exactly match the finish of a Gerard roof or chosen in a contrasting colour to create a specific effect.

	Angle trim	Barrel trim	Box trim
Stratos	☑	☑	☑
Senator	☑		
Rockport	☑		
Alpine	☑		
Aspen	☑		
Heritage	☑	☑	☑
Milano	☑	☑	
Classic	☑	☑	☑

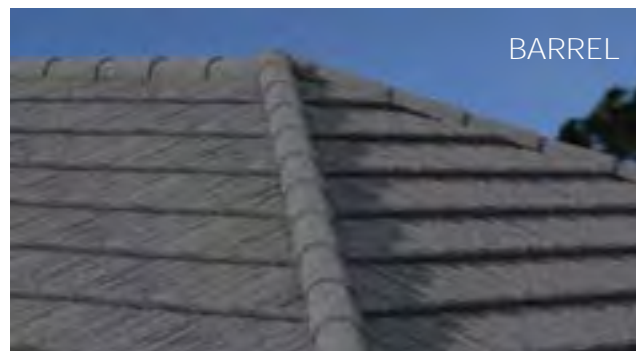
Gerard Roof Profiles With Corresponding Trims



ANGLE



ANGLE



BARREL



BARREL



BOX



BOX

1.2 Finishes

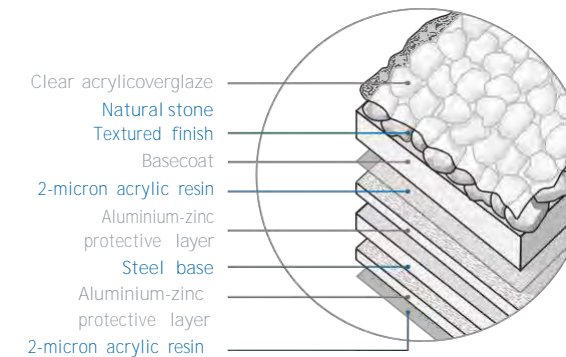
Choice of surface finishes

Some Gerard roof profiles allow you to choose either a textured or Smooth finish on the surface of your roof.

Both have their merits and both come in a range of contemporary colours. The decision is usually influenced most by the architectural style of the home and the intended colour scheme.

1.2.1 Textured finishes

Naturally coloured mineral fragments, or ceramic coated stone fragments, fused to aluminium-zinc steel in layers of acrylic resin and over-glaze.



Textured finish advantages:

- Additional protection from the elements
- Natural stone colours are almost entirely fade-free
- Gerard textured finishes have longer warranty

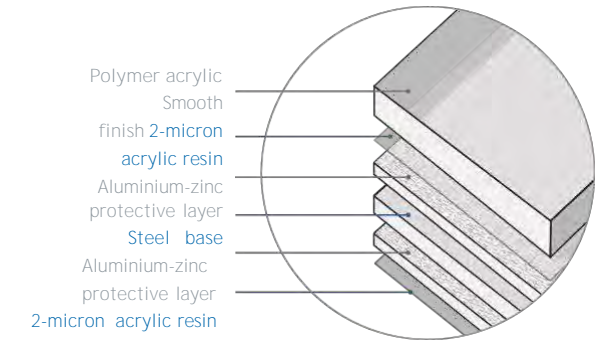
A textured stone finish is inclined to look a little more substantial yet visually softer than a Smooth finish.



Products and specifications

1.2.2 Smooth finishes

45-micron thick topcoat of ultra-tough polymer acrylic applied after the shape has been pressed into the aluminium-zinc steel (preventing surface micro-cracks).



Smooth finish advantages:

- Less expensive than a textured finish
- Smooth surface with clearer detail
- Just like ordinary coloured steel but much more durable

Smooth finishes tend to produce a smoother, crisper look accentuating patterns and details more.



1.2.3 Custom finishes to order

Custom finishes can be created for special projects by request.

A Gerard Smooth finish can be made to match any colour sample. We also have the ability to develop a custom textured finish - for example, we could work with stone that's native to your location.

To find out more contact Gerard Roofs on 0800 100 244.

1.3 Colours & finishes

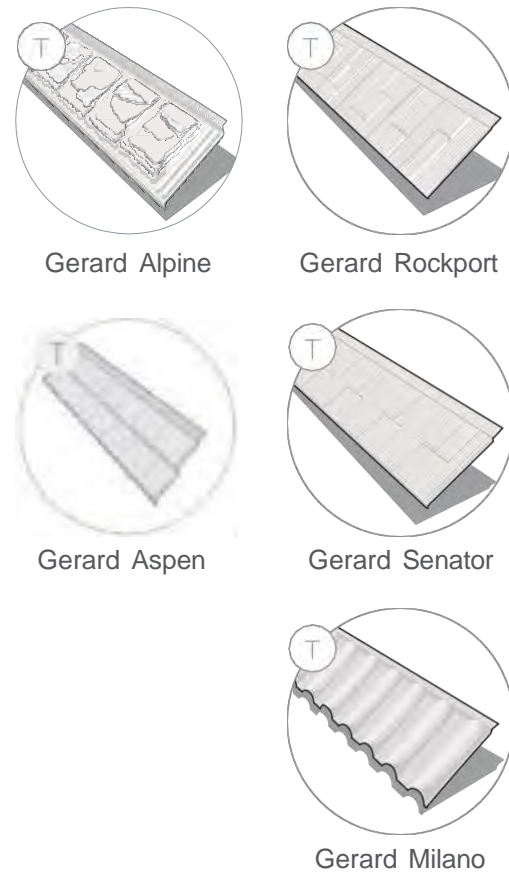
1.3.1 Textured finish colours



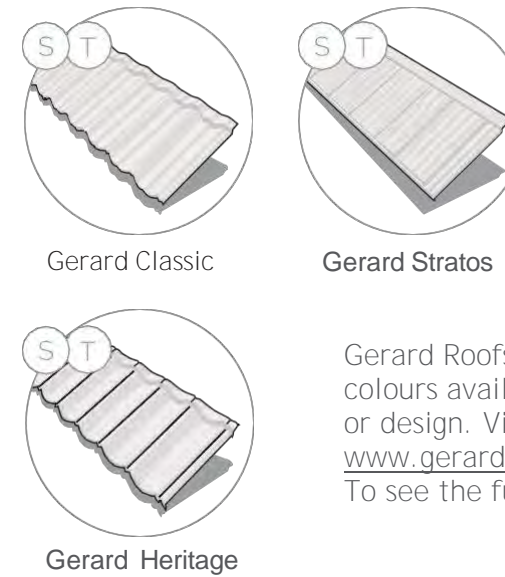
The name below each colour swatch title is the Colorcote® / Colorsteel® equivalent. These are useful for matching accessories like fascia or aluminium joinery as the names are often referred to as a colour standard.

1.3.2 Types of finish by roof profile

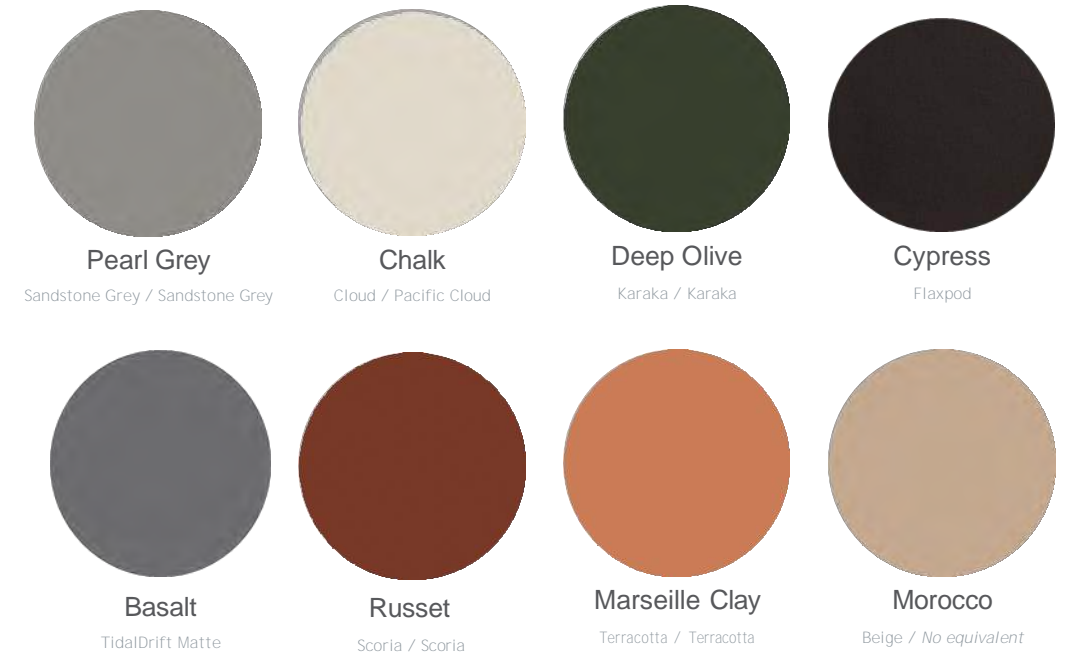
Textured finishes and colours are available for all Gerard roof profiles.



Smooth finishes and colours are available for the three Gerard profiles shown below.



Gerard Roofs has many more colours available to suite any build or design. Visit our website at, www.gerardroofs.co.nz To see the full range



The name below each colour swatch title is the Colorcote® / Colorsteel® equivalent. These are useful for matching accessories like fascia or aluminium joinery as the names are often referred to as a colour standard.

1.3.3 Smooth finish colours

Products and specifications

1.4 Product warranty

Gerard's warranty addresses

homeowners' two main concerns:

1. That the roof remains weatherproof
2. That the coating remains sound

Complicated rules simplified

Warranties are complex but we've narrowed the variables affecting Gerard Roofs' warranty cover down to two questions:

Is the building sited in a corrosive environment?

Does the roof have a Smooth or a textured finish?

On the right is a chart showing the terms of the warranty according to the circumstances of the individual building.

In each situation the warranty is pro-rata with cover diminishing over time.

There are two warranty environment zones: Standard and Corrosive. Warranty cover is longer in the standard environment zone.

A Corrosive Environment is defined as anywhere within 750m of breaking surf.

Gerard Roofs' warranty applies to all Gerard manufactured products, even if installed in extreme corrosive conditions.

Installation is assured

Be reassured that Gerard roofs are only installed by Gerard Certified Roofers.

Each GCR is responsible under law to make good any problems in the unlikely event they arise.

Visit www.gerardroofs.co.nz to download a sample of the full warranty document.

	Initial period Full cost of repair or replacement	Subsequent period Pro-rata share
Weatherproof warranty	First 25 years	Years 26 - 50, as per Schedule A
Surface Coating warranty: Textured Coated Tile	First 10 years	Years 11 - 20, as per Schedule B
Surface Coating warranty: Smooth Finish Tile	First 5 years	Years 6 - 15, as per Schedule C

1.5 Environmental responsibility

A Gerard pressed steel roof is an environmentally responsible choice.

Pressed steel roofing generates minimal manufacturing, construction site and demolition waste.

A pressed steel roof is lighter than its concrete or clay equivalent, which means transportation is more energy-efficient. It requires less framing support, which also saves resources. Steel is endlessly recyclable too.

Gerard Roofs is conscious of its environmental footprint and was New Zealand's first roofing manufacturer to be awarded ISO 14001 environmental accreditation.



1.6 CAD details available

CAD details for commonly encountered roof details in a number of common formats can be found at www.gerardroofs.co.nz/designtech

At the time of publication these details cover:

- Eaves
- Gables
- Ridges
- Roof-to-wall (transverse)
- Hips
- Roof-to-wall (parallel)
- Valleys

Gerard Roofs' CAD library is an expanding online resource that will be added to periodically as new details become available.

Check www.gerardroofs.co.nz to see the latest available versions.

Specific details for unusual or challenging areas can be requested by contacting Gerard Roofs on 0800 100 244.

Products and specifications

1.7 Handling and storage

Gerard panels and accessories must be transported and handled with care to avoid damaging the pre-finished surfaces.

Long term storage of panels and accessories must be under dry, ventilated cover. For short term storage on site, panels and accessories must be stored flat off the ground, no more than two pallets high.

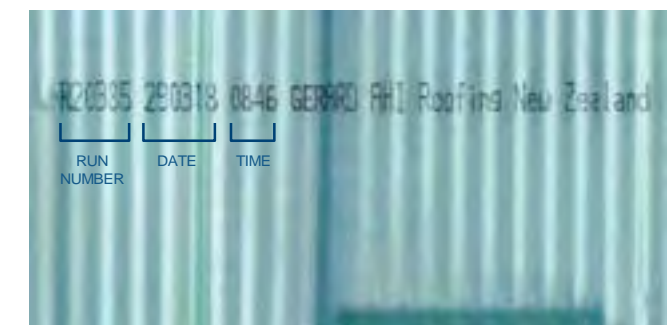
Handling and storage of all materials supplied by Gerard Roofs, whether on or off site, is under the control of the Gerard Certified Roofer.

Other materials must be handled and stored in accordance with the relevant manufacturer's instructions.

1.8 Product identification

Gerard Roofs print a run number, date and time of production on the reverse side of each panel. Pallets have pallet cards that show the run number, date of production and colour code markings; this allows identification of batch colours.

The steel supplier also prints a code which allows identification of the parent coil.



Reverse side of the panel.



2.0 Design considerations

This section contains general information you need to keep in mind when designing buildings with Gerard Roofs. The numbered sections (2.1; 2.2; etc.) correspond to the equivalent parts of the Gerard Roofs website specification area (www.gerardroofs.co.nz/designtech).

Any details and diagrams can be downloaded from there.

2.0 Design considerations

2.1 Scope

This specification covers the supply and fixing of:

- Materials
- General information
- Limitations of use
- Service of life
- Workmanship - pre-roofing requirements
- Timber battens.
- Roofing underlay
- Valleys
- Gerard Roofs - pressed metaltiles/panels
- Trim, standard, barrel and angle
- Wall flashings
- Fixings/fasteners
- Incompatible materials
- Extra high wind zone variations
- Solar panels

2.2 Building code

The following standard specifications should be adhered to in both materials and workmanship.

NZS 2295	Roofing underlays
NZS 4217	Standard for pressed metal tile roofs
NZS 3604:2011	Code of practice for light timber framed buildings, not requiring specific design
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles - galvanising of nails
E2/AS1	New Zealand Building Code clause E2 External moisture

AS1397:2011 AS 1397-2011 continuous hot-dip metallic coated steel sheet and strip - coatings of zinc and zinc alloyed with aluminium and magnesium.

AS/NZS 1530 pt. 3:1999. Fire standard
NZ Building Code sections B1,B2,E2, G12

2.3 Serviceable life

Durability (B2)

Without recoating, the Gerard Roofs products will meet the provisions of NZBC B2.3(C) for 15 years, when used and maintained.

Structure (B1)

When installed according to the manufacturers recommendations the Gerard Roofs products will allow provisions of NZBC B1.3.1, B1.3.2 and B1.3.4 to be met for the relevant provisions of B1.3.3.

External moisture (E2)

When correctly used and installed, the Gerard products meet the requirements of the NZ Building Code E2/AS1

Live loads

During installation and subsequent construction process or maintenance, walking load must be positioned to the front of the panel where the panel is supported by a batten.

Wind zones

On new roofs when fixed to battens sized and installed according to NZS 3604:2011 Gerard Roofs systems are suitable for use in all NZS 3604:2011 building wind zones up to and including extra high.

Spread of fire (C3)

The coating of the roof is <1mm thickness and applied directly to a non-combustible substrate. There was no spread of flames when tested to AS/NZ 1530.pt3.

Water supplies (G12)

Rainwater collected from the Gerard Roofs systems will meet the provisions of NZBC G12.3.1, providing the surface coating is maintained as directed.

It is recommended that a potable water collection system is not installed until 3 good rainfalls have washed the new roof surface free of building debris and surface coating surfactants.

Snow

The Gerard Roofs products are suitable for use where buildings are designed for a 1kPa snow loading.

2.4 Other information sources

NZ MRM Code of Practice.

2.5 Alternatives

No alternatives or substitutions permitted.

2.6 Materials

2.6.1 Panels and accessory materials

The roofing panels and accessories are made by Gerard Roofs.

The base material is aluminium-zinc coated steel - 0.39 mm, AZ150 of AS1397:2011.

Panels are finished in either a granulated textured or Smooth paint finish.

Submissions

An actual product sample should be sighted to confirm colour choice before material orders are placed/accepted.

2.0 Design considerations

2.6.2 Installation materials

1. Roofing underlay shall be either a bitumen impregnated Kraft or synthetic underlay. Kraft underlays are covered by NZS2295 while synthetic roofing underlays are approved by Acceptable Solution documentation from the suppliers.
2. Battens of rough sawn radiata pine type timber meeting suitable dimensions (table 02, page 22) with H1.2 protection.
3. Ridge, hip, gable and wall flashings shall be supplied as standard products from Gerard Roofs.
4. Valleys may be used as supplied pre-finished in 2.4 metre lengths by Gerard Roofs or made to order out of pre-painted 0.55 mm G300 AZ150 aluminium-zinc coated steel in a matching colour from a sheet metal fabricator. If made to order, valleys should have similar dimensions to those supplied by Gerard Roofs.
5. Valleys must be painted to the same colour as the roof panel if not pre-finished.
6. Hip end caps to be installed where necessary to stop ingress of moisture or bird-life.
7. All nails in panels should be 50 mm galvanised and coated to meet AS/NZS 4680 specification (Zn 390 g/m²). Galvanised nails are used for ridge hip caps 30 mm, all other trim or flashings 50 mm.

2.0 Design considerations

2.7 General information

Profile	Minimum pitch
Stratos	15°
Senator	15°
Rockport	15°
Alpine	15°
Oberon	20°
Heritage	12°
Milano	12°
Classic	12°

Minimum Roof Pitches For Gerard Roof Profiles

For full specifications - refer to individual panel profile data (pages 6-9) dimensions, coverage, weights etc.

2.7.1. Dissimilar metals/materials

When two different metals are in contact and moisture is present, one metal is relatively protected while the other suffers accelerated corrosion. A similar effect often occurs with water flowing over different metals.

This form of corrosion is commonly found:

- Where water is discharged from copper or brass systems over a galvanised or aluminium-zinc coated steel roof.

- Where unpainted lead flashings are applied directly to aluminium-zinc coated steel products.
- Where fasteners are incompatible with the roofing material.
- Any electrical contact between dissimilar metals should be avoided, e.g. wet leaves making contact between copper gutters and aluminium-zinc coated steel roof panels.

Note: Special consideration should be given when replacing existing roofs as some roof claddings use unsuitable materials for flashing such as lead.

2.8 Limitations on use

2.8.1. Corrosive environments

The Gerard system must not be used in high alkaline environments (such as intensive animal shelters or other buildings with high ammonia concentrations); contact with fresh concrete or plaster must be avoided. The roofing must not be used in contact with permanently damp materials, nor on or near industrial buildings in which corrosive processes occur, nor over swimming pools.

Directing water-flow to minimise potential corrosion

More active metals

More noble metals

Zinc > Aluminium-Zinc Coated Steel > Aluminium > Steel > Lead > Copper > Stainless Steel

This chart lists commonly used metals in a 'Galvanic Series'. If any two of these metals are in damp contact or a run-off situation, the metal further to the left will sacrifice itself to protect the metal further to the right. Therefore the simple rule to remember is that you can run water from left to right, but not from right to left. For example zinc to copper is alright, but copper to zinc is not. Specific advice should be sought from Gerard Roofs regarding use of dissimilar metals.



3.0 Substrate & installation overview

Information for the design and specification of the sub-structure of a Gerard roof; rafters, battens, underlays and fixings are covered in detail. The numbered points (3.1; 3.2; etc.) correspond to the equivalent parts of the Gerard Roofs website specification area (www.gerardroofs.co.nz/designtech). Any details and diagrams can be downloaded from there.

3.0 Substrate & installation overview

3.1 Preparation of structure

3.1.1 Rafters and valley boards

Rafters and valley boards are to be correctly installed by the builder before roofing can start.

Refer to Gerard Roofs Technical Note - Builder Check List, on the Gerard Roofs website.

Where an exact number of complete panel courses is not possible, the top row of panels should be trimmed to fit and then bent up beneath the ridge flashing.

3.2 Battens

Select batten size to suit rafter or truss spacing. Battens are to be treated to H1.2 and graded on site.

Truss spacing (mm)	Batten size (mm)	Situation
900	40 x 50	Standard
1200	50 x 50	Occasional
1500	50 x 65 on edge	Unusual
1800	50 x 75 on edge	Unusual

Table 02 Batten/Spacing

3.2.1 Batten setout

Stratos, Heritage, Classic, Milano, Rockport and Alpine profiles

A row of battens fixed directly behind the fascia with the second batten 330mm up the truss. Subsequent battens are spaced at 370mm (or as specified for profile and coating finish). The final, top row of panels is 365mm or less, depending on whether the top row needs cutting due to rafter length.

Senator

A row of battens fixed directly behind the fascia with the second batten 330mm up the truss. Subsequent battens are spaced at 368mm. A centre support

batten (40x50 mm) positioned 185 mm behind the front face of the panel batten is installed and held in place with a single batten nail. Panels are not fastened to this support batten. The final top row of panels should be 365mm or less, depending on whether the top row needs cutting due to rafter length.

NB. The second batten up from the fascia is left out to allow the roofing underlay to maintain an angle above horizontal.

Aspen

A row of battens fixed directly behind the fascia with the second batten 330 mm up the truss. Panel Battens are spaced at 368 mm (textured), with a support batten set at 185 mm from the front face of each panel batten to support roof traffic. The final top row of panels should be 365 mm or less, depending on whether the top row needs cutting due to rafter length. Panels are fastened to intermediate support battens only at the side lap.

NB. The second batten up from the fascia is left out to allow the roofing underlay to maintain an angle above horizontal.

Eaves panels at gutter fascia

Panels should extend into the gutter by 40mm. This may vary slightly depending on the rafter length and roof pitch.

Roof profile	Batten spacing	
	Textured	Smooth
Stratos	370mm	371mm
Senator*	368mm	
Rockport	368mm	
Alpine	368mm	
Aspen^	368mm	
Heritage	369mm	370mm
Milano	368mm	
Classic	369mm	370mm

Table 03 Batten Set-Out

*Centre batten 185 mm, second batten from eave not installed

^Centre batten 185 mm, second batten from eave not installed

3.0 Substrate & installation overview

3.4 Valleys

Valley trays should be made from 0.55 mm AZ150 coated steel. Typically the steel will be pre-painted. Install valleys in a weatherproof workmanlike manner. Do not fix through valleys. Where more than one valley length is used in one run, have an overlap of at least 150mm. Tag valleys at the top edge of the valley join to eliminate valley creep.

3.5 Solar brackets

Gerard Roofs have proprietary solar brackets which can be installed at the time of roofing or later. These brackets do not require holes to be cut into the surface of the panels offering complete weather security.

Refer to Gerard Roofs for more information.

3.6 Panel installation

Care must be taken when handling, cutting, bending and installing to avoid damage to the surface. In particular, the paint finish must be kept clean.

Use rubber soled work shoes during installation and protective/synthetic padding on bending equipment.

Where work is still to be carried out on upper storey dormer windows or walls, panels can be left off to avoid damage or fallout from paint or plaster coatings. Alternatively, a plank embedded into 3 sand bags along its length can be used on top of the panel, with the sand bags placed over the support batten near the nose of the panel.

Where work is progressing above installed panels, dust sheets must be used held down with sand bags.

3.2.2 Batten/rafter fastening

Gerard Roofs require that all 40 x 50 mm battens fastened to rafters at 900 mm centres are to be fastened with 2 x 90 mm gun nails in all wind zones up to and including the very high wind zone.

In extra high wind zones a screw fastener must be used for all batten rafter junctions.

This meets or exceeds the requirements of NZS3604:2011

Wind zone	900 rafter 50x40 mm	1200 rafter 50x50 mm
Low 32m/s	S	S
Medium 37m/s	S	S
High 44m/s	S	T
Very high 50m/s	S	T
Extra high 55m/s	T	T
SED +55m/s*	Contact GR	Contact GR

Table 04 Fasteners for Panel Battens - Wind Zones - NZS3604.

S = 2 x 90 mm x 3.15 mm nails (0.8kN)

T = 80 mm x 10g screw (2.4kN)

*In SED Specific design situations refer to Gerard Roofs Technical Notes on installation in SED wind areas.

3.3 Roofing underlay

Must comply with standard NZS 2295 - Pliable and Permeable Building Underlays. Roofing underlay is installed under the battens but over the bottom batten.

Roofing underlay should be installed horizontally with a minimum overlap of 75 mm.

All vertical laps to be taken past rafters and lap by a minimum of 150 mm.

The Roofing underlay is self-supporting up to 1200 mm and does not need mesh.

3.0 Substrate & installation overview

3.6 Panel installation continued

Heritage, Classic and Milano

Heritage, Classic and Milano can be installed to a minimum of 12° and may be laid left to right or right to left. All laps to be the same way on each plane.

Stratos

Stratos can be installed to a minimum of 15° and may be laid left to right or right to left. The laps must be laid facing away from prevailing winds or line of vision. All laps should be the same way on each plane. Courses must be staggered in a random pattern to avoid patterning as you progress up a hip, or gable.

Senator, Alpine and Rockport

Senator, Alpine and Rockport can be installed to a minimum of 15°. These profiles may only be laid in a single direction, as follows:

- Senator and Alpine - left to right only
- Rockport - right to left only

Courses of all three should be laid in a random pattern, with staggered start points.

Senator should be installed with an intermediate batten at 185mm to support roof traffic.

Aspen

Aspen can be installed at a minimum of 15° and must be laid right to left. Reference can be made to the individual profile fixing pattern pages at the back of this specification manual. Courses must be staggered in a random pattern for Aspen, to avoid patterning as you progress up a hip or gable.

Eaves

At eaves, the front rows of panels are fixed to the battens alongside the fascia by driving nails through the top face into the eave batten. These nails are positioned at points of low water run off. Eaves nails for Smooth finish have a synthetic washer installed under the nail head, eaves nails on textured finishes are sealed with the touch up kit basecoat and chip.

Nailing panels

Successive rows of panels are fixed by driving 50mm nails through the centre of the panel nose into the face of the battens. These nails are spaced as shown/ described in the individual profile fixing pattern pages at the back of this specification manual.

Only Gerard Roofs approved nails should be used in the installation of panels and accessories.

Valleys

Panels are cut at the same angle as the valley, at appropriate points, and bent down into the valley; they must not touch the valley tray. At the ridge, panels are cut and bent up under ridge accessories.

Ridge, Hip, Gable and Wall flashings

Only factory produced flashings and trim as supplied by Gerard Roofs may be installed. Panels are turned up by a minimum of 40 mm and covered by Gerard Roofs accessories to the prescribed coverage. Special flashings can be formed and coated to order.

Wall roof lower junctions

Gerard roofs have proprietary PVC stop end flashings that direct roof/wall run off water into the rain water gutter system.

Membrane areas

If flat membrane areas such as Butynol overlap onto product surfaces, these can be painted with the touch up kit or base coated and granite textured.

Weather sealing

Proprietary or custom made rubber or metal flashings require neutral-cure silicone or MS sealants acceptable to Gerard Roofs to be used for weather-sealing services penetrating the roof. Sealant shall be applied between the flashing and panel surface and mechanical fasteners (rivets, Tek screws) installed to permanently fix the flashing in place.



4.0 Standard roof details

This section contains the common junction details and information you need to design and specify buildings with Gerard Roofs. The numbered sections (4.1; 4.2; etc.) correspond to the equivalent parts of the Gerard Roofs website specification area (www.gerardroofs.co.nz/designtech). Any details and diagrams can be downloaded from there.

4.1 Batten spacing - Eave

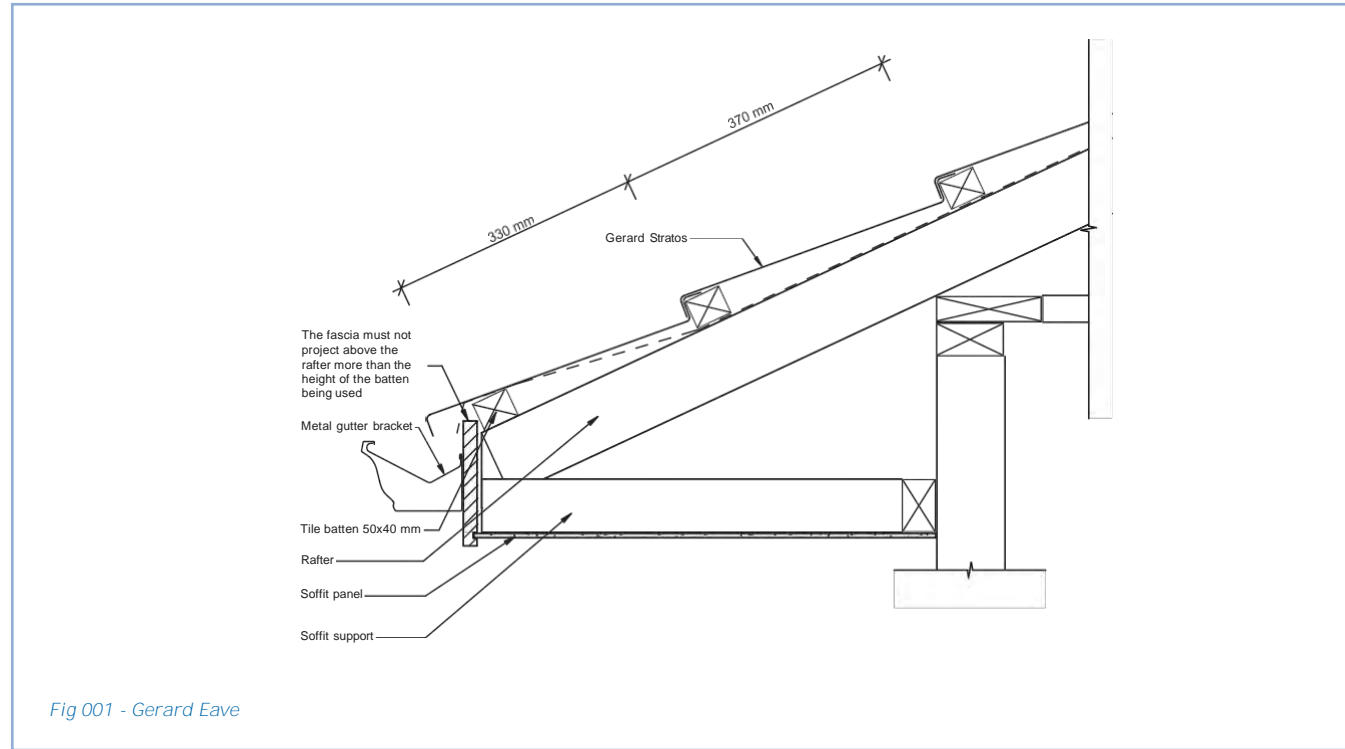


Fig 001 - Gerard Eave

4.2 Ridge installation

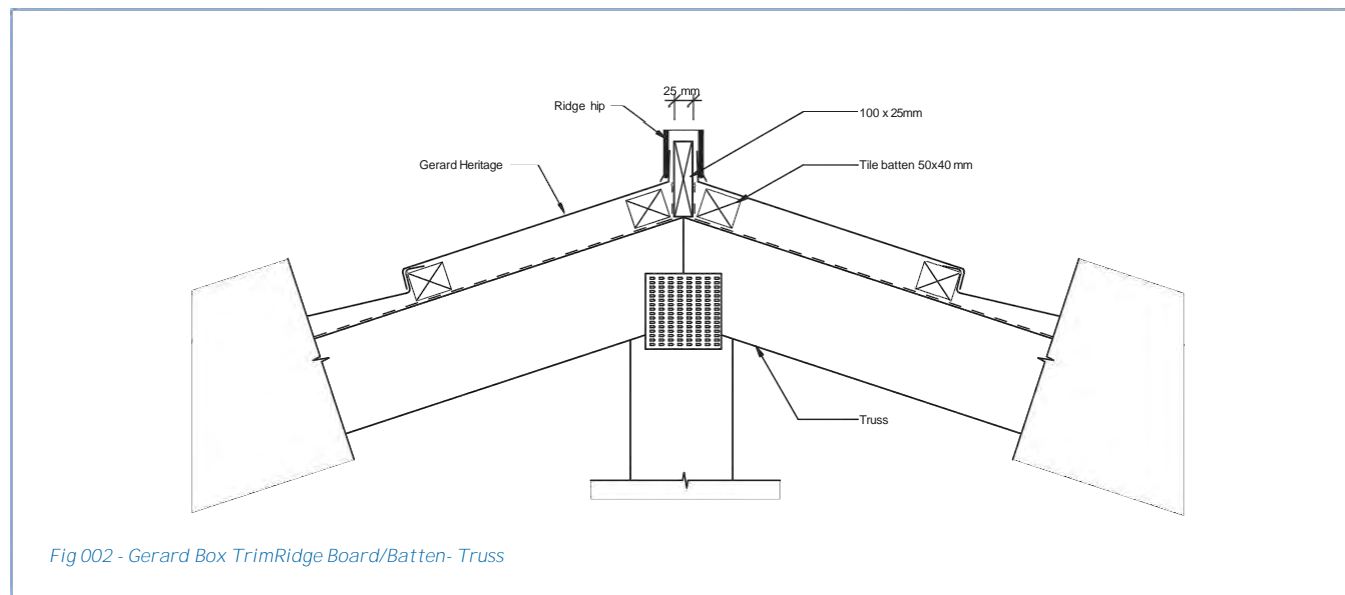


Fig 002 - Gerard Box Trim Ridge Board/Batten- Truss

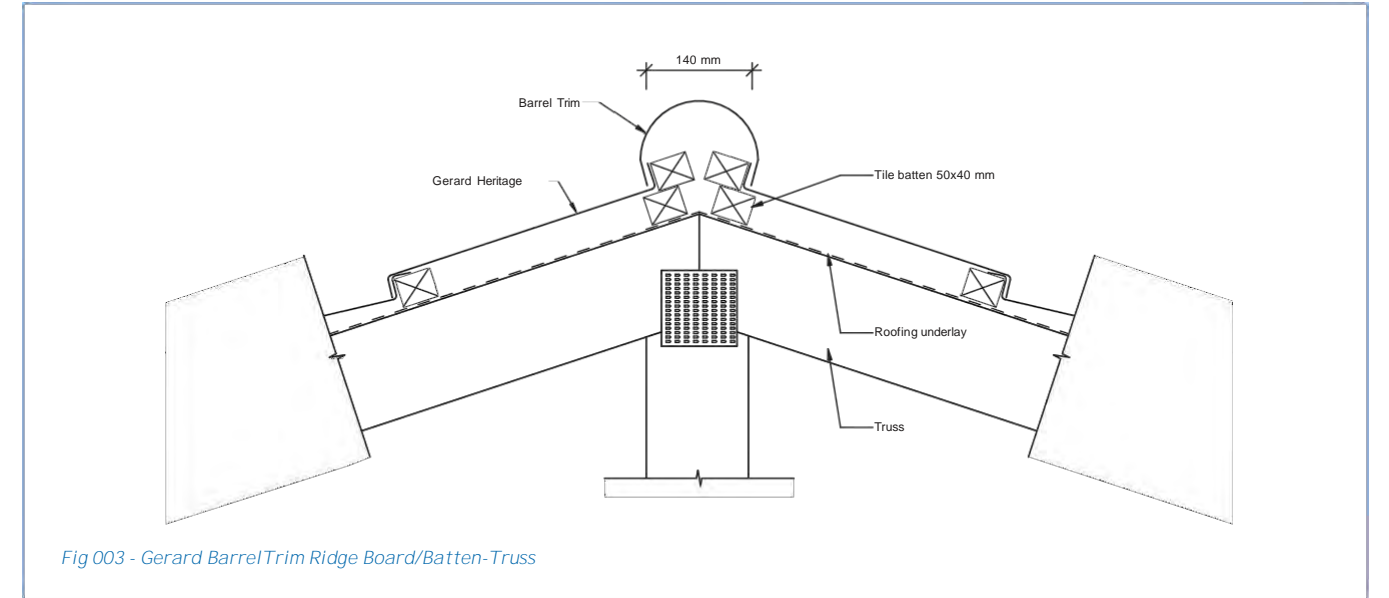


Fig 003 - Gerard Barrel Trim Ridge Board/Batten-Truss

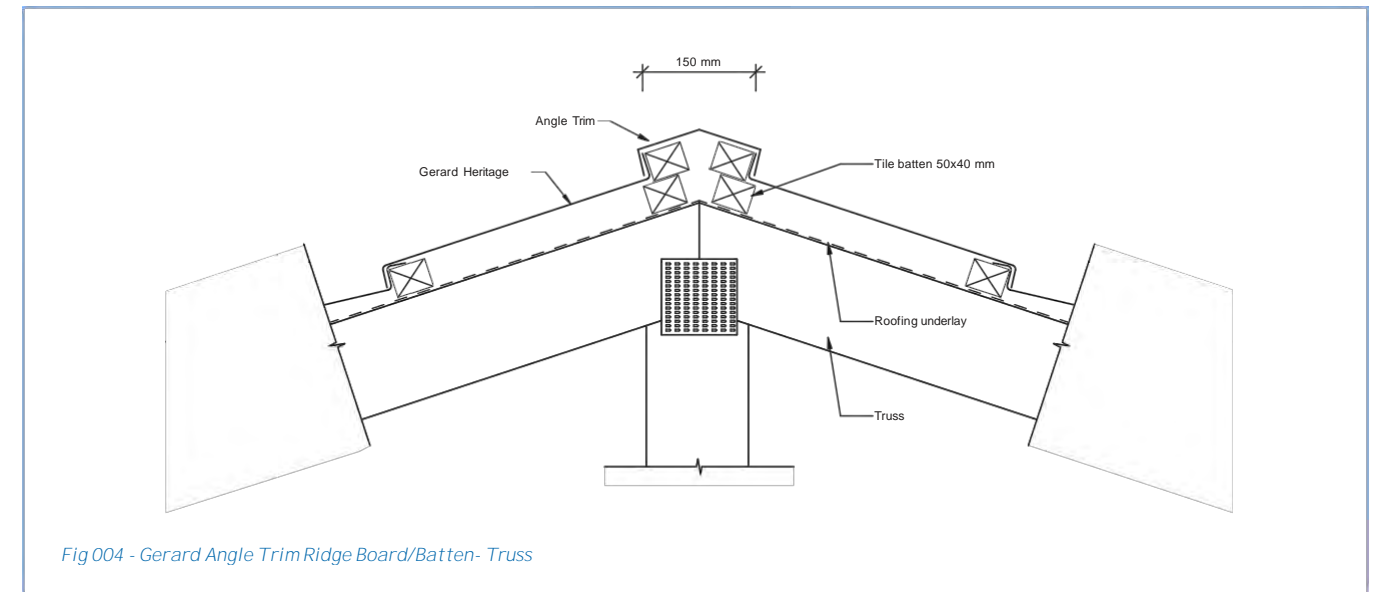


Fig 004 - Gerard Angle Trim Ridge Board/Batten- Truss

4.0 Standard roof details

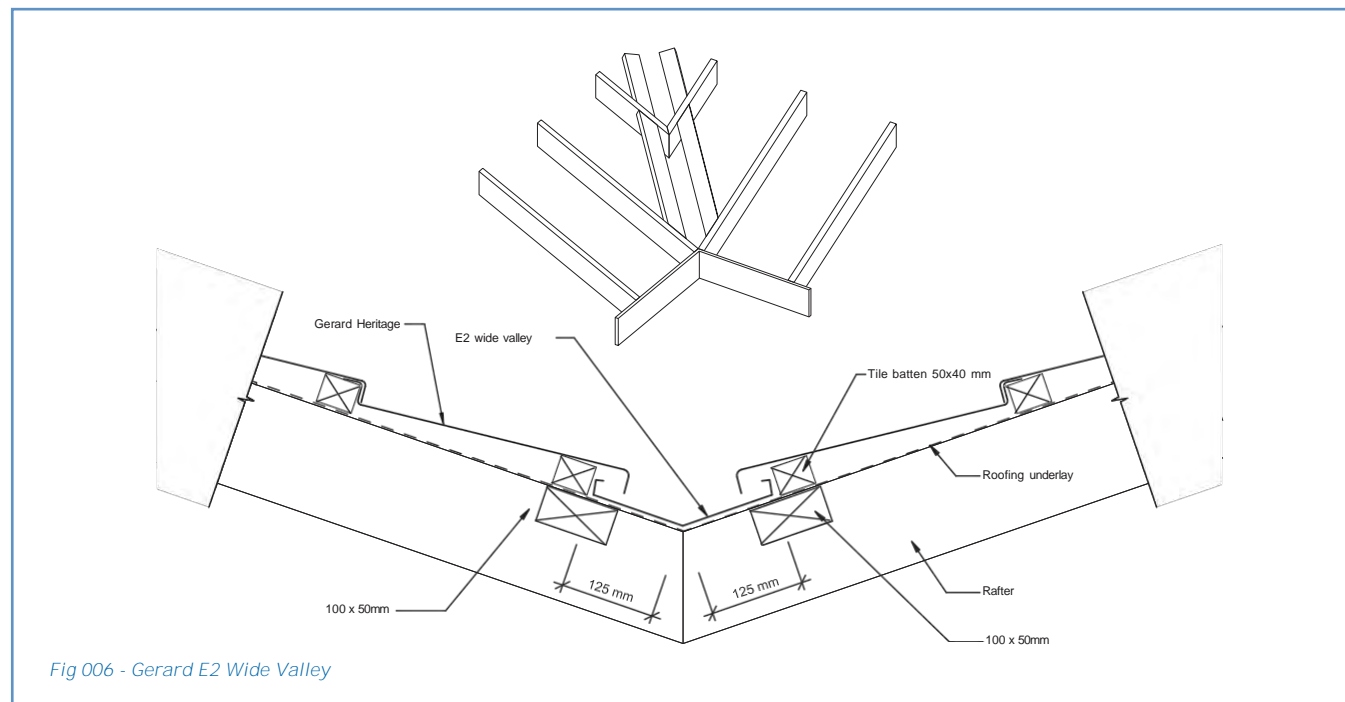
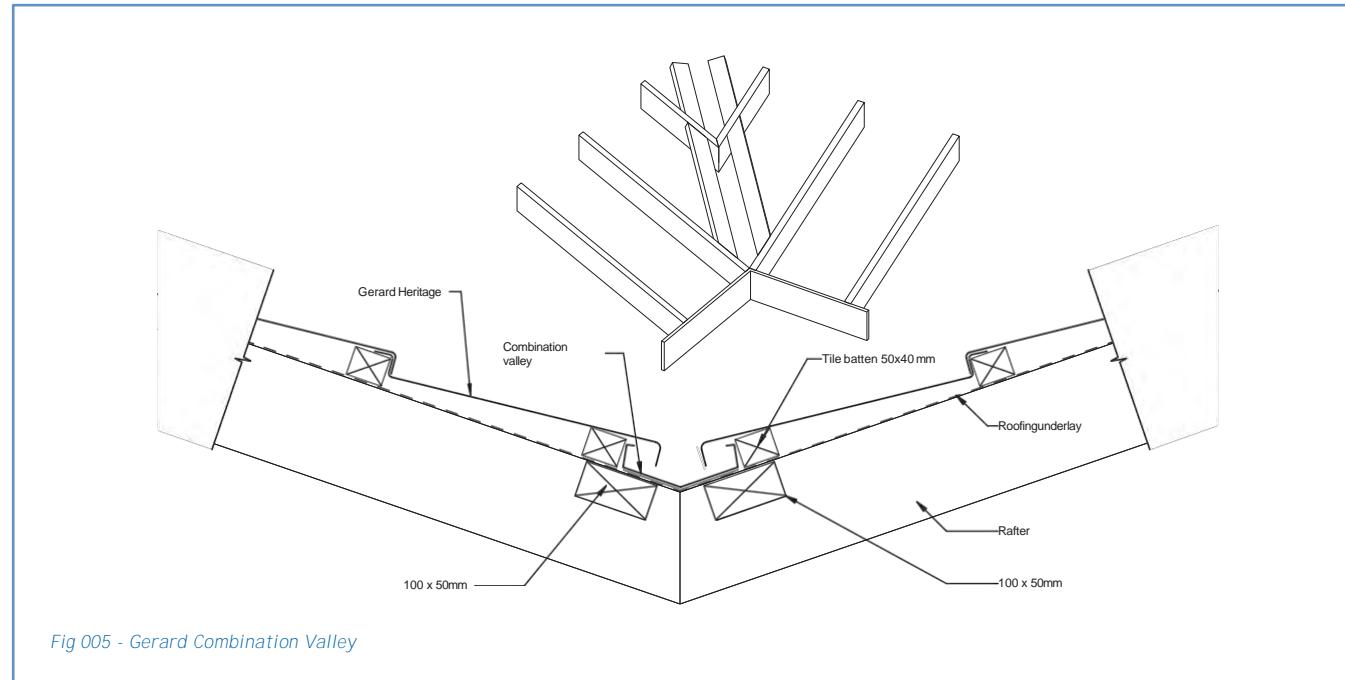
4.3 Valleys

Gerard Roofs provide valley trays in two widths, a 160mm Combination Valley and a 250mm E2 Wide Valley for use where required by specification.

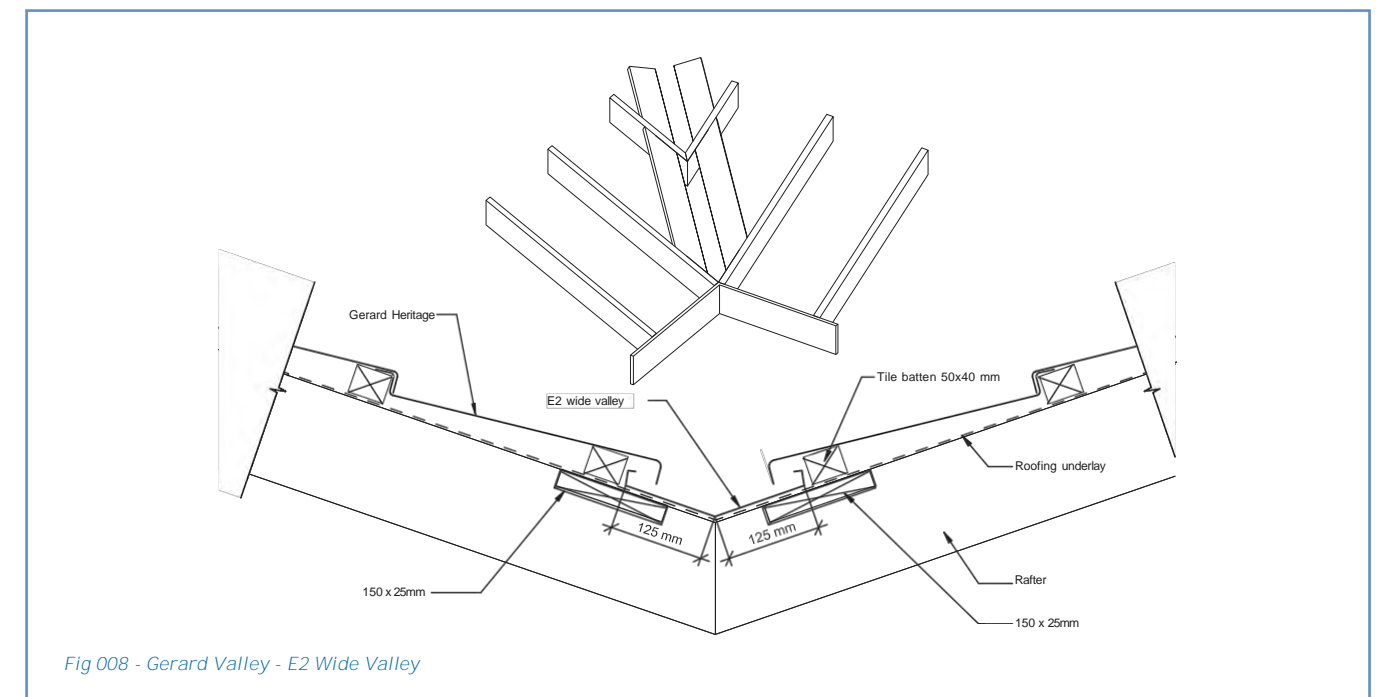
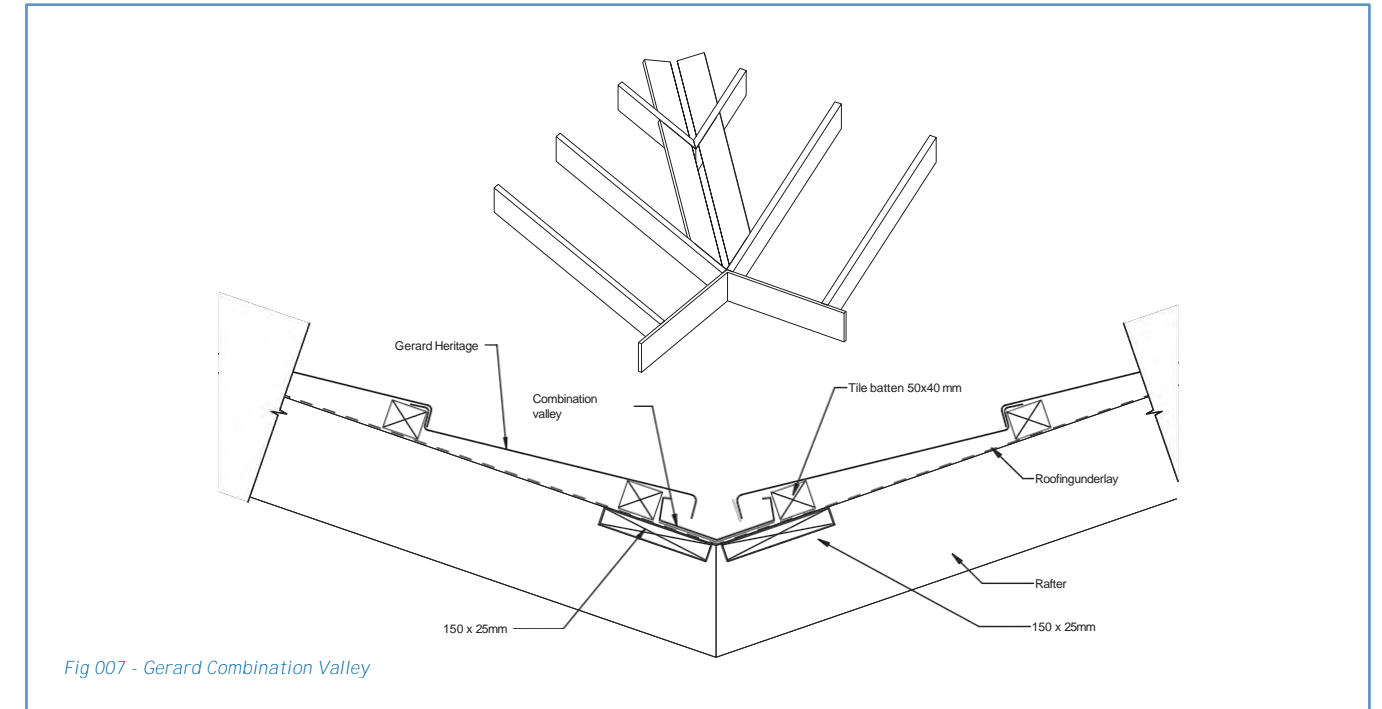
Valleys must be supported by valley boards; these should be installed with nogging where necessary.

The nogging should have at least 25 mm clearance beyond where the valley sits so battens have sufficient support and nailing width.

Panels above valleys should be turned down to within 5 mm of the valley tray but must not touch the tray.



4.0 Standard roof details

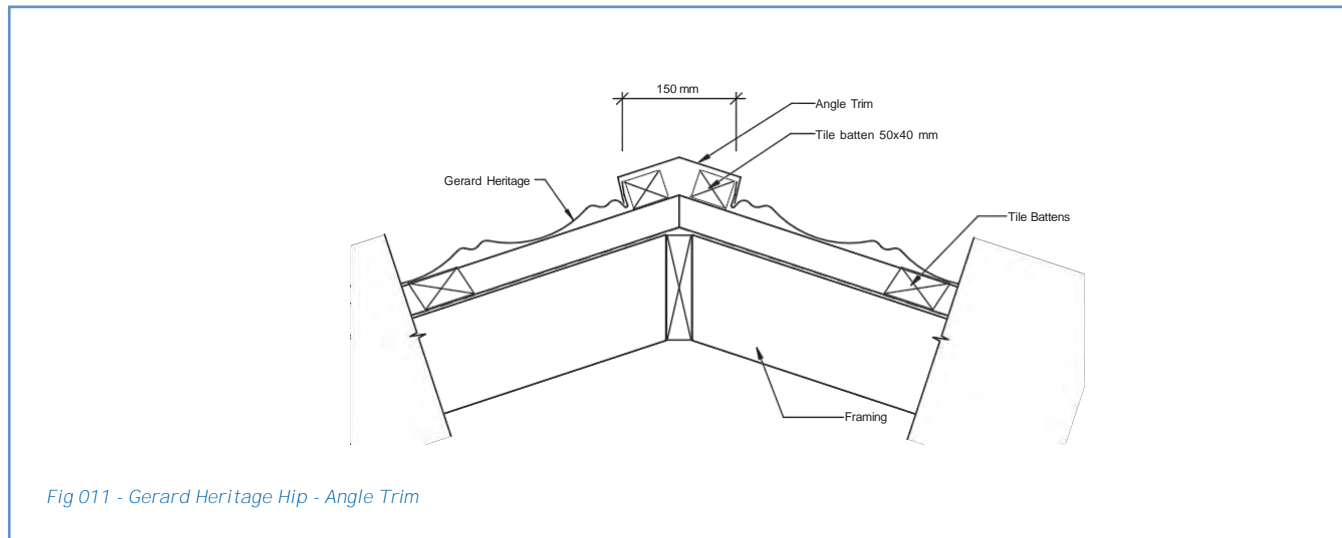
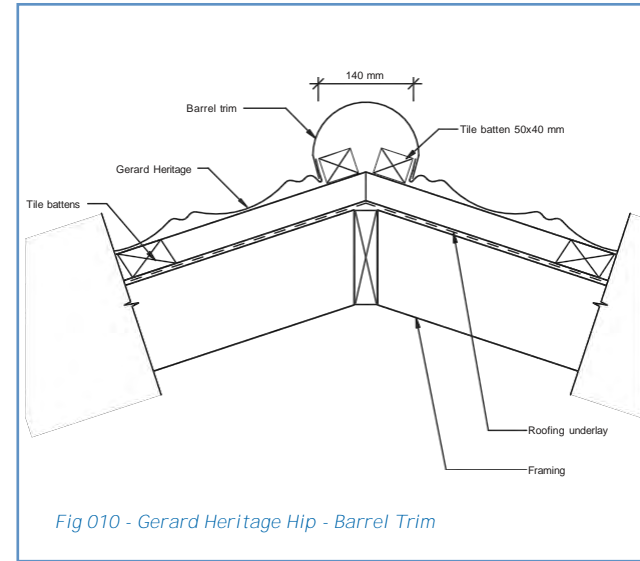
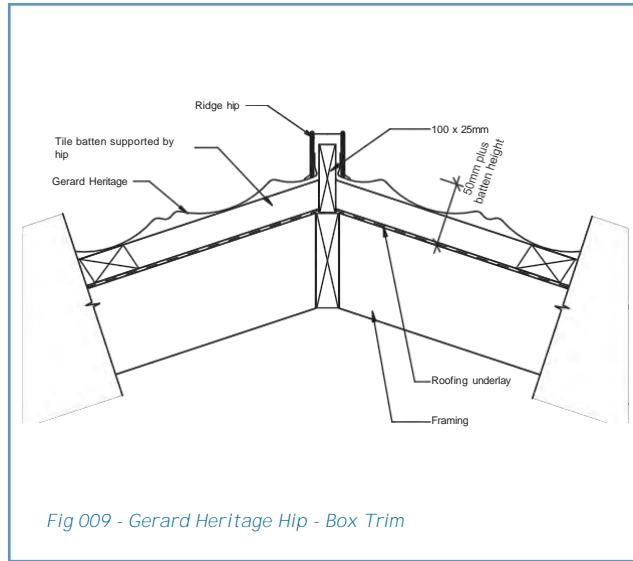


4.0 Standard roof details

4.4 Hips

4.4.1 Installation of roof trim on hip junction with wooden battens

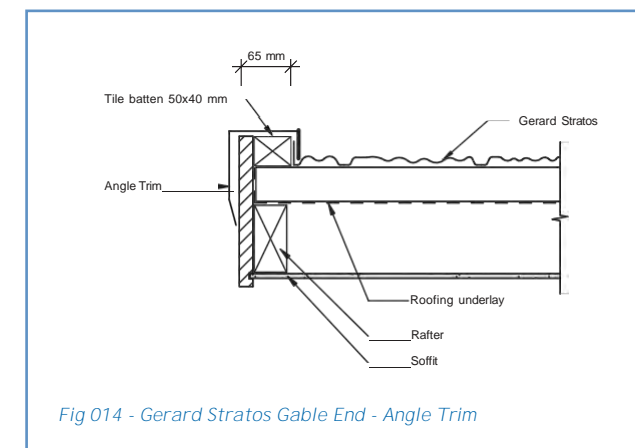
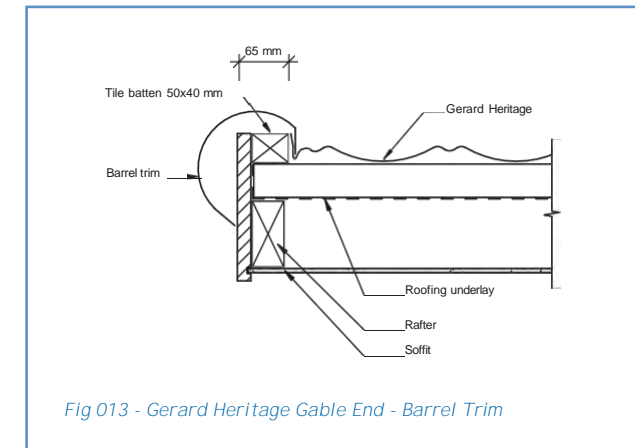
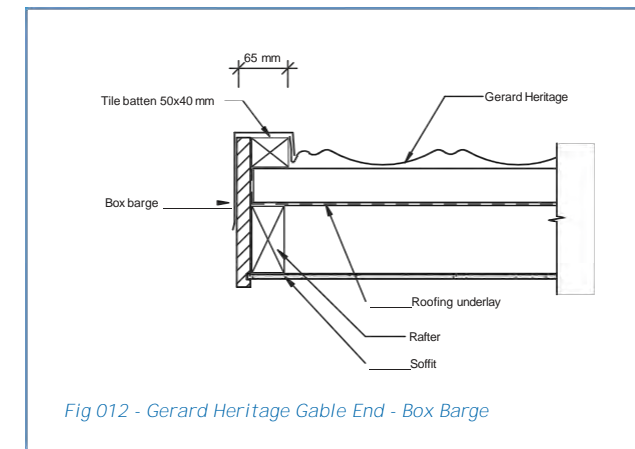
Roof panels that butt up to hip battens should be turned up by 40 mm; roof trims must cover battens and overlap panels below by a minimum of 35 mm.



4.5 Barge/Gable ends

4.5.1 Installation of roof trim over a wooden fascia with batten

Roof panels that butt up to edge battens should be turned up by 40 mm; roof trims must cover battens and overlap panels below by a minimum of 25 mm.

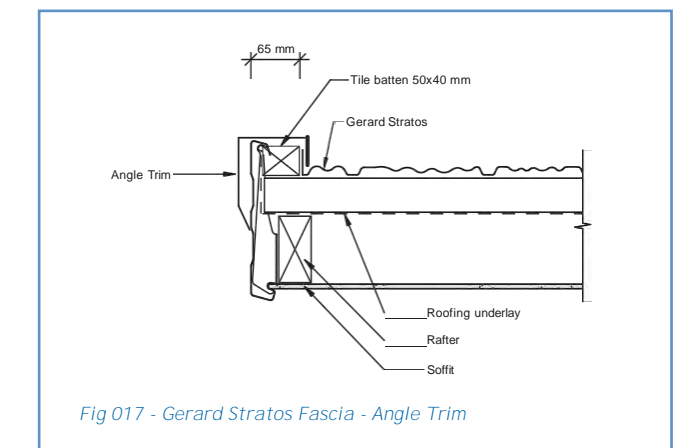
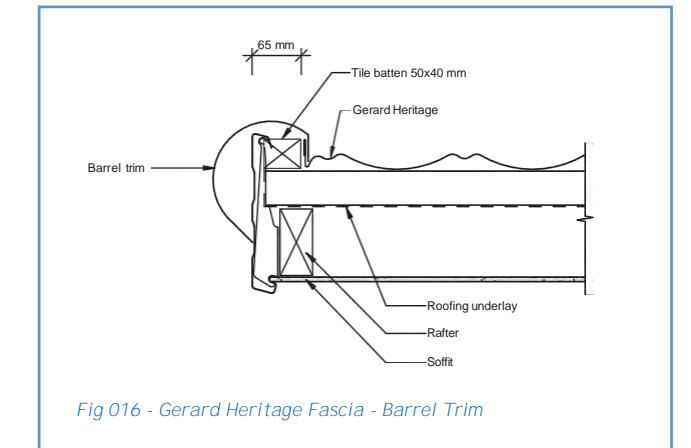
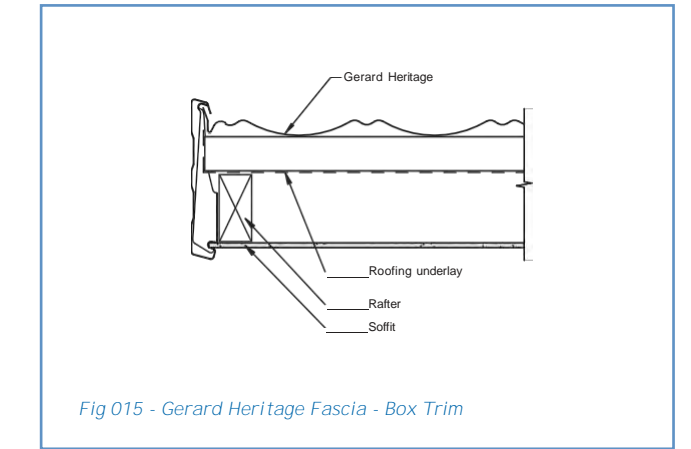


4.0 Standard roof details

4.5.2 Installation of roof trim over a metal fascia with and without batten

Roof panels that butt up to edge battens should be turned up by 40 mm; roof trims must cover battens and overlap panels below by a minimum of 25 mm.

Roof trims should be riveted to the metal fascia.



4.0 Standard roof details

4.6 Wall flashings

There are several types of wall flashings that may be used with various thicknesses of wall claddings.

Gerard Roofs manufacture most of these without hooks or hems which then requires 100 mm coverage of the section hidden behind the wall cladding.

4.6.1 Side flashings

Side flashings are general purpose flashings suitable for use with most wall claddings.

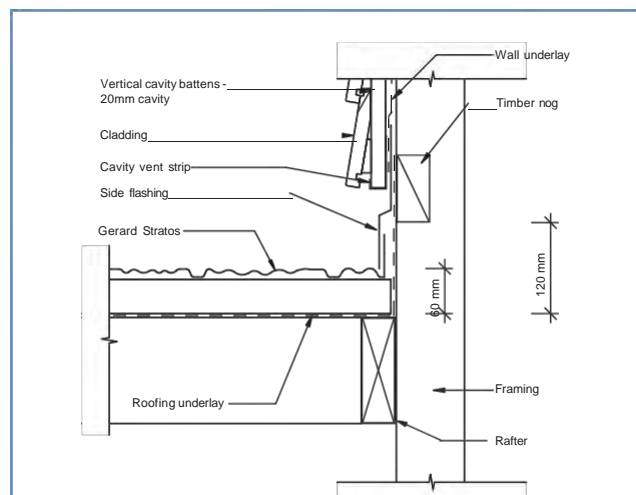


Fig 018 - Gerard Stratos Wall Parallel - Side Flashing

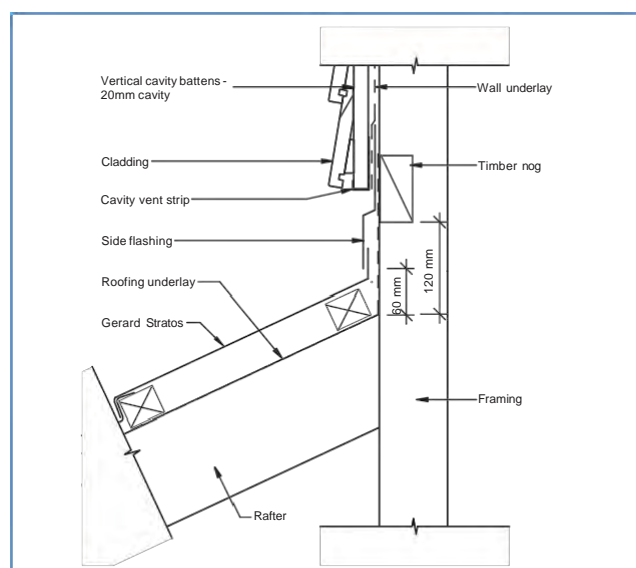


Fig 019 - Gerard Wall Transverse - Side Flashing

4.6.2 Step - Pitch flashings

Pitch flashings are a special system for thicker wall claddings like brick veneer. The transverse wall flashing is folded to closely match the roof pitch allowing the corner junctions to mitre neatly.

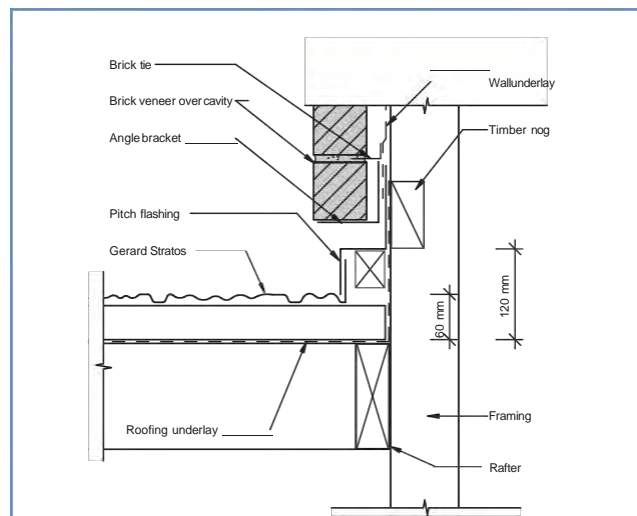


Fig 020 - Gerard Stratos Wall Parallel - Pitch Flashing

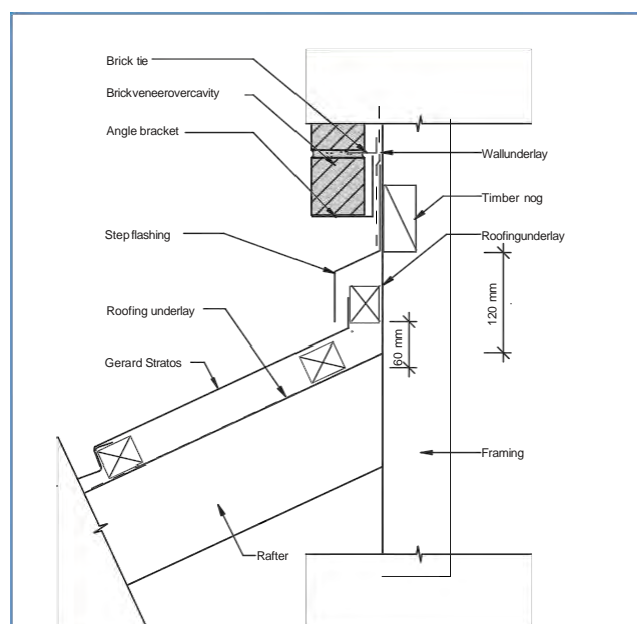


Fig 021 - Gerard Wall Transverse - Step Flashing

4.6.3 Soft edge apron flashings

Soft edge apron flashings are general purpose flashings suitable for most wall claddings. The soft edged aluminium is moulded down to meet the surface of the panel.

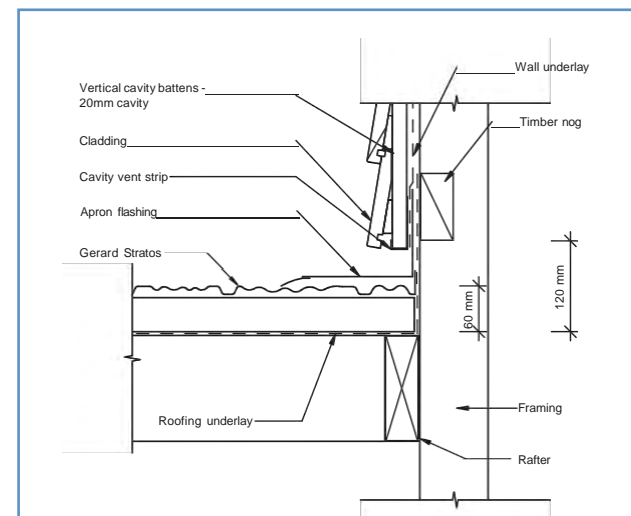


Fig 022 - Gerard Stratos Wall Parallel - Apron Flashing

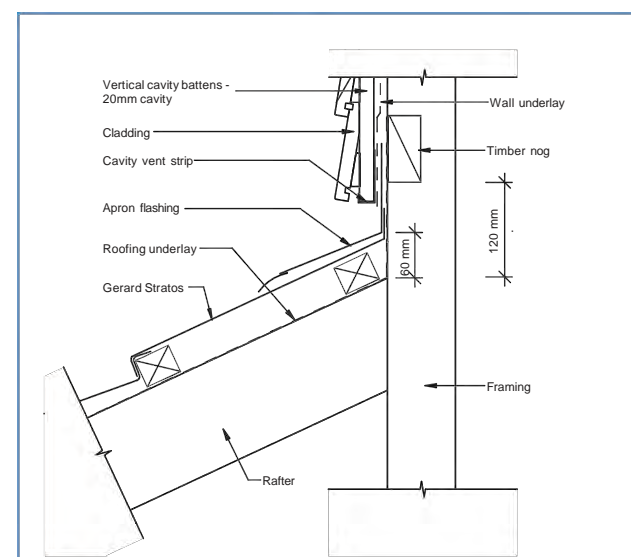
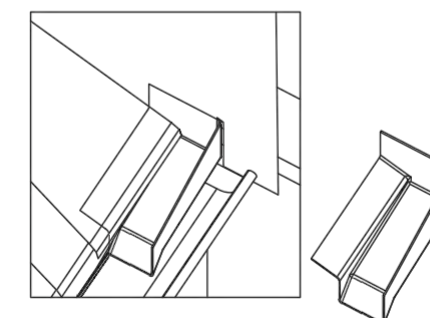
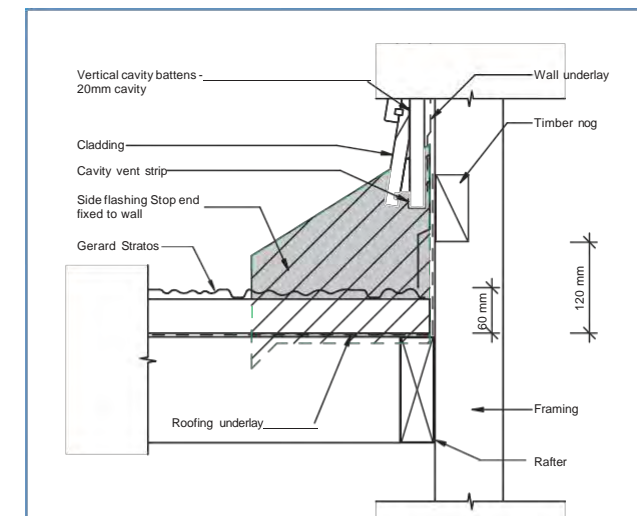


Fig 023 - Gerard Transverse - Apron Flashing

4.7 Wall Stop Ends

Gerard Roofs proprietary PVC Stop Ends direct water away from the roof and wall and into the rain water collection gutters. There are left and right versions.



Stopend

Fig 024 - Gerard Wall Parallel - Stop End Wall

4.0 Standard roof details

4.8 Change in pitch

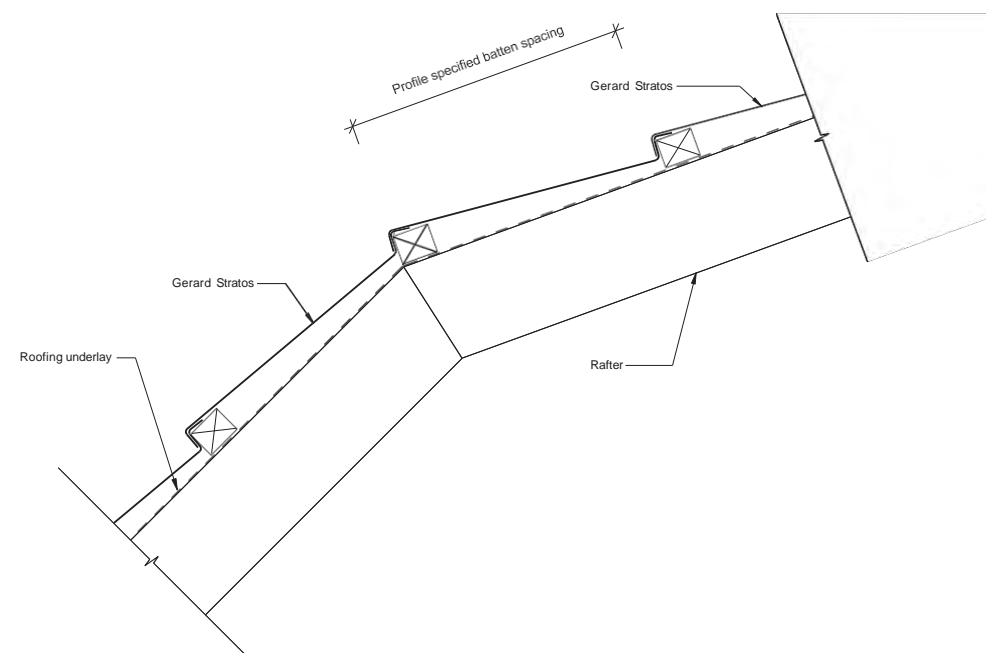


Fig 025 - Gerard Change in Pitch - Low Pitch to High Pitch

A batten is located at the point where the roof line changes pitch. If an exact number of courses of full panels is not practical a panel may be bent to suit.

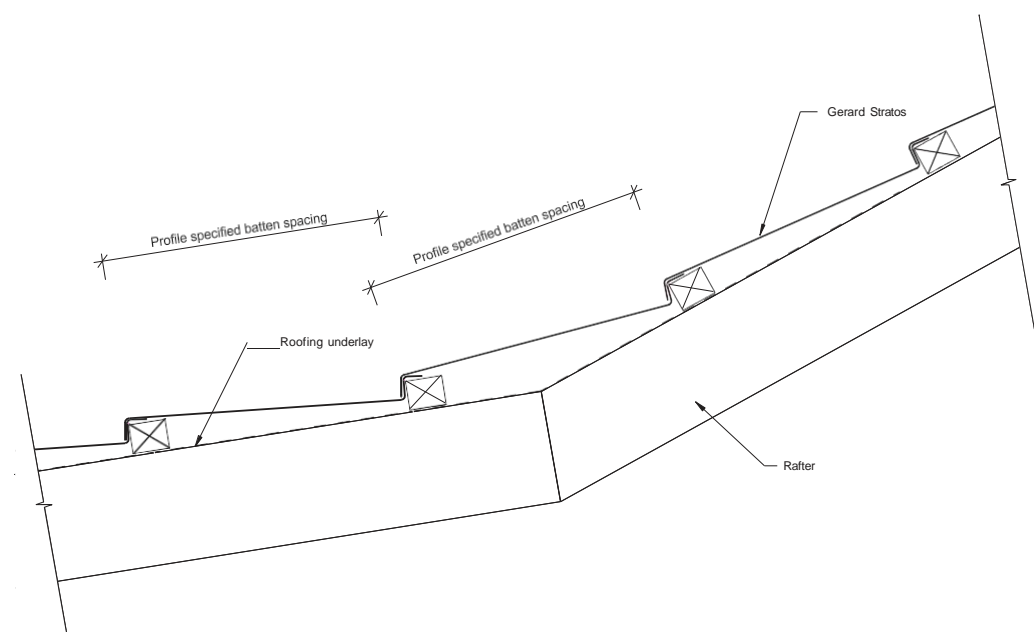


Fig 026 - Gerard Change in Pitch

A batten is located at the point where the roof line changes pitch. If an exact number of courses of full panels is not practical a panel may be bent to suit.

4.0 Standard roof details

4.9 Penetrations

4.9.1 Pipes

Pipe penetrations should be flashed using an EPDM flexible sleeve/boot or similar, such as Aquaseal. The edge of the EPDM flexible sleeve/boot should be fixed at 45° to horizontal.

4.9.2 Chimneys

Chimneys require specific flashings depending on the type and width of the chimney.

Cylindrical chimneys may be flashed with a large EPDM rubber sleeve similar to pipe flashings.

Rectangular chimneys require a back flashing. For chimneys up to 600 mm wide this may be made of flat sheet supplied by Gerard Roofs, AZ150 pre-painted steel, aluminium, or a supported butyl membrane.

Chimneys exceeding 600mm in width

For chimneys and other penetrations wider than 600mm an internal gutter should be used to create a fall to the edges of the penetration.

This requires a cricket flashing or slope to direct water to the edges using a supported butyl membrane.

Where the chimney is situated at the eave an internal gutter should be installed around the side to allow water to exit into the eave's rainwater system.

Angled internal gutters should be formed using butyl rubber or other inert material such as aluminium. These should be installed by suitably qualified Licensed Building Practitioners (LBPs).

4.9.3 Roof windows

Refer to specific roof window supplier's installation instructions. Typically this will involve cutting and bending panels up to the perimeter of the roof window in a manner that supports installation of the proprietary flashings supplied by the roof window manufacturer.

4.9.4 Solar panels

Refer to specific solar panel supplier's installation instructions. Note that these should allow for fastening directly to the rafters and not to the roof panel battens. Penetrations of the support must be appropriately flashed to ensure weather security, e.g. an EPDM flexible sleeve/boot.

4.0 Standard roof details

4.10 Extra high wind zone installation

Refer to *Table 04 Fasteners for Panel Battens - Wind Zones - NZS3604*. (Page 23)

Gerard Roofs fixing patterns do not change for extra high wind zones.

Gerard Roofs can provide a wall flashing that retains the panel turn up and offers greater wind-blown rain protection. This is an extended side flashing that has a soft edge to contour the panel surface and a hem at the top section that is mandatory for roofs in extra high wind zones.

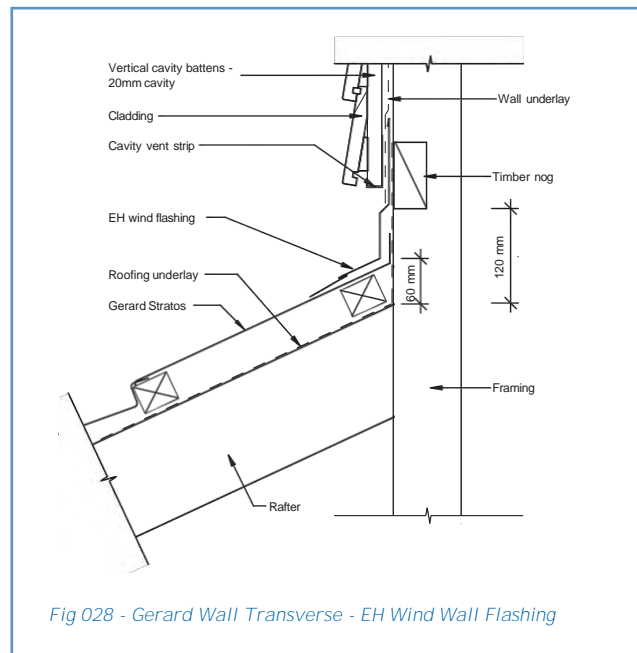


Fig 028 - Gerard Wall Transverse - EH Wind Wall Flashing

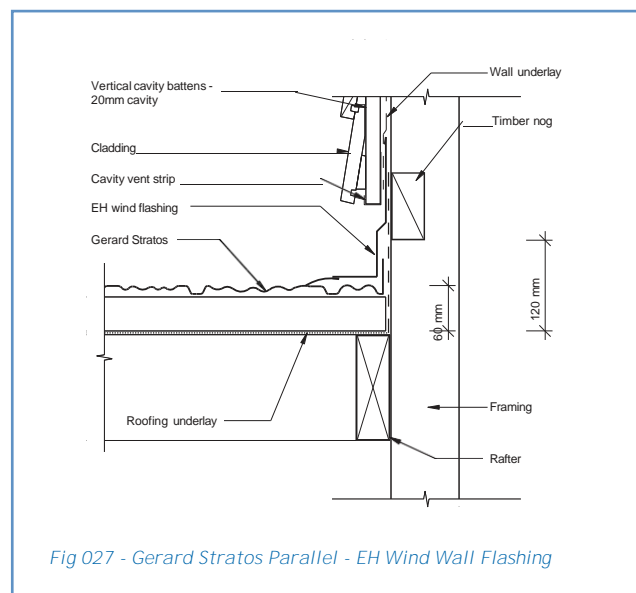


Fig 027 - Gerard Stratos Parallel - EH Wind Wall Flashing



5.0 Components & fixing patterns

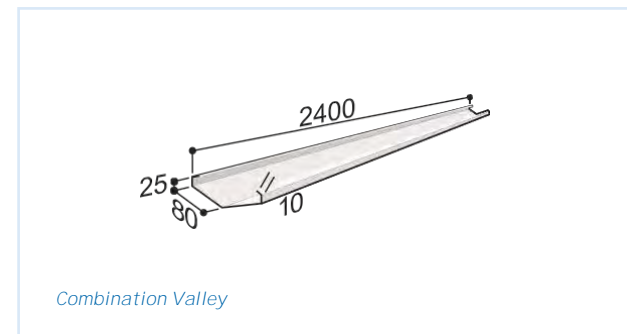
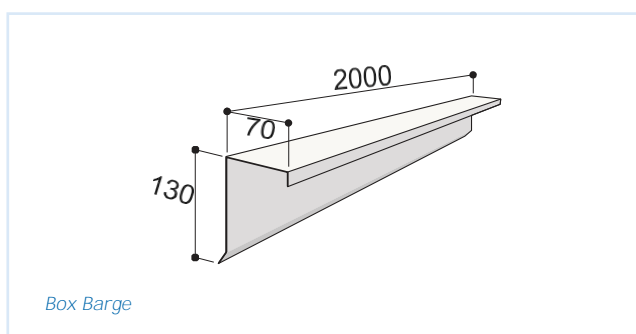
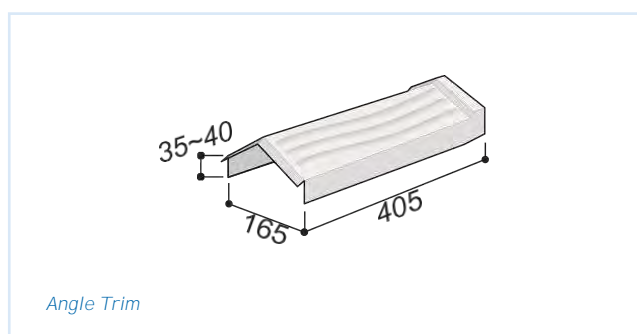
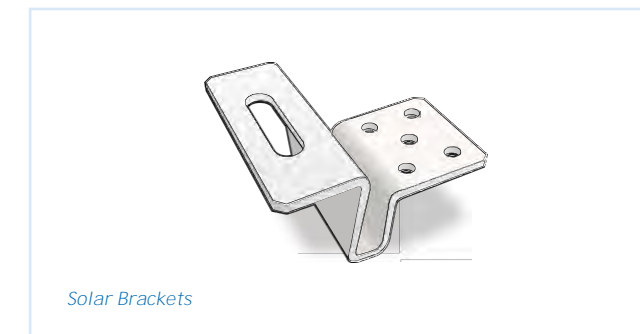
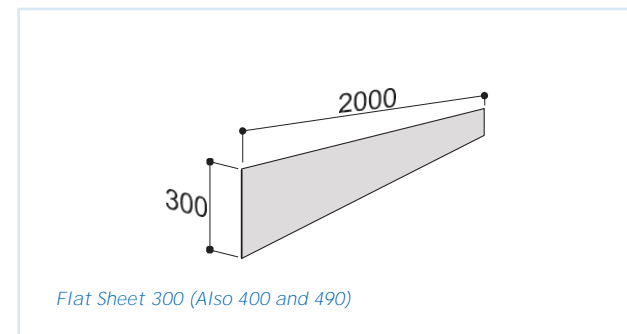
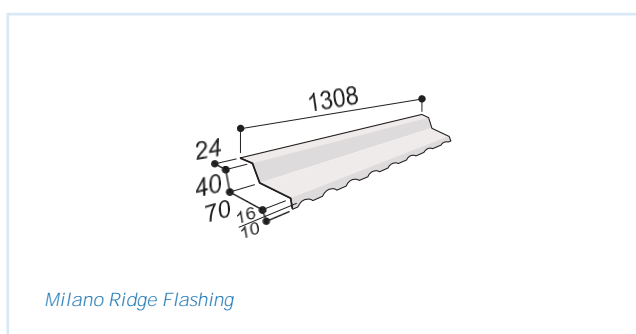
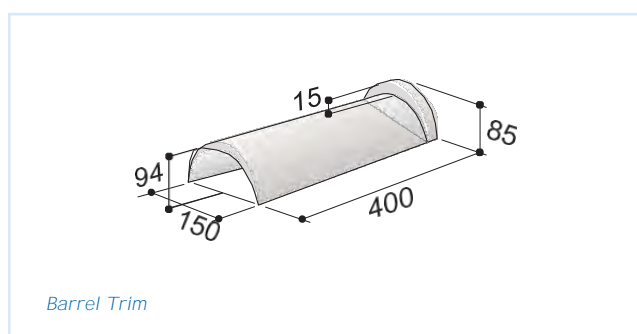
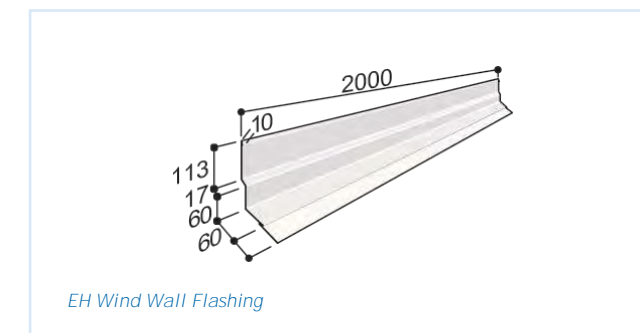
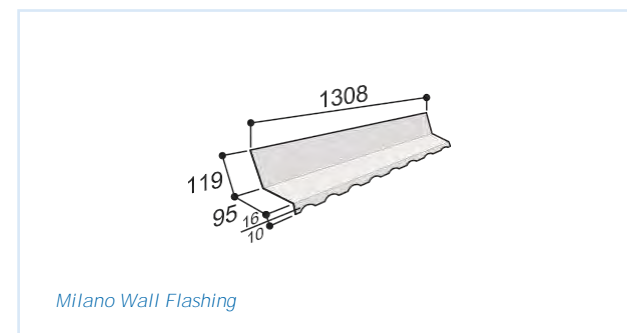
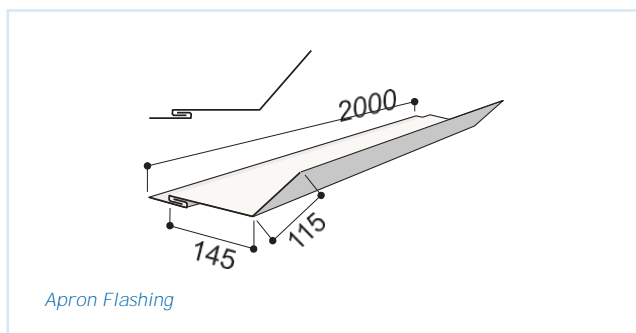
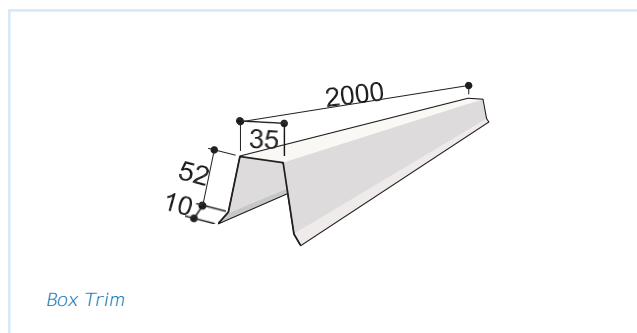
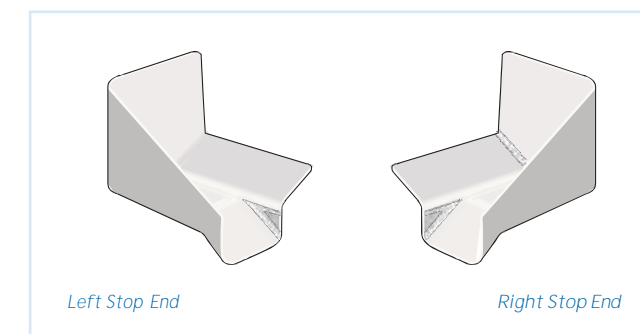
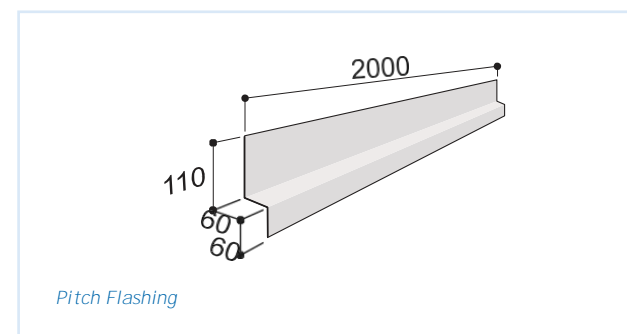
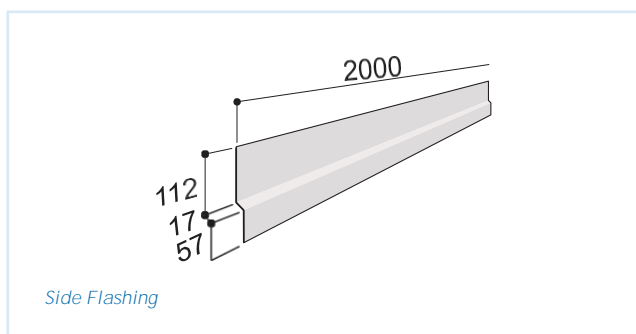
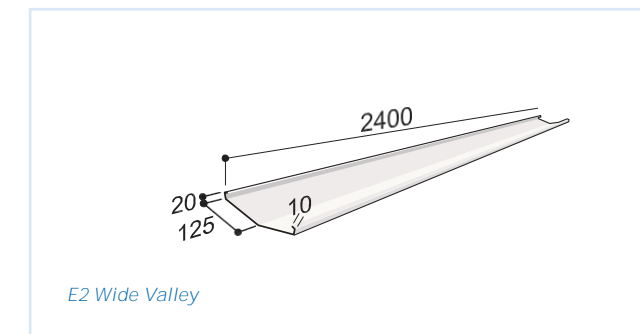
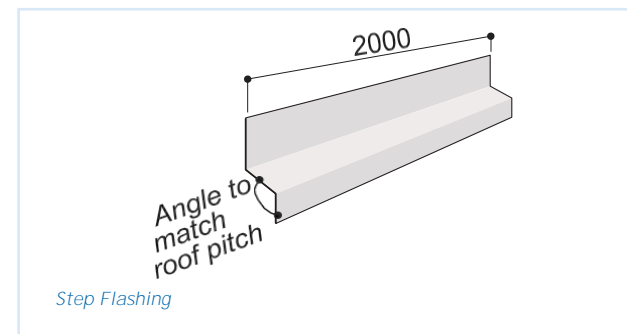
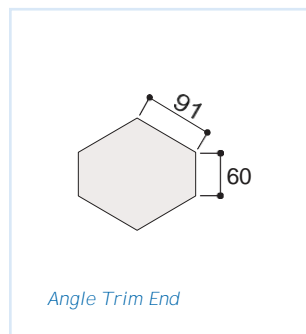
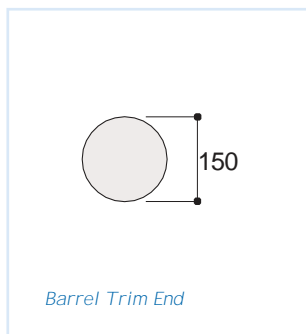
This section contains useful installation information for very detailed specification. **You'll** find a complete list of Gerard Roofs componentry and specific layout and fixing instructions for each of the eight Gerard Roof profiles. The information contained in this section is also contained in individual product profile sheets available for download at www.gerardroofs.co.nz/designtech

5.0 Components & fixing patterns

5.1 Gerard Roofs components

To accompany their eight roof profile panels - Stratos, Senator, Rockport, Alpine, Aspen, Milano, Heritage and Classic - Gerard Roofs produces a full range of accessories.

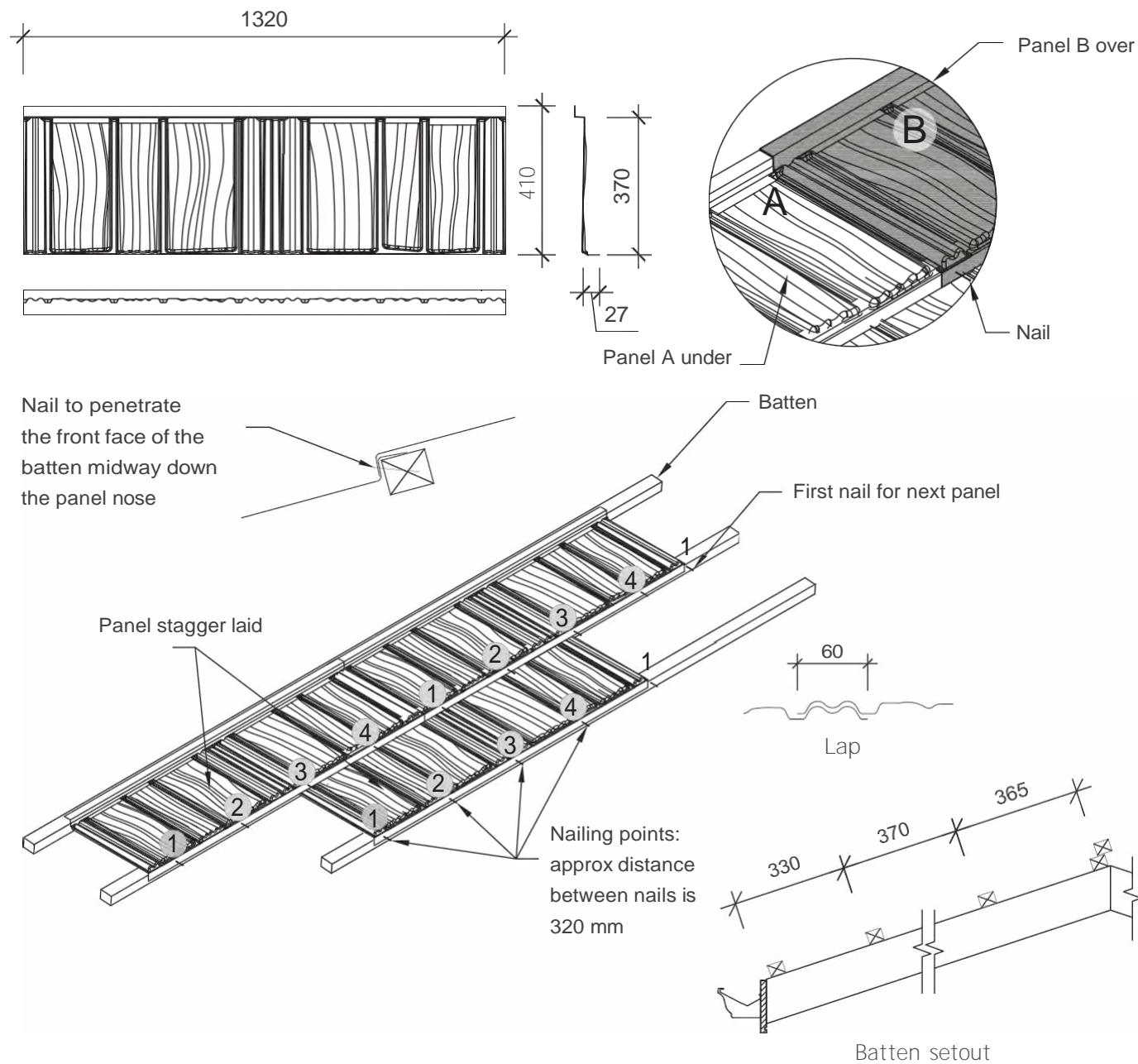
All components are produced in the same way, from the same steel and, where appropriate, coated to match the roof profile panels themselves using the same materials and techniques to ensure complete synergy for performance and aesthetics.



5.0 Components & fixing patterns

5.2 Gerard Stratos installation

Panel installation instructions & nailing positions



Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

Fastening Panels in Cyclone Areas

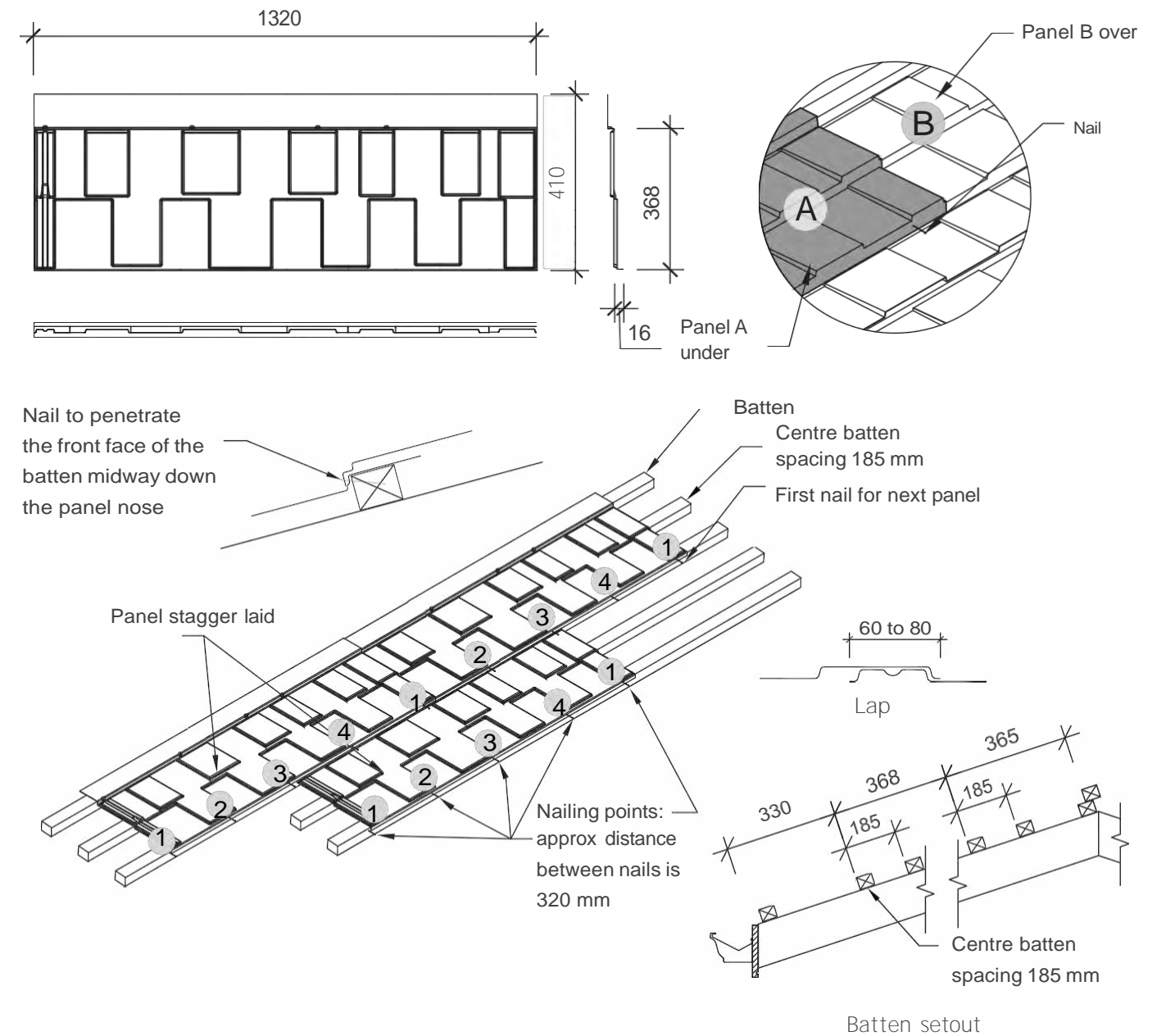
- Where a building has been designed outside the scope of NZS 3604. Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

5.0 Components & fixing patterns

5.3 Gerard Senator installation

Panel installation instructions & nailing positions



Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

Fastening Panels in Cyclone Areas

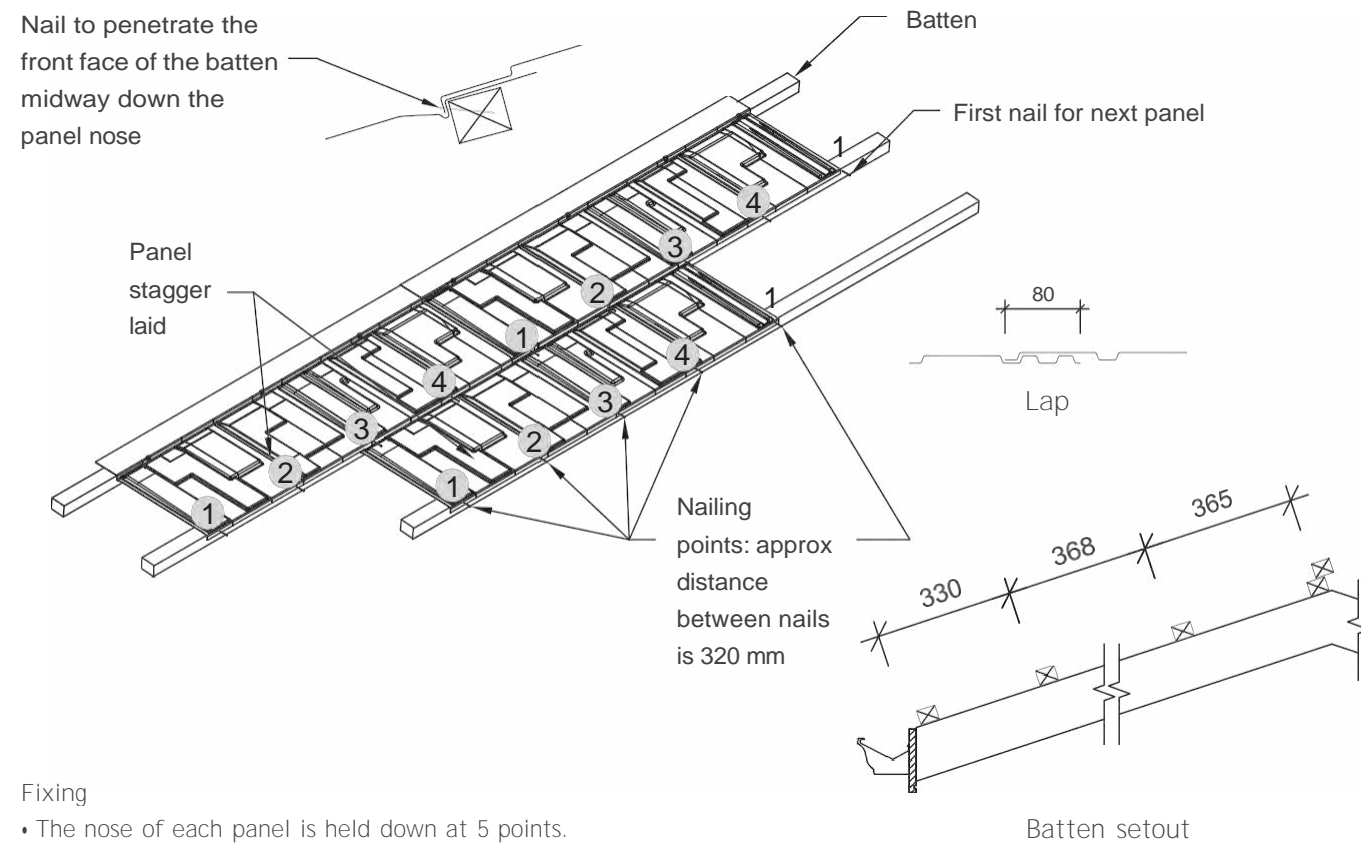
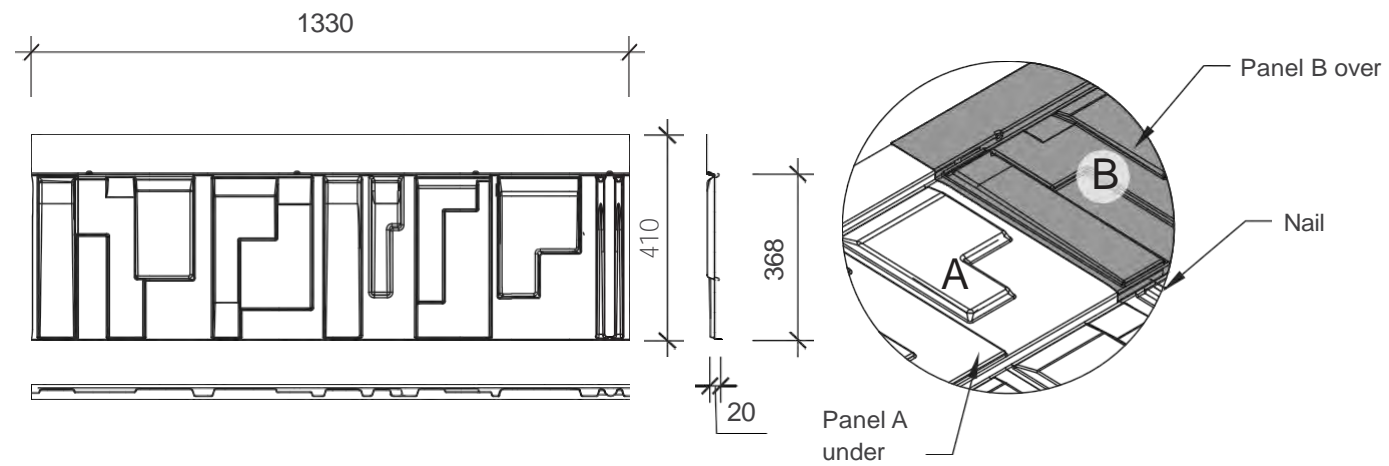
- Where a building has been designed outside the scope of NZS 3604. Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

5.0 Components & fixing patterns

5.4 Gerard Rockport installation

Panel installation instructions & nailing positions



Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

Fastening Panels in Cyclone Areas

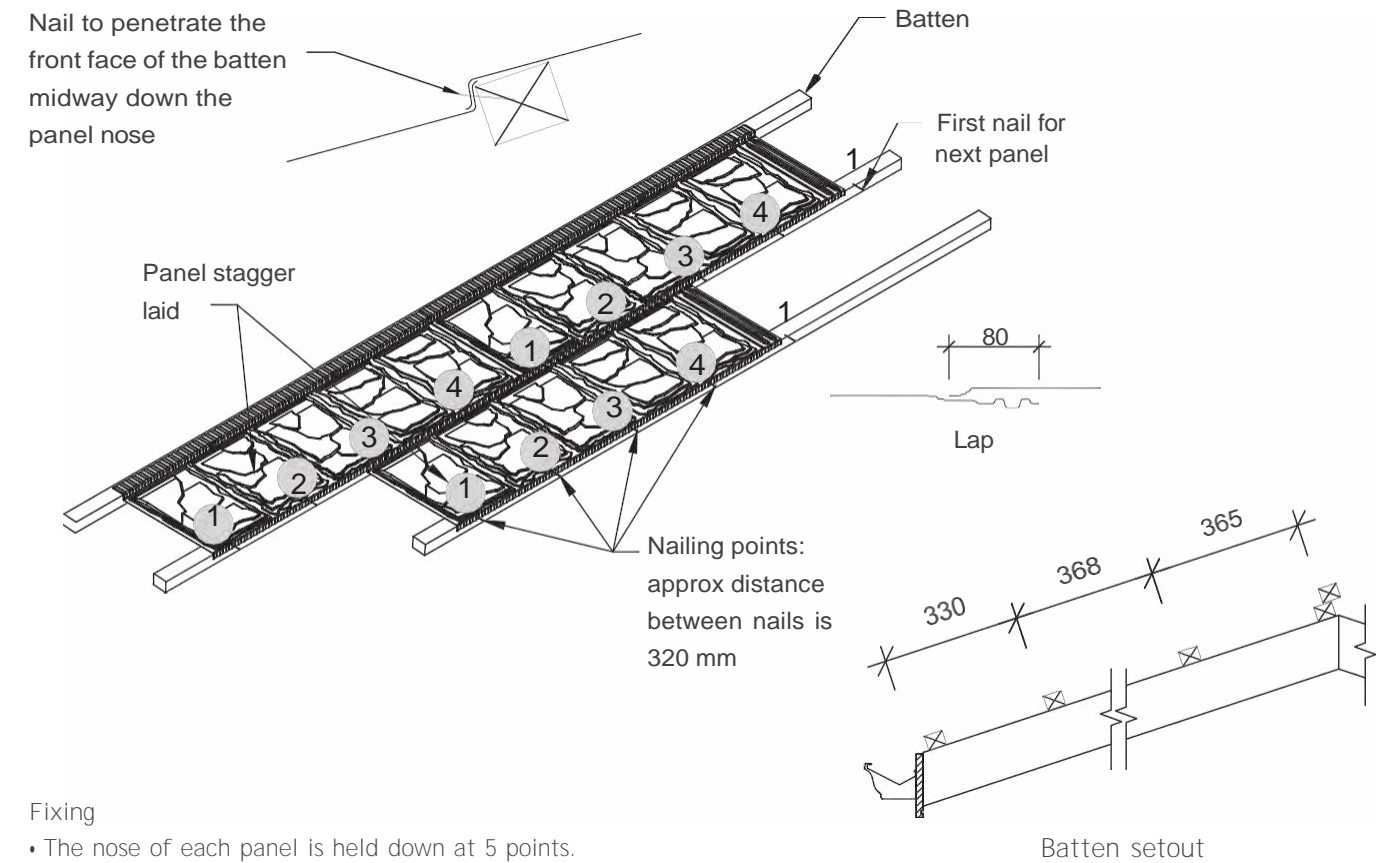
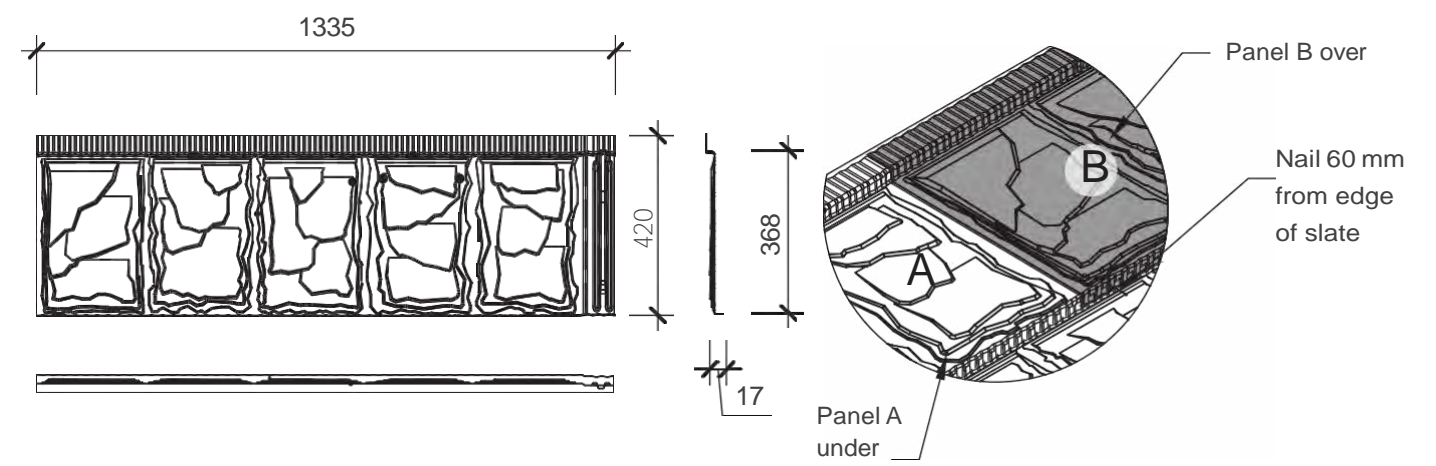
- Where a building has been designed outside the scope of NZS 3604, Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

5.0 Components & fixing patterns

5.5 Gerard Alpine installation

Panel installation instructions & nailing positions



Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

Fastening Panels in Cyclone Areas

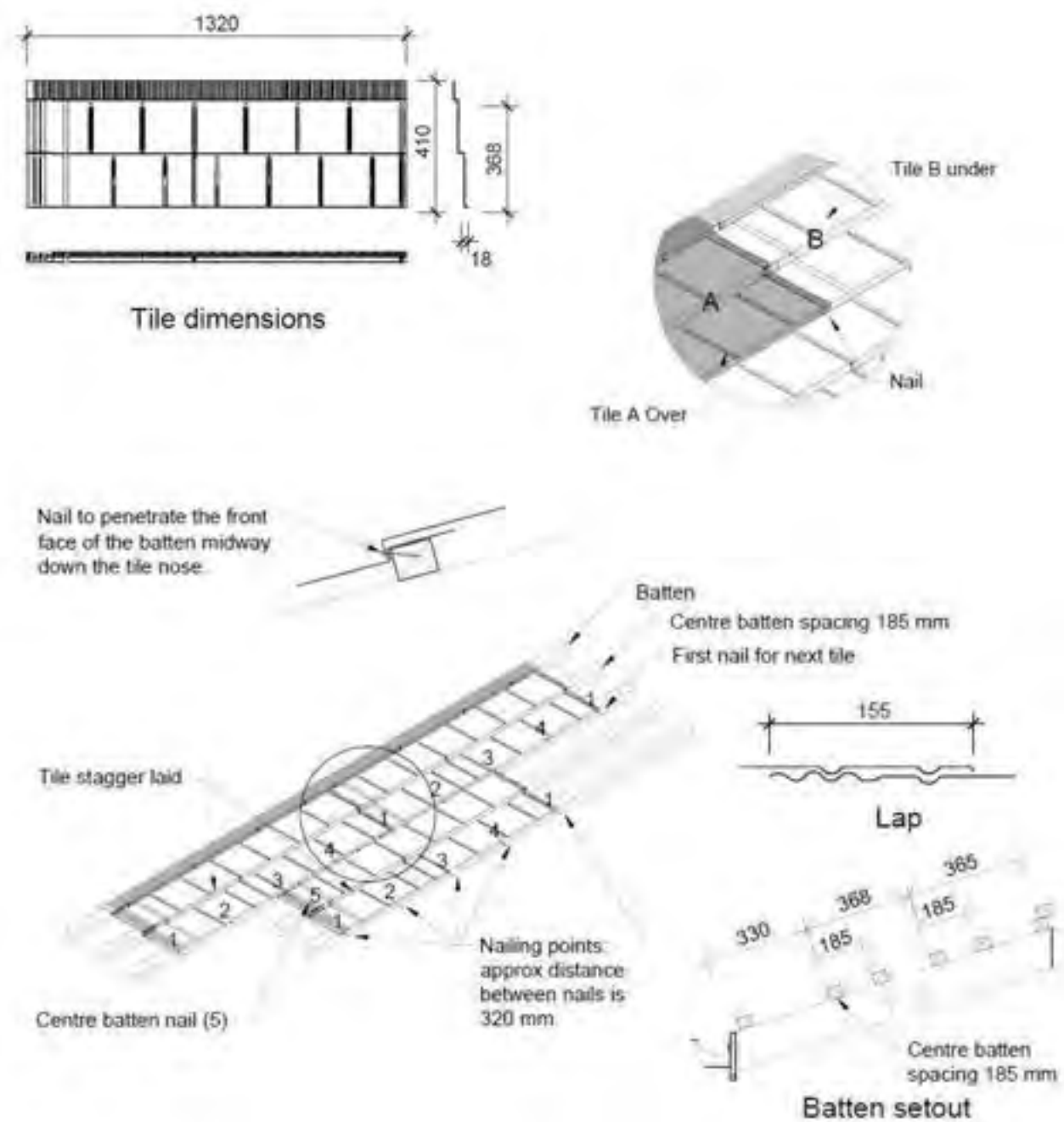
- Where a building has been designed outside the scope of NZS 3604, Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

5.0 Components & fixing patterns

5.6 Gerard Aspen installation

Panel installation instructions & nailing positions



Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

Fastening Panels in Cyclone Areas

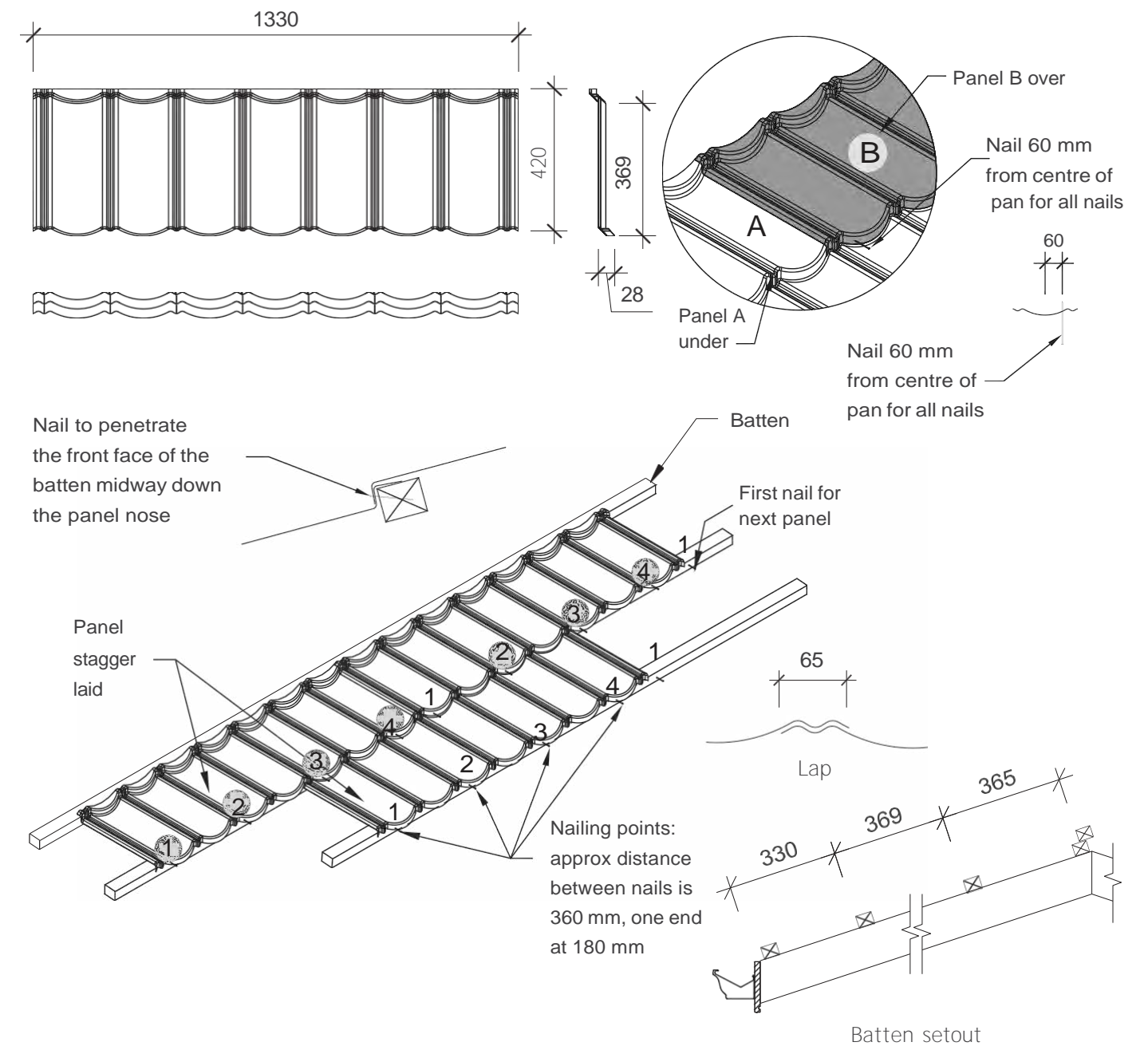
- Where a building has been designed outside the scope of NZS 3604, Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx. 160 mm spacing (each module).

Dimensions and weights given are nominal.

5.0 Components & fixing patterns

5.7 Gerard Heritage installation

Panel installation instructions & nailing positions



Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

Fastening Panels in Cyclone Areas

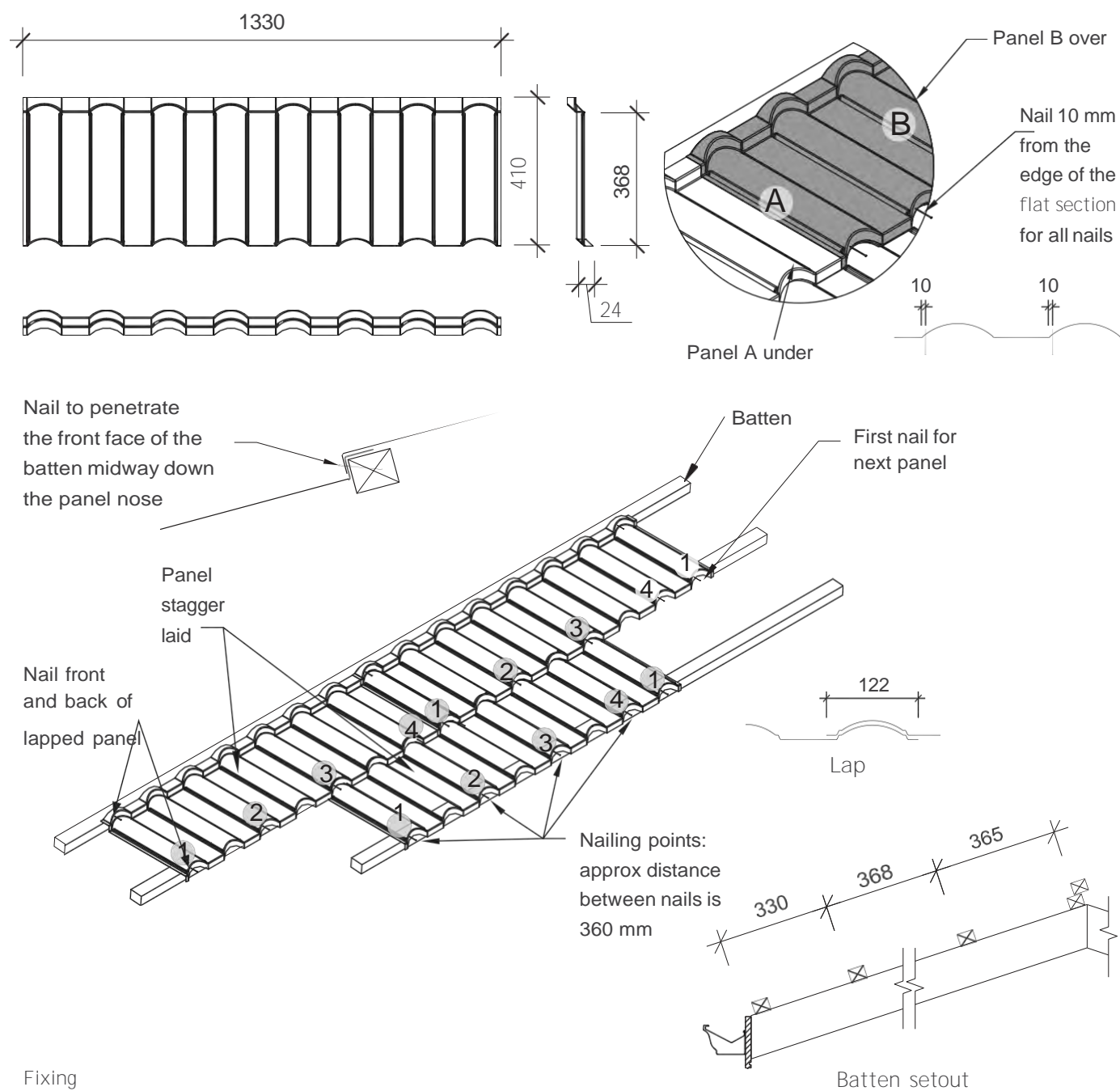
- Where a building has been designed outside the scope of NZS 3604, Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

5.0 Components & fixing patterns

5.8 Gerard Milano installation

Panel installation instructions & nailing positions



Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.
- Nail front and back of lapped panel.

Fastening Panels in Cyclone Areas

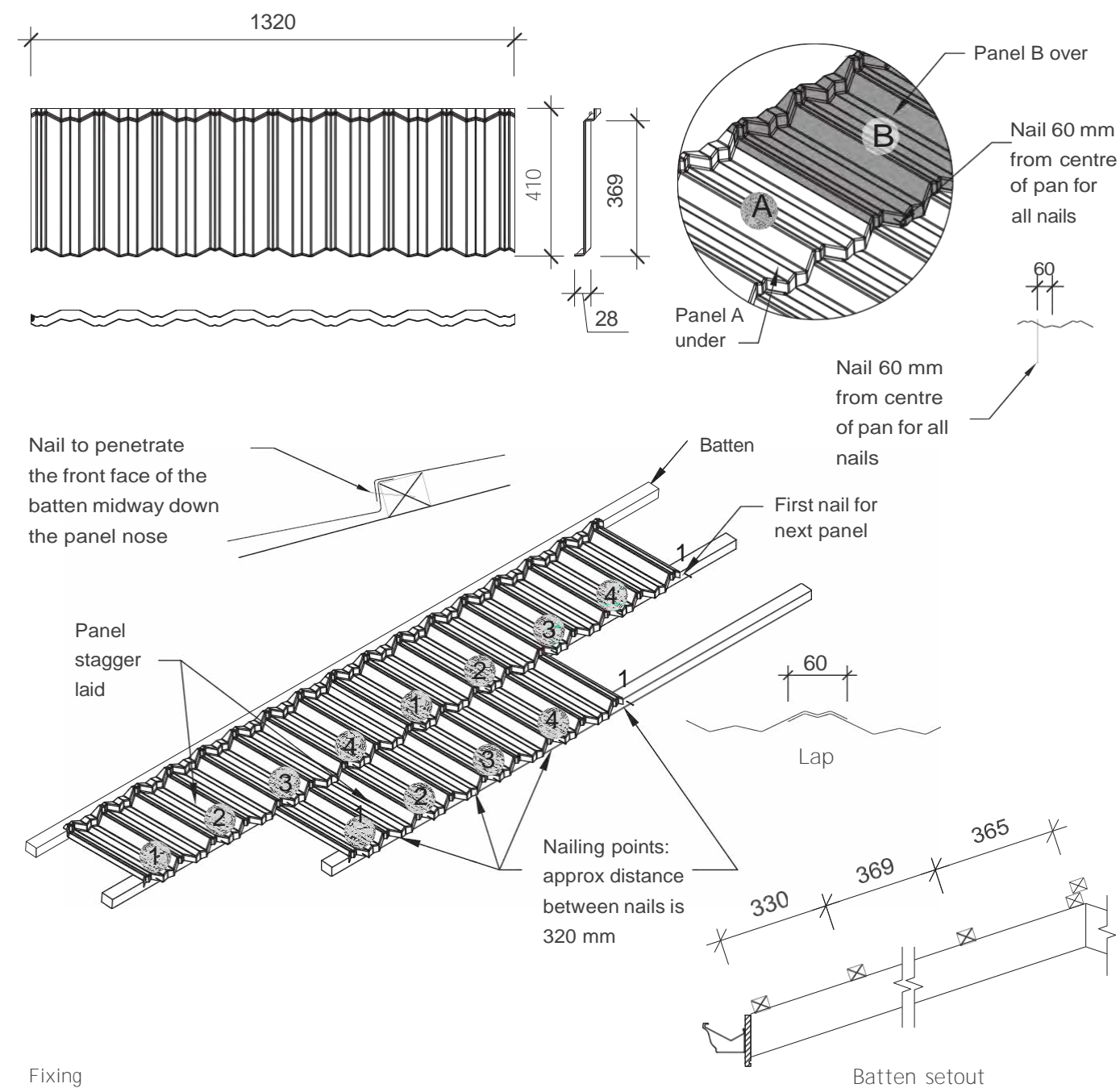
- Where a building has been designed outside the scope of NZS 3604, Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

5.0 Components & fixing patterns

5.9 Gerard Classic installation

Panel installation instructions & nailing positions



Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

Fastening Panels in Cyclone Areas

- Where a building has been designed outside the scope of NZS 3604, Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

Important information about this material

The Gerard Roofing System

RoofTG Pacific Ltd accepts no liability if the Gerard roofing system is not used in accordance with instructions contained in this publication.

Use only the current specification

This publication may be superseded by a newer publication. RoofTG Pacific Ltd accepts no liability for reliance upon publications that have been superseded. Before using this manual check whether this is the current version; simply call the Gerard Roofs Helpline on 0800 100 244 or visit www.gerardroofs.co.nz

Substitution

RoofTG Pacific Ltd accepts no liability if the systems are not installed in accordance with instructions contained in this and other Gerard Roofs technical literature. Substitution of specified or recommended components with alternative brands can compromise performance dramatically. The Gerard roofing system is not generic and must be installed as specified including the use of Gerard branded components.

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GER2006-25

This edition published July 2020

28 September 2022

Waikanae North Ltd c/o LandMatters
Attention: Phillip Mitchell

Manu Park Subdivision, Waikanae - Stage 2: Foundation Recommendations

MINZ Ref: 210292.02-TM-001[B]

1. Introduction

Miyamoto International NZ Ltd (Miyamoto) has been engaged by Waikanae North Ltd c/o LandMatters, the Client, to undertake a 'post-earthworks' geotechnical assessment and provide recommendations for new building foundations within Stage 2 of the Manu Park Subdivision. This memorandum may be used in support of building consent application for the lot specific developments.

The Stage 2 Manu Park Subdivision comprises 36No. new residential lots (Lot Nos. 40 to 60, 65 to 75, 126 & 128 to 130). The site location and layout are shown in Figure 1 and the Cuttriss Consultants (Cuttriss) Engineering Plans included in Appendix A.

At the time of writing, the earthworks for Stage 2 were complete. The design, monitoring, verification and certification of the Stage 2 earthworks (already complete) has been undertaken by Cuttriss with the earthworks completion report provided under separate heading.

To assess the 'post-earthworks' liquefaction risk across Stage 2 and to inform appropriate foundation recommendations, Miyamoto directed a deep ground investigation and have undertaken a liquefaction assessment for Stage 2, the results of which are included within this technical memorandum (TM).



Figure 1: Site Location & Layout

2. Stage 2 Earthworks

As detailed above, the design, monitoring, verification and certification of the Stage 2 earthworks has been undertaken by Cuttriss with the earthworks completion report provided under separate heading. In summary, the earthworks comprised a balanced cut / fill operation to create a level grade for the residential lots, with unsuitable materials (topsoil, organics etc.) removed and site won sand material used as engineered fill. Cuttriss have certified the earthworks in accordance with NZS4431 and NZS4404.

3. Ground Investigation

To facilitate a 'post-earthworks' liquefaction assessment, a deep ground investigation comprising 6No. cone penetration tests (CPT) was undertaken by Griffiths on behalf of Miyamoto in September 2022. The locations of the tests are shown in Figure 2 and the CPT plots are provided in Appendix B.

In addition to the stage specific CPTs, the following ground investigation information has been used to inform our understanding of the ground conditions:

- Subgrade and fill inspections along with a number of scala penetrometer tests undertaken by Cuttriss as part of the Stage 2 earthworks monitoring and verification (selected results are included in Appendix B, a full set of results are covered under separate heading by Cuttriss).
- Shallow and deep ground investigations undertaken for the wider subdivision (the results of which are discussed in the various Stage reports).



Figure 2: Geotechnical Investigation Location Plan

4. Liquefaction Assessment

Ground Motion Parameters

The ground motion parameters for geotechnical analysis including liquefaction hazard assessment have been assessed using the MBIE – NZGS Earthquake Geotechnical Engineering Practice Module 1 (November 2021) with:

- Recommended interim seismic hazard of New Zealand for geotechnical assessments as presented in Table A1 (Appendix A) for Peak Ground Acceleration (a_{max}) and Earthquake Magnitude (M_w) values for Site Classes A, B, C, D and E, for level ground conditions.

The derived ground motion parameters for the design events are summarised in Table 1 following the interim NZ seismic hazard.

Table 1: Design Ground Motion Parameters for Geotechnical Evaluation

Earthquake scenario / return period*	Magnitude	Peak horizontal ground acceleration a_{max}
Recommended interim seismic hazard of New Zealand for geotechnical assessments		
<i>Table A1 (Appendix A): Peak Ground Acceleration (a_{max}) and Earthquake Magnitude (M_w) values recommended for Geotechnical Assessment, for Site Classes A, B, C, D and E, for level ground conditions</i>		
1/25-year SLS event	6.5	0.13g
1/100-year Intermediate Event	7.1	0.28g
1/500-year ULS event	7.7	0.68g

* Importance level 2 (IL2) buildings with 50-year design life.

It should be noted that the above parameters are for geotechnical design purposes only. Ground motion parameters for purposes of structural analysis and design should be derived in accordance with NZS 1170.5:2004.

Liquefaction Susceptibility and Triggering

A liquefaction triggering assessment has been carried out using proprietary liquefaction assessment software (Cliq by GeoLogismiki), in general accordance with MBIE - NZGS Earthquake Geotechnical Engineering Practice Module 3 and the latest technical publications. The design criteria adopted are as follows:

- Boulanger and Idriss (2014) simplified CPT-based methods for liquefaction triggering.
- Zhang et al. (2002) post-liquefaction volumetric strain calculation for estimating the free-field settlements (it should be noted that these settlement estimates only account for the free-field component of the expected settlement. Actual total settlements under design earthquake loading may be greater or less).
- Liquefaction assessment, including evaluation of vulnerability indicators (free-field settlement values, Liquefaction Severity Number (LSN) and Liquefaction Potential Index (LPI) damaging criteria) based on the CPT data.

The results of our analysis are summarised in Table 2 and presented in Appendix C.

Table 2: Estimated “Free-Field” Ground Surface Settlements & Performance Levels

Earthquake scenario	Total Estimated Ground Surface Settlements (full depth tested)	Performance Level (as per Table 5.1 of MBIE – NZGS Module 3)
Interim NZ Seismic Hazard Model		
1/25-year SLS event	-	Insignificant effects - L0
1/100-year IE	<40 mm	LSN 0 to 5 LPI 0 to 2 Mild to moderate effects - L1 / L2
1/500-year ULS event	<60 mm	LSN 0 to 8 LPI 0 to 11 Moderate effects - L2

* **LSN = Liquefaction Severity Number.** LSN (van Ballegooy et al., 2014) is a vulnerability indicator (damage index) quantifying liquefaction-induced damage developed to reflect more damaging effects of shallow liquefaction on residential land and foundations following the Canterbury Earthquakes (2010-11). LSN considers depth weighted calculated volumetric densification strain within soil layers as a proxy for the severity of liquefaction land damage likely at the ground surface.

The liquefaction assessment indicates that liquefaction is unlikely to be triggered under SLS loading conditions with moderate effects anticipated under ULS loading conditions. Furthermore, the presence of a thick non-liquefiable crust (2.5 m to 6.5 m in thickness) provides additional resilience and significantly reduces the severity of liquefaction induced damage (demonstrated by the low values of LSN).

5. Foundation Recommendations

With consideration of the assessment presented herein, NZS3604 foundation systems are considered feasible for NZS3604 compliant structures, with consideration of the available bearing capacity.

The following geotechnical ultimate bearing capacities (GUBC) may be assumed for typical foundations:

- Min. 300 mm wide strip footing / ground beam / slab thickening:
 - 200 kPa at 0.3 mbgl.
 - 300 kPa at 0.5 mbgl.
- Min. 400 mm square pad footing / pile base:
 - 300 kPa at 0.4 mbgl.

The subgrade should be inspected by a suitably experienced geo-professional during construction and compacted / proof rolled prior to foundation construction. Any material identified as being soft or unsuitable should be removed and replaced with compacted hardfill (or site materials suitable for backfill and compaction).

6. Limitations

This memorandum is subject to the following limitations:

- This memorandum has been prepared by Miyamoto for the Client for the purpose/s agreed with the Client (Purpose). Miyamoto accepts no responsibility for the validity, appropriateness, sufficiency or consequences of the Client using the memorandum for purposes other than for the Purpose.
- The sub surface information has been obtained from investigation carried out at discrete locations, which by their nature only provide information about a relatively small volume of subsoils. While Miyamoto has taken reasonable skill and care in carrying out the investigation to determine the subsoil condition, the subsoil condition could differ substantially from the results of any sampling investigation. Miyamoto is not responsible for and does not accept any liability in respect of any difference between the actual subsoil conditions and the results of our investigation.
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7. Closure

If you have any queries or you require any further clarification on any aspects of this memorandum, please do not hesitate to contact Miyamoto International (NZ) Ltd.

Prepared by:



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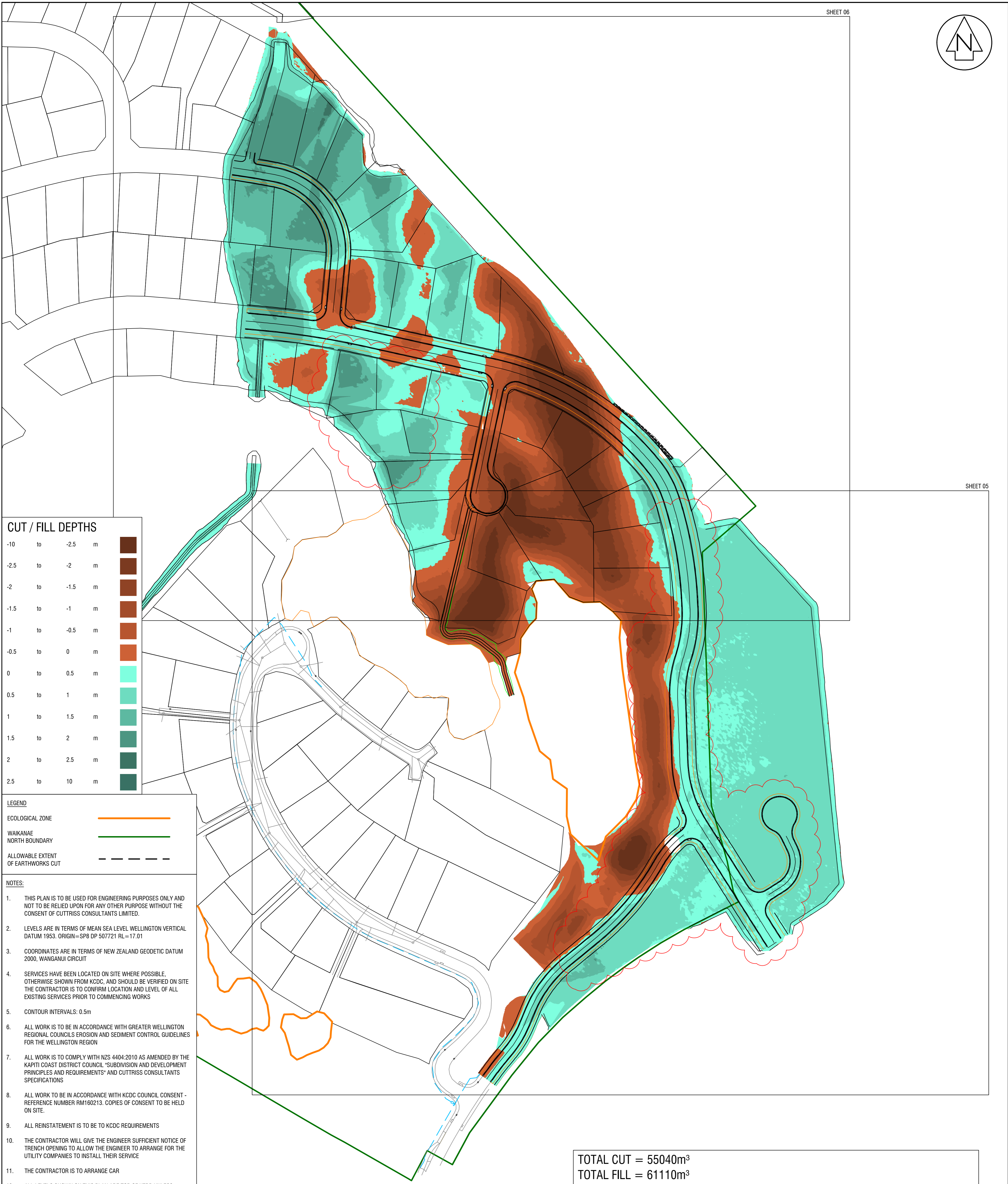
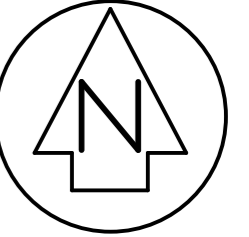
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Appendix A: Cuttriss Engineering Plans (Selected)





CUT / FILL DEPTHS

-10	to	-2.5	m	[Dark Brown]
-2.5	to	-2	m	[Brown]
-2	to	-1.5	m	[Light Brown]
-1.5	to	-1	m	[Orange]
-1	to	-0.5	m	[Light Orange]
-0.5	to	0	m	[Yellow]
0	to	0.5	m	[Light Green]
0.5	to	1	m	[Green]
1	to	1.5	m	[Dark Green]
1.5	to	2	m	[Dark Teal]
2	to	2.5	m	[Teal]
2.5	to	10	m	[Light Blue]

LEGEND

ECOLOGICAL ZONE	[Orange Line]
WAIKANAЕ NORTH BOUNDARY	[Green Line]
ALLOWABLE EXTENT OF EARTHWORKS CUT	[Dashed Line]

- NOTES:**
- THIS PLAN IS TO BE USED FOR ENGINEERING PURPOSES ONLY AND NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
 - LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON VERTICAL DATUM 1953. ORIGIN=SP8 DP 507721 RL=-17.01
 - COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 2000, WANGANUI CIRCUIT
 - SERVICES HAVE BEEN LOCATED ON SITE WHERE POSSIBLE. OTHERWISE SHOWN FROM KDCDC. AND SHOULD BE VERIFIED ON SITE. THE CONTRACTOR IS TO CONFIRM LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORKS
 - CONTOUR INTERVALS: 0.5m
 - ALL WORK IS TO BE IN ACCORDANCE WITH GREATER WELLINGTON REGIONAL COUNCILS EROSION AND SEDIMENT CONTROL GUIDELINES FOR THE WELLINGTON REGION
 - ALL WORK IS TO COMPLY WITH NZS 4404:2010 AS AMENDED BY THE KAPITI COAST DISTRICT COUNCIL "SUBDIVISION AND DEVELOPMENT PRINCIPLES AND REQUIREMENTS" AND CUTTRISS CONSULTANTS SPECIFICATIONS
 - ALL WORK IS TO BE IN ACCORDANCE WITH KDCDC COUNCIL CONSENT - REFERENCE NUMBER RM160213. COPIES OF CONSENT TO BE HELD ON SITE.
 - ALL REINSTATEMENT IS TO BE TO KDCDC REQUIREMENTS
 - THE CONTRACTOR WILL GIVE THE ENGINEER SUFFICIENT NOTICE OF TRENCH OPENING TO ALLOW THE ENGINEER TO ARRANGE FOR THE UTILITY COMPANIES TO INSTALL THEIR SERVICE
 - THE CONTRACTOR IS TO ARRANGE CAR
 - ALL LEVELS SHOWN ON THIS PLAN ARE TOP OF KERB UNLESS SHOWN
 - ROAD CARRIAGEWAY WIDTH DIMENSIONS MEASURED FACE OF KERB TO FACE OF KERB
 - ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES

TOTAL CUT = 55040m³
 TOTAL FILL = 61110m³
 VOLUMES ARE SOLID IN PLACE, NO BULKING ALLOWANCE
 VOLUMES ARE TO FINISHED DESIGN SURFACE TIN
 NO ALLOWANCE FOR ADDITIONAL CUT TO SUBGRADE, TRENCHES, SOAKAGE ETC
 NO ALLOWANCE FOR ADDITIONAL FILL TO SUPPORT AND COVER NEW SEWER PIPE
 NO BULKING ALLOWANCE OR COMPACTION FACTOR ALLOWED FOR

FOR CONSTRUCTION

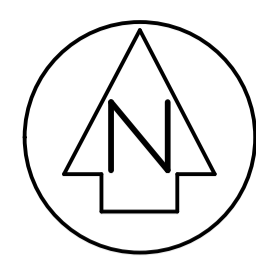
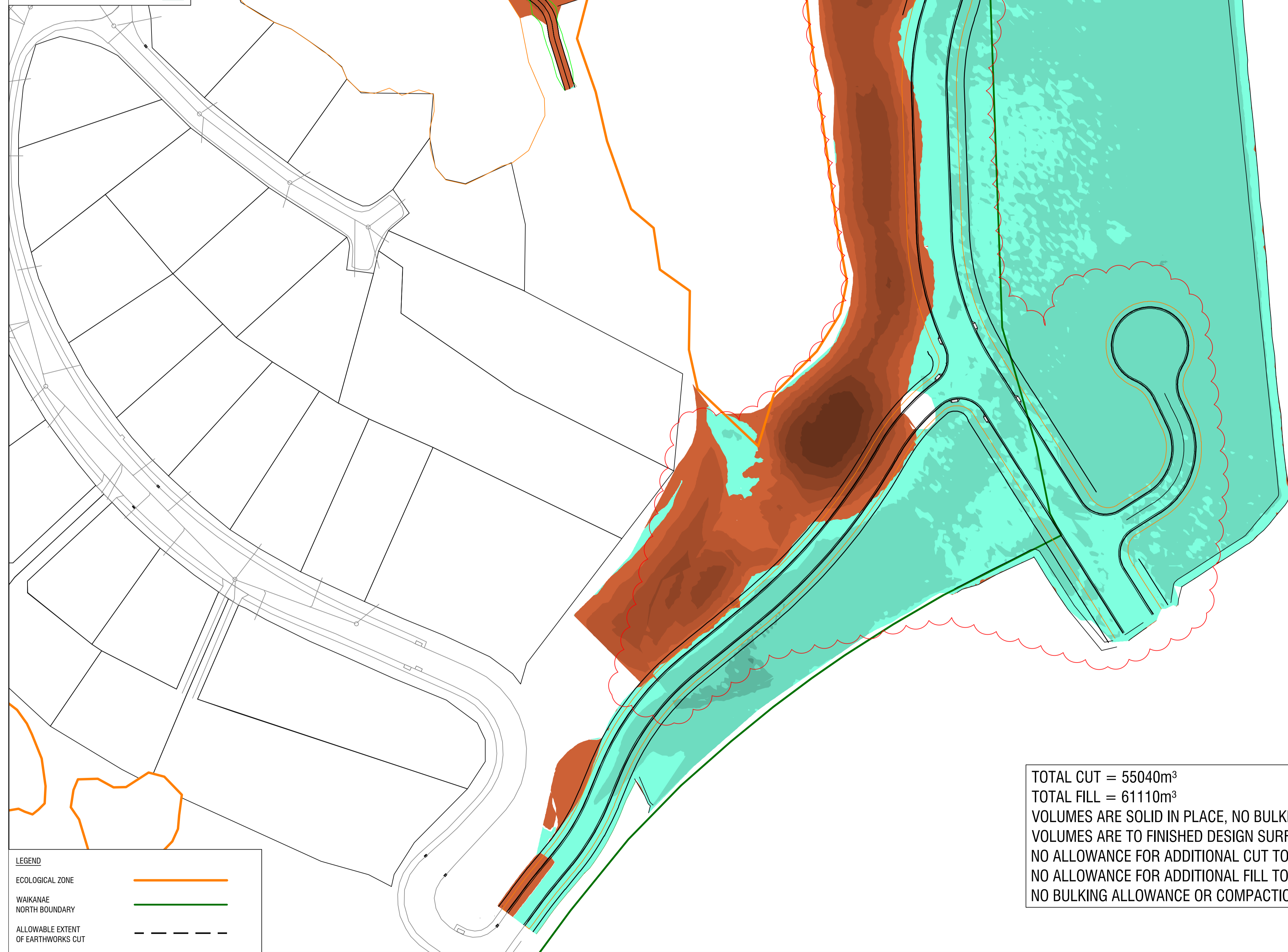
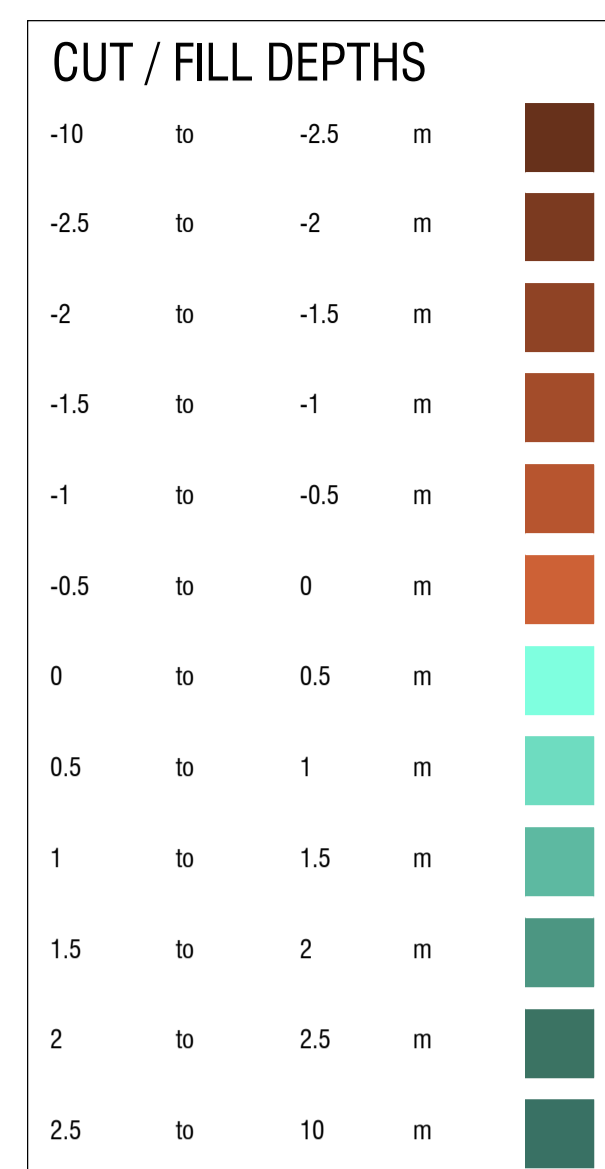
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0 FOR CONSTRUCTION-UPDATES FOLLOWING KDCDC COMMENTS, CHANGES AS CLOUDED	CMB	12/11/21
P FOR CONSTRUCTION - RD 2 RAISED, SWALE ADDED	CMB	23/02/22
P.1 FOR CONSTRUCTION - LOT 58 DIG OUT ADDED	CMB	15/02/22

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PROJECT
MANU PARK STAGE 2 & 2A
WAIPUNAHAU ROAD, WAIKANAЕ NORTH
ENGINEERING PLANS EWP 01

CLIENT
LANDMATTERS LIMITED

SCALE A1 1:1000			REDUCED SCALE A3 - 1:2000		
FIELDWORK	NAME	DATE	DRAWING NUMBER		
DESIGNED	CMB	07/20	22621 ENG		
DRAWN	CMB	07/20	SHEET 4	OF 63	SHEETS
CHECKED	NAJ	07/20	REVISION	P.1	



REVISION DETAILS		NAME	DATE
0	FOR CONSTRUCTION-UPDATES FOLLOWING KCDC COMMENTS, CHANGES AS CLOUDED	CMB	12/11/21
P	FOR CONSTRUCTION - RD 2 RAISED, SWALE ADDED	CMB	23/02/22
P.1	FOR CONSTRUCTION - LOT 58 DIGOUT ADDED	CMB	15/03/22

- NOTES:**
- THIS PLAN IS TO BE USED FOR ENGINEERING PURPOSES ONLY AND NOT TO BE RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE CONSENT OF CUTTRISS CONSULTANTS LIMITED.
 - LEVELS ARE IN TERMS OF MEAN SEA LEVEL WELLINGTON VERTICAL DATUM 1953. ORIGIN=SP8 DP 507721 RL=17.01
 - COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 2000, WANGANUI CIRCUIT
 - SERVICES HAVE BEEN LOCATED ON SITE WHERE POSSIBLE, OTHERWISE SHOWN FROM KCDC, AND SHOULD BE VERIFIED ON SITE. THE CONTRACTOR IS TO CONFIRM LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORKS
 - CONTOUR INTERVALS: 0.5m
 - ALL WORK IS TO BE IN ACCORDANCE WITH GREATER WELLINGTON REGIONAL COUNCILS EROSION AND SEDIMENT CONTROL GUIDELINES FOR THE WELLINGTON REGION
 - ALL WORK IS TO COMPLY WITH NZS 4404:2010 AS AMENDED BY THE KAPITI COAST DISTRICT COUNCIL "SUBDIVISION AND DEVELOPMENT PRINCIPLES AND REQUIREMENTS" AND CUTTRISS CONSULTANTS SPECIFICATIONS
 - ALL WORK TO BE IN ACCORDANCE WITH KCDC COUNCIL CONSENT - REFERENCE NUMBER RM160213. COPIES OF CONSENT TO BE HELD ON SITE.
 - ALL REINSTATEMENT IS TO BE TO KCDC REQUIREMENTS
 - THE CONTRACTOR WILL GIVE THE ENGINEER SUFFICIENT NOTICE OF TRENCH OPENING TO ALLOW THE ENGINEER TO ARRANGE FOR THE UTILITY COMPANIES TO INSTALL THEIR SERVICE
 - THE CONTRACTOR IS TO ARRANGE CAR
 - ALL LEVELS SHOWN ON THIS PLAN ARE TOP OF KERB UNLESS SHOWN
 - ROAD CARRIAGEWAY WIDTH DIMENSIONS MEASURED FACE OF KERB TO FACE OF KERB
 - ALL ELECTRONIC CAD DATA MUST BE READ IN CONJUNCTION WITH THESE NOTES

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CLIENT
LANDMATTERS LIMITED

PROJECT
**MANU PARK STAGE 2 & 2A
 WAIPUNAHAU ROAD
 WAIKANAЕ NORTH**

**ENGINEERING PLANS
 EWP 02**

TOTAL CUT = 55040m³
 TOTAL FILL = 61110m³
 VOLUMES ARE SOLID IN PLACE, NO BULKING ALLOWANCE
 VOLUMES ARE TO FINISHED DESIGN SURFACE TIN
 NO ALLOWANCE FOR ADDITIONAL CUT TO SUBGRADE, TRENCHES, SOAKAGE ETC
 NO ALLOWANCE FOR ADDITIONAL FILL TO SUPPORT AND COVER NEW SEWER PIPE
 NO BULKING ALLOWANCE OR COMPACTION FACTOR ALLOWED FOR

LEGEND

ECOLOGICAL ZONE	
WAIKANAЕ NORTH BOUNDARY	
ALLOWABLE EXTENT OF EARTHWORKS CUT	

SCALE		REDUCED SCALE	
A1	1:600	A3	1:1200
FIELDWORK		DRAWING NUMBER	
DESIGNED	CMB 19/05/21	22621 ENG	
DRAWN	CMB 19/05/21	SHEET 5 OF 64 SHEETS	
CHECKED	NAJ 19/05/21	REVISION P.1	

Appendix B: Ground Investigation Data





CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

1

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

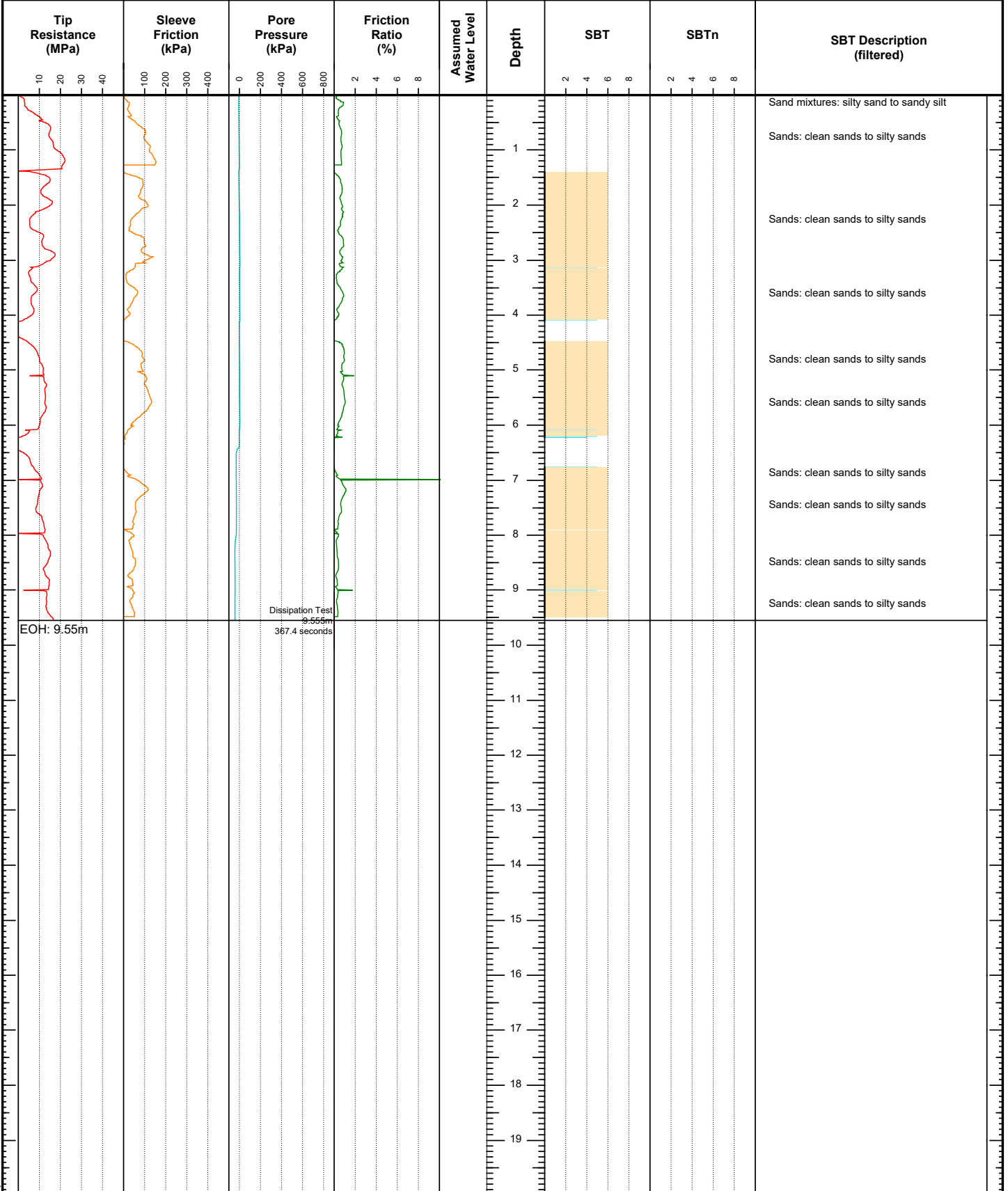
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



Dissipation Test
9.556m
367.4 seconds

EOH: 9.55m

REMARKS:

NOTES:



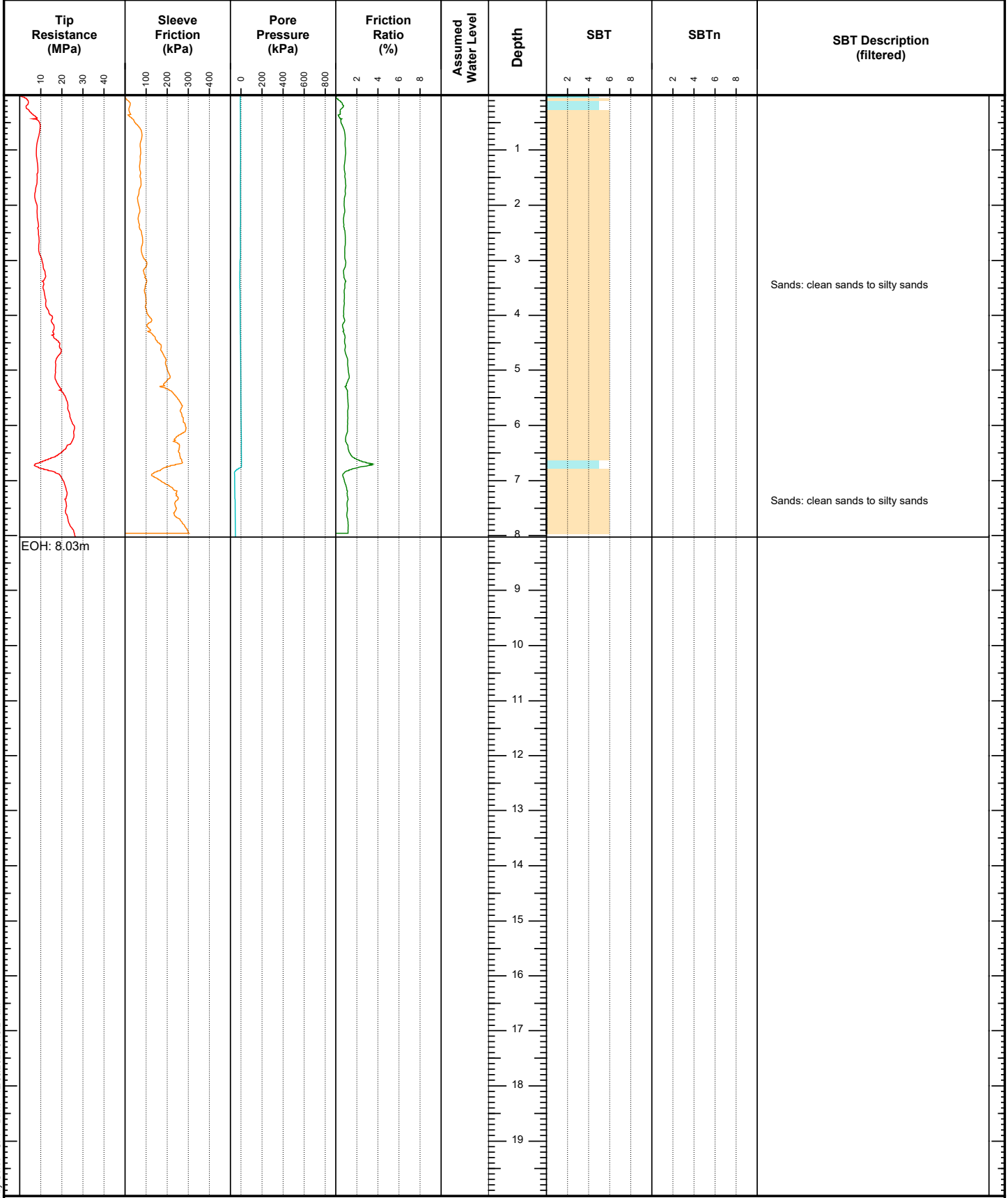
CONE PENETRATION TEST (CPT) LOG

HOLE NO.:
2

CLIENT: Miyamoto International NZ Ltd.
PROJECT: Manu Park, Waikanae
SITE LOCATION: Manu Park, Waikanae
CO-ORDINATES:

CONTRACTOR:
ELEVATION: Ground
START DATE:
END DATE:

JOB NO.:
220907



REMARKS:

NOTES:



CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

3

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

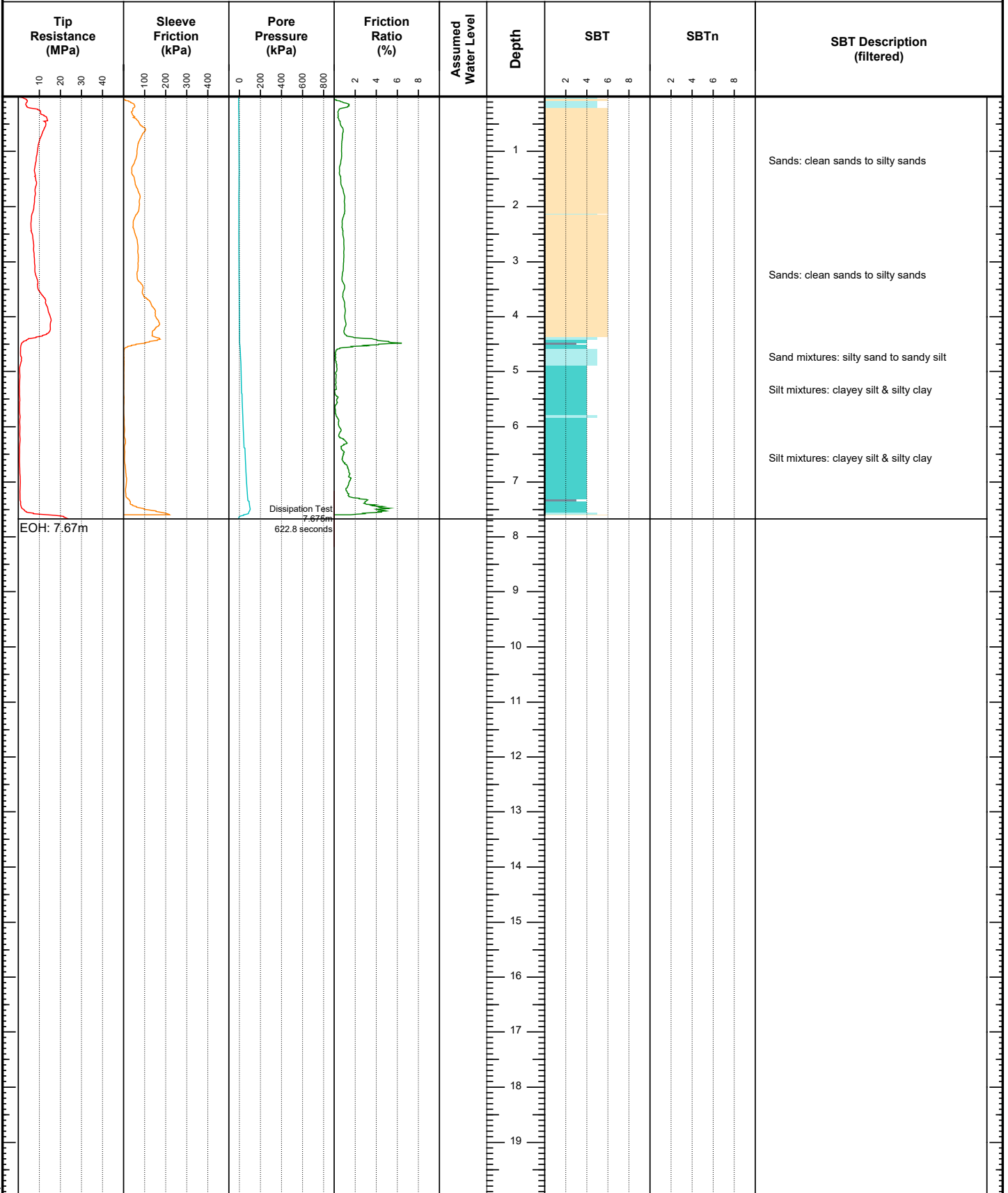
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



EOH: 7.67m

Dissipation Test
7.67m
622.8 seconds

REMARKS:

NOTES:



CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

4

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

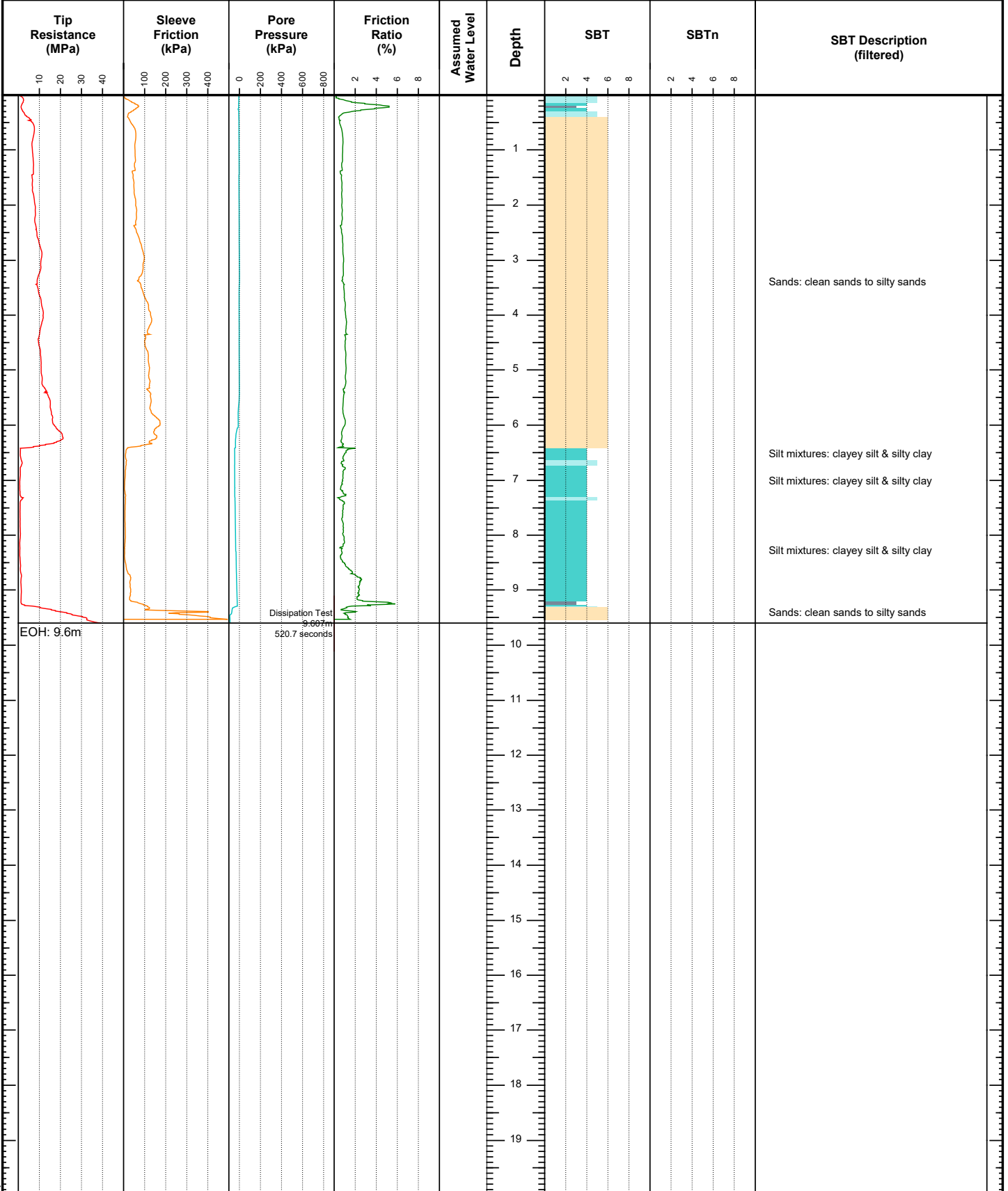
CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:



REMARKS:

NOTES:



CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

5

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:

Tip Resistance (MPa)	Sleeve Friction (kPa)	Pore Pressure (kPa)	Friction Ratio (%)	Assumed Water Level	Depth	SBT	SBTn	SBT Description (filtered)
					0			Sand mixtures: silty sand to sandy silt Sands: clean sands to silty sands Sands: clean sands to silty sands Silt mixtures: clayey silt & silty clay Silt mixtures: clayey silt & silty clay Silt mixtures: clayey silt & silty clay Silt mixtures: clayey silt & silty clay
EOH: 6.41m								
					7			
					8			
					9			
					10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			
					19			

REMARKS:

NOTES:



CONE PENETRATION TEST (CPT) LOG

HOLE NO.:

6

CLIENT: Miyamoto International NZ Ltd.

JOB NO.:

220907

PROJECT: Manu Park, Waikanae

SITE LOCATION: Manu Park, Waikanae

CONTRACTOR:

START DATE:

CO-ORDINATES:

ELEVATION: Ground

END DATE:

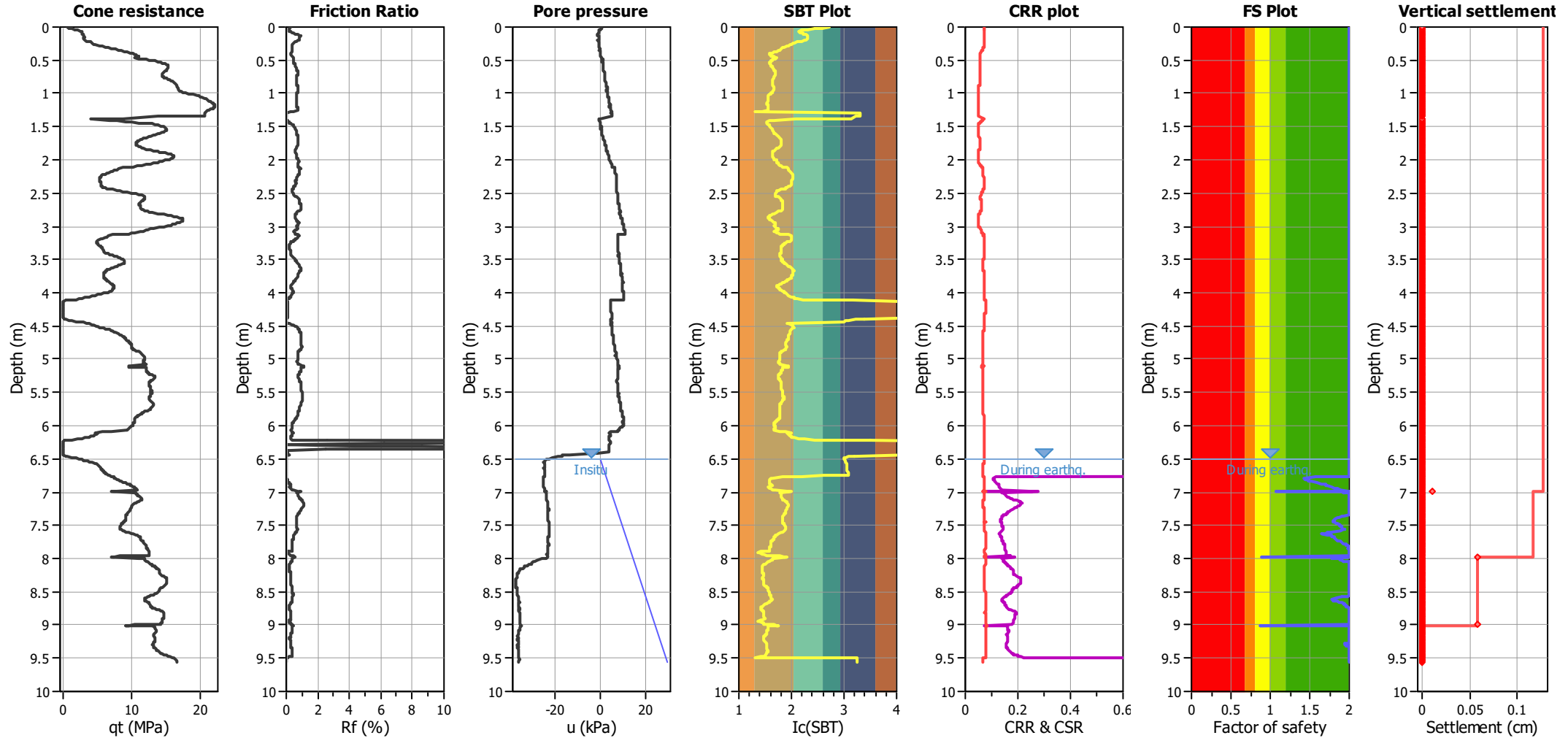
Tip Resistance (MPa)	Sleeve Friction (kPa)	Pore Pressure (kPa)	Friction Ratio (%)	Assumed Water Level	Depth	SBT	SBTn	SBT Description (filtered)
10 20 30 40	100 200 300 400	0 200 400 600 800	2 4 6 8			2 4 6 8	2 4 6 8	
								Sand mixtures: silty sand to sandy silt Sands: clean sands to silty sands Sands: clean sands to silty sands
EOH: 1.03m								
					1			
					2			
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			
					19			

REMARKS:

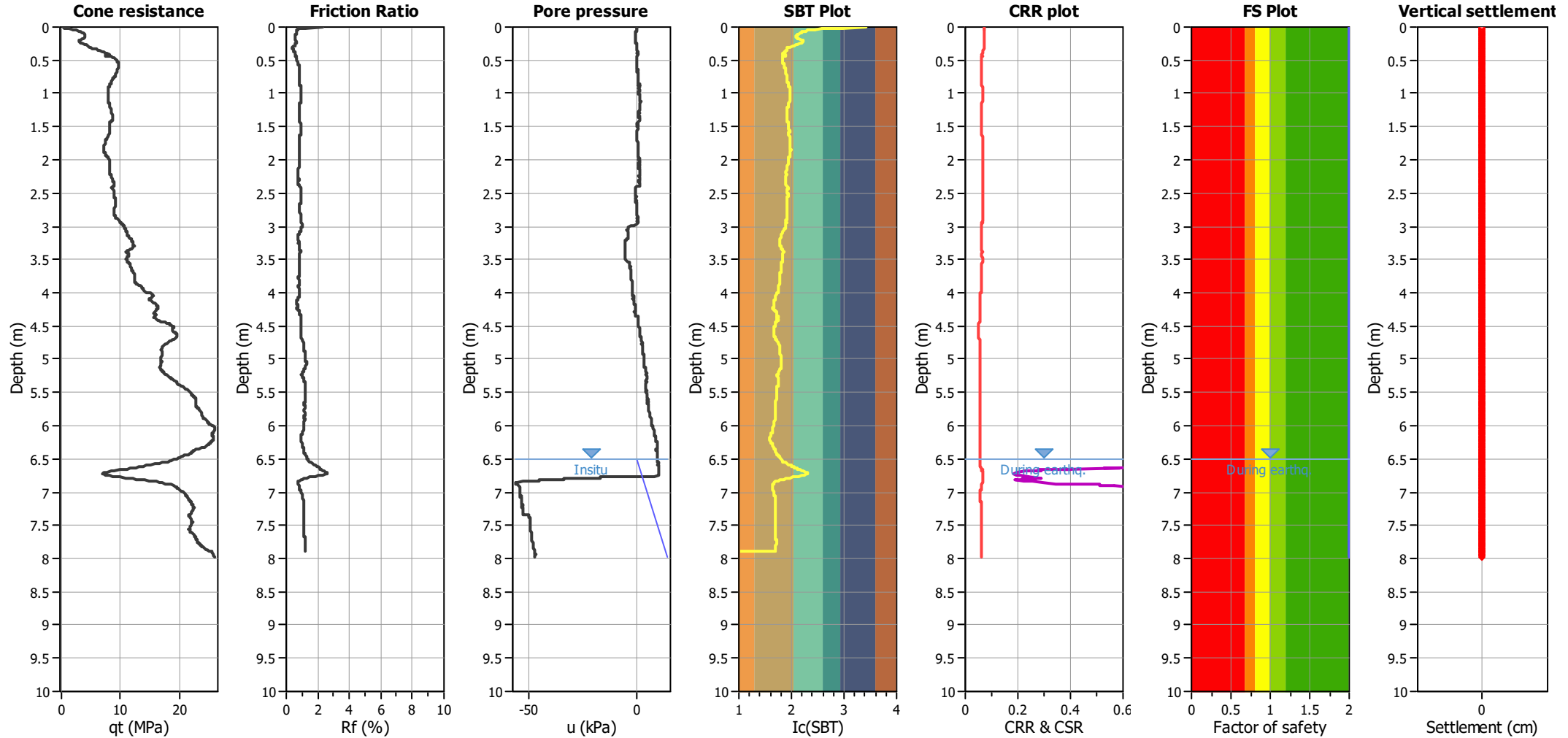
NOTES:

Appendix C: Liquefaction Assessment Results

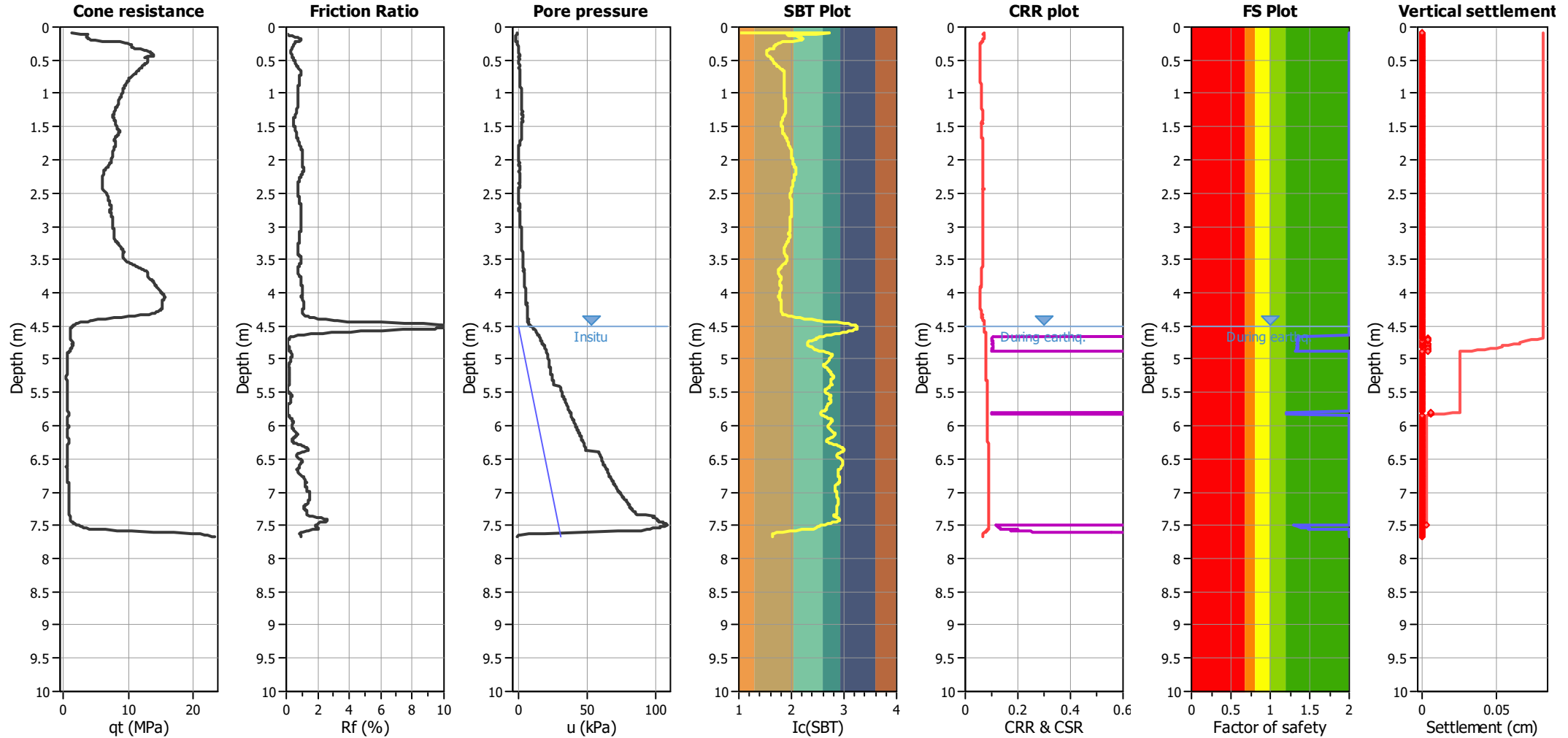




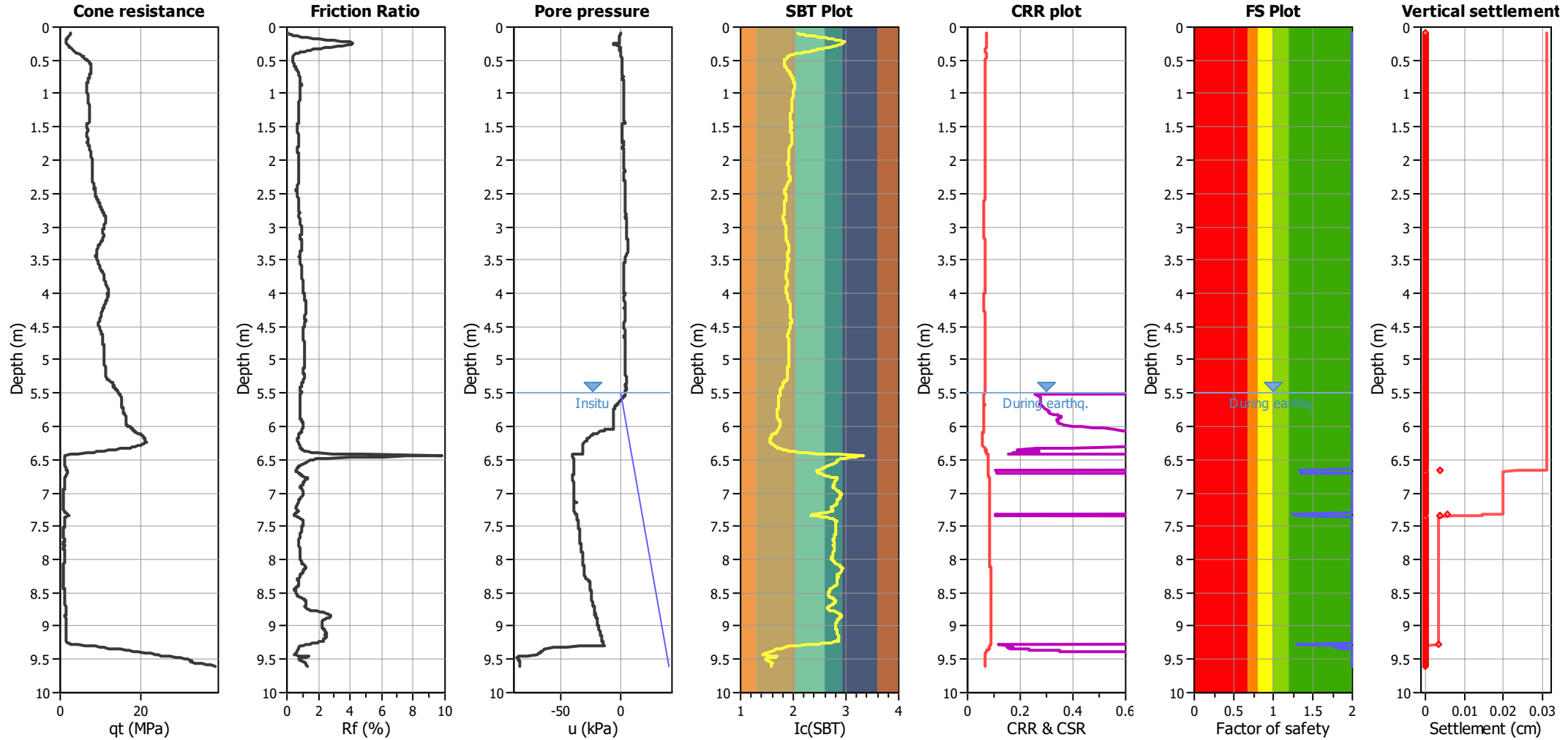
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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



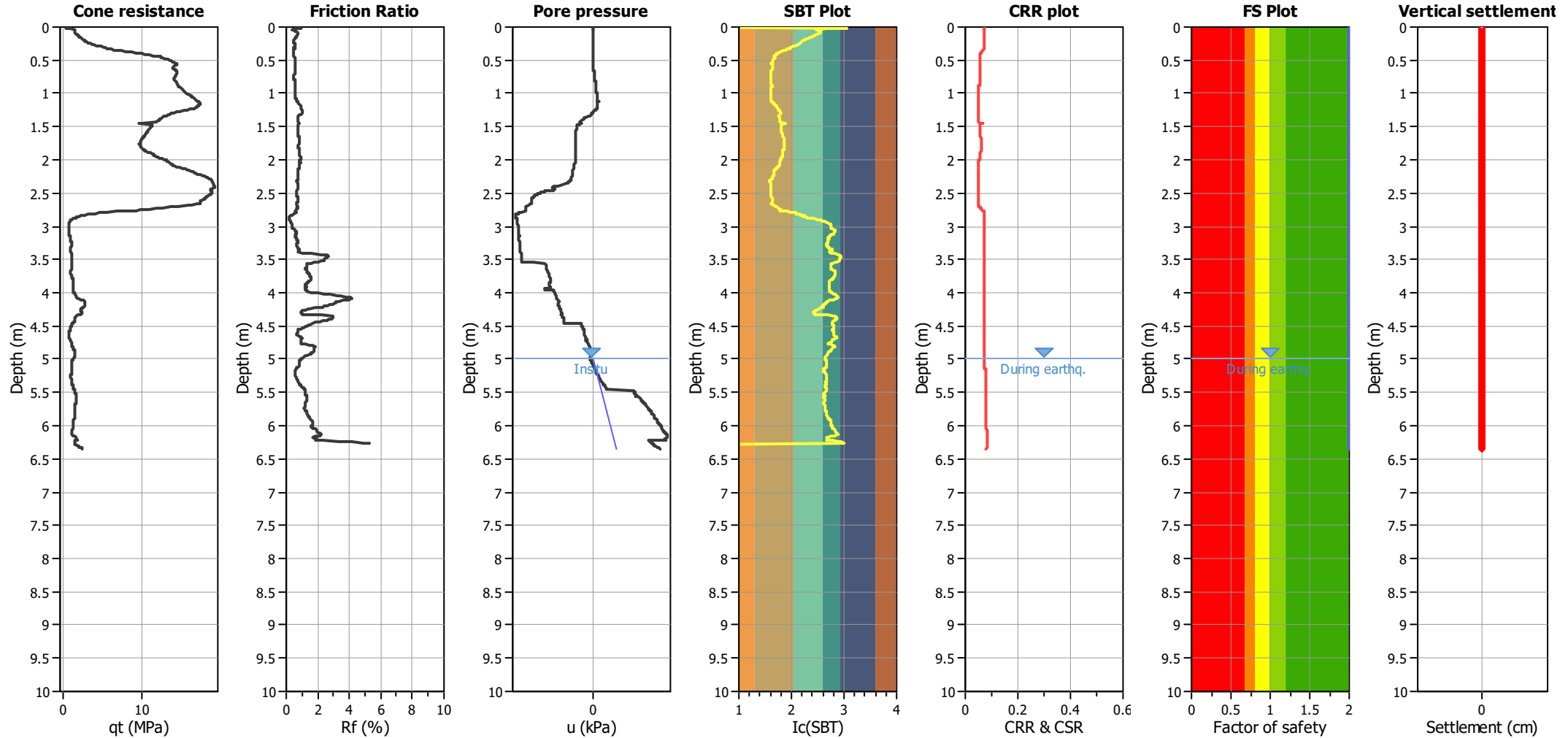
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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



Analysis method:	B&I (2014)	G.W.T. (in-situ):	5.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



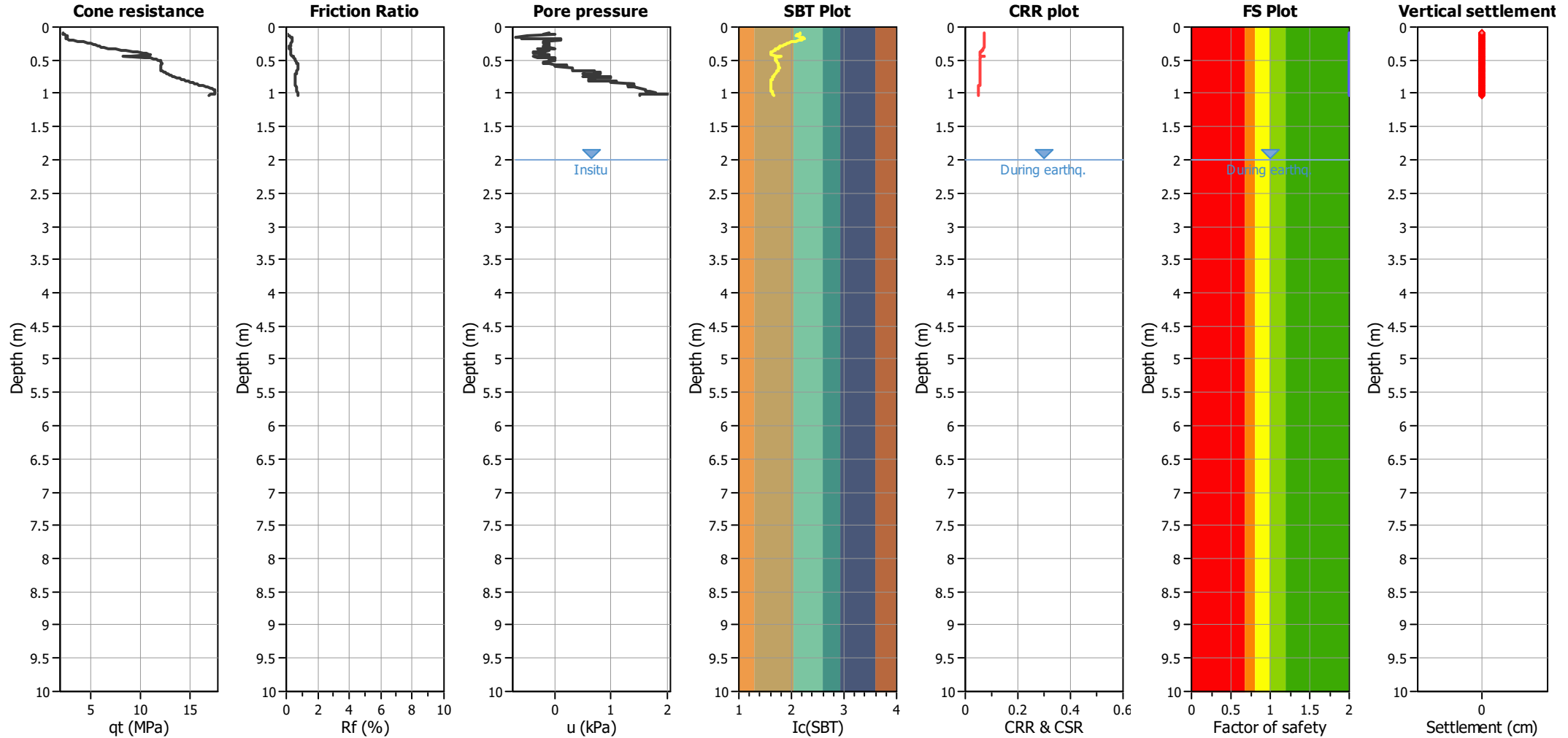
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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

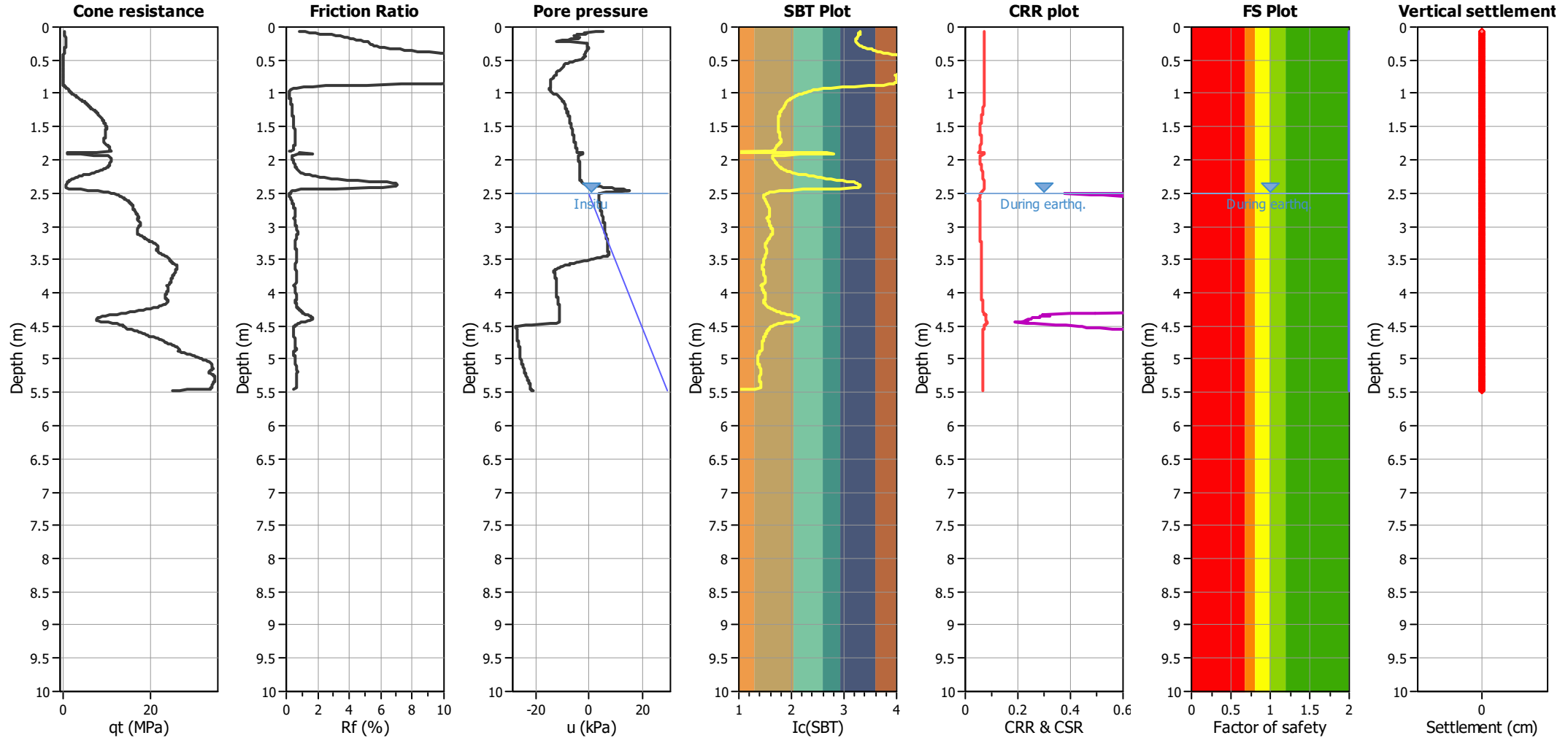
Location:

CPT: S2006 SLS_ISH

Total depth: 1.03 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



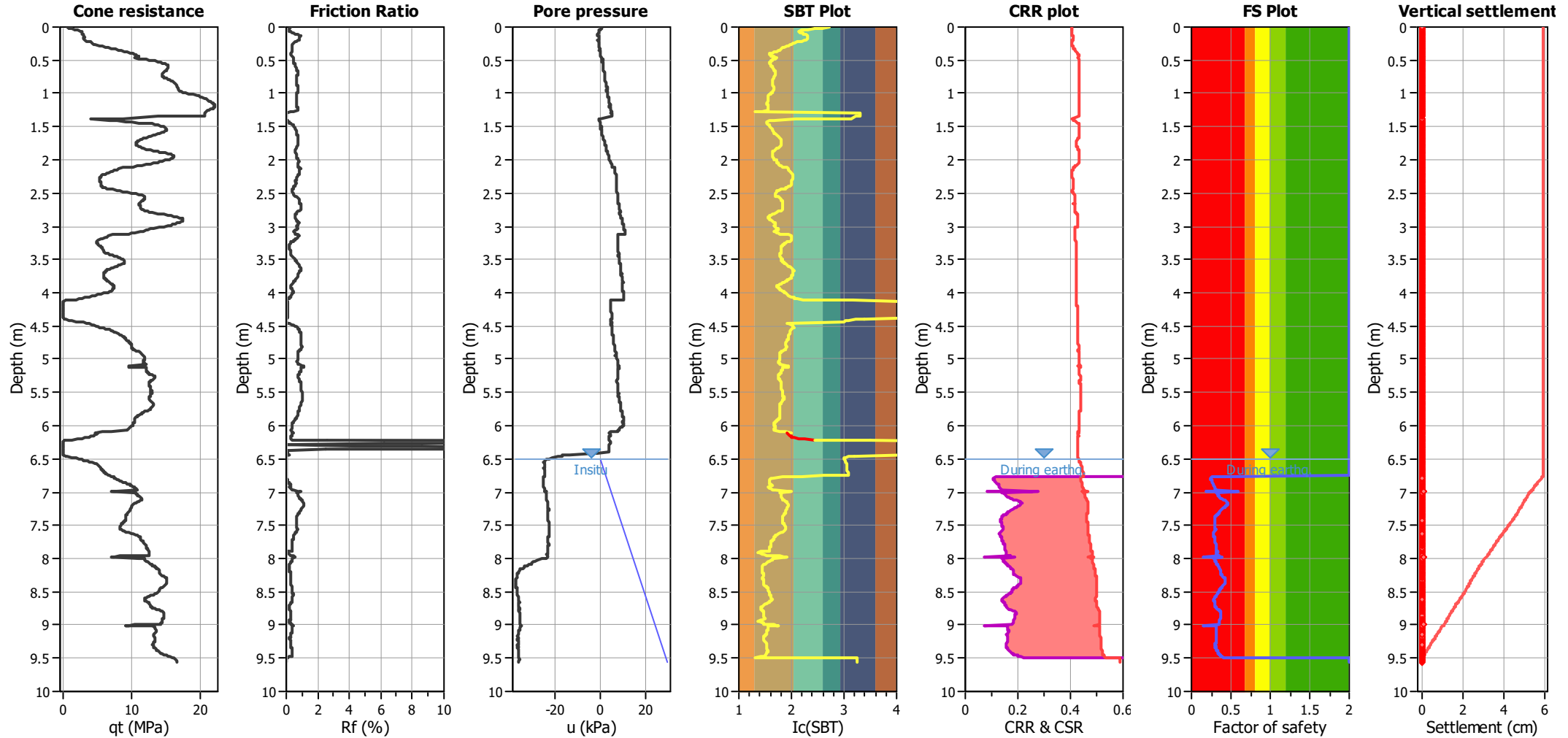
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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

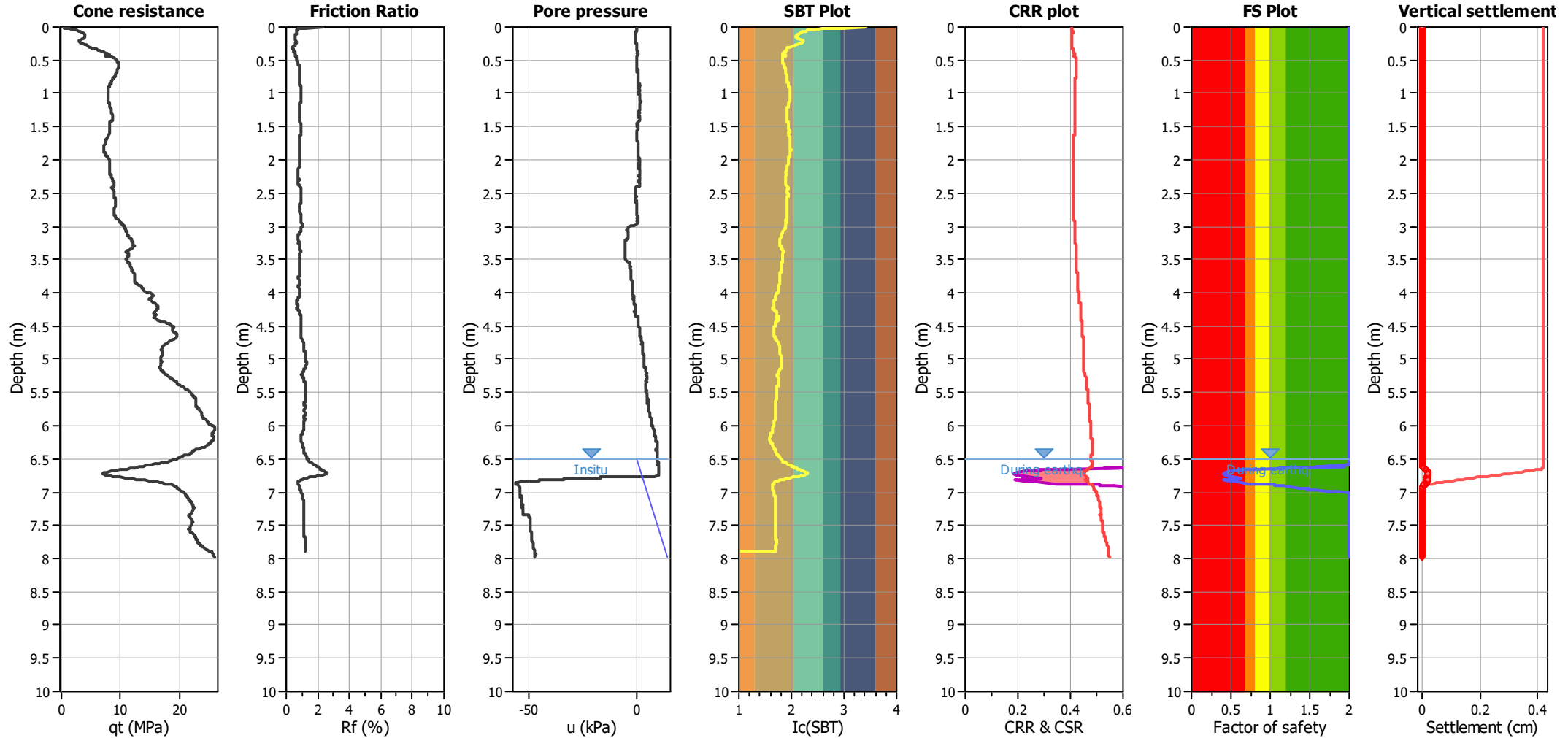
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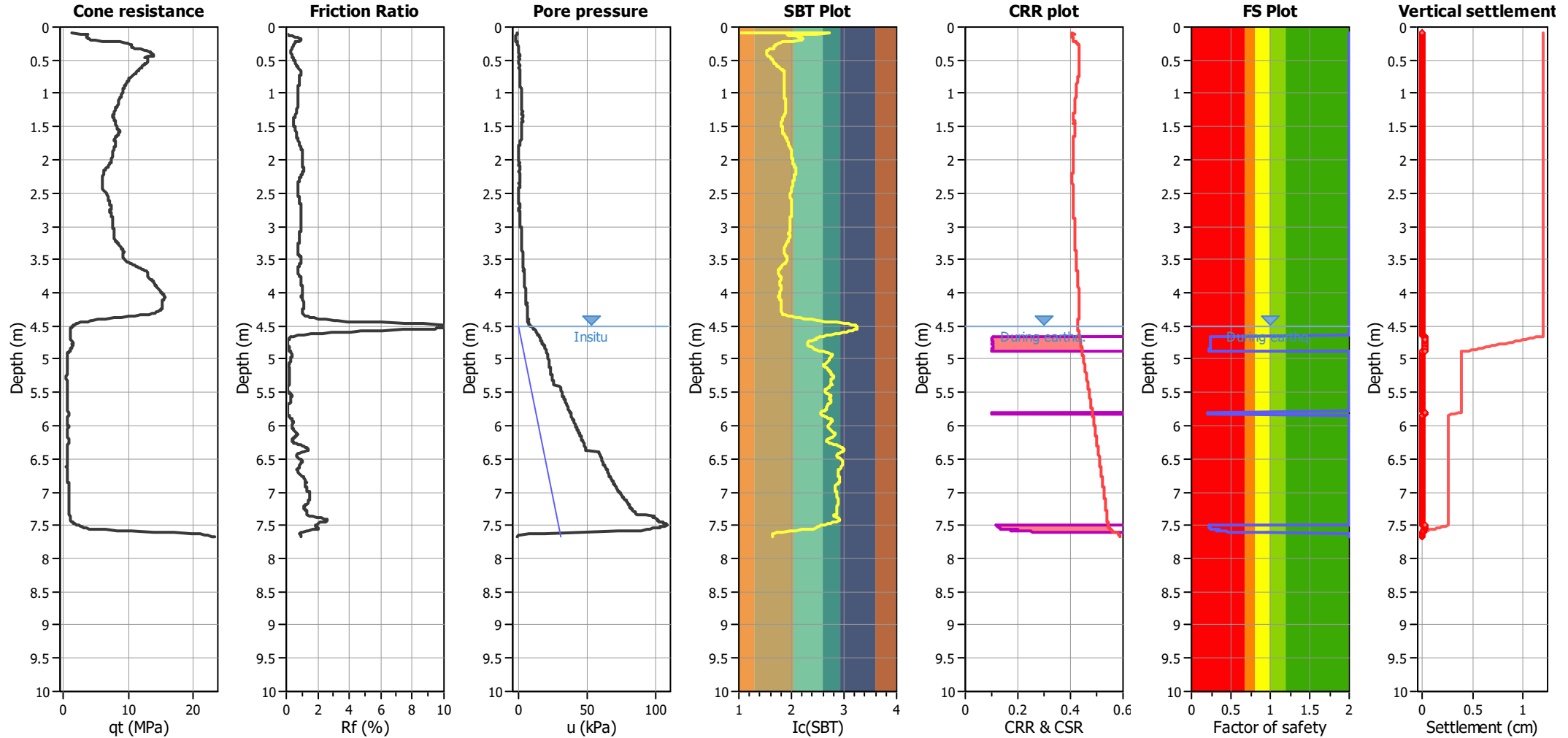
Total depth: 9.55 m



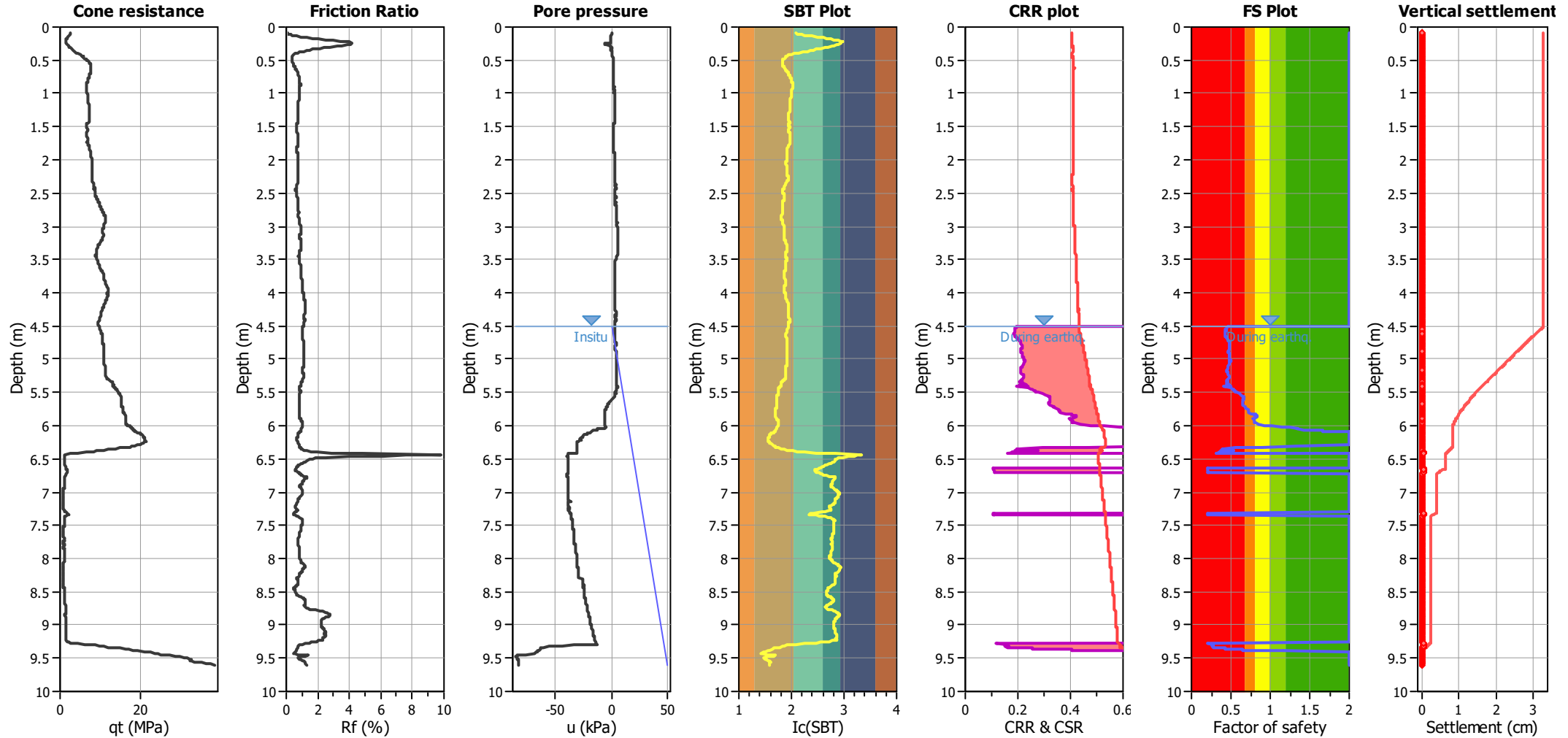
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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



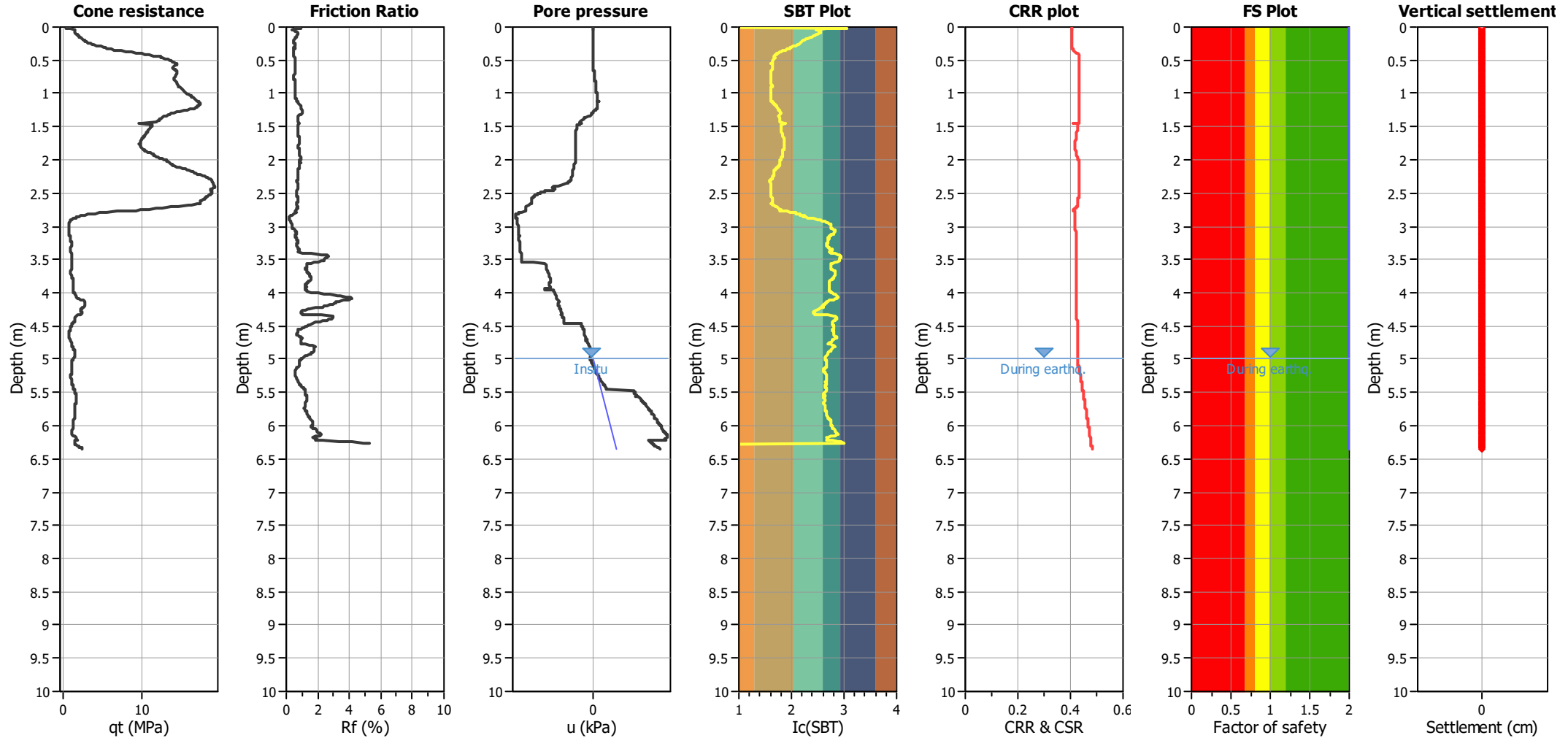
Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

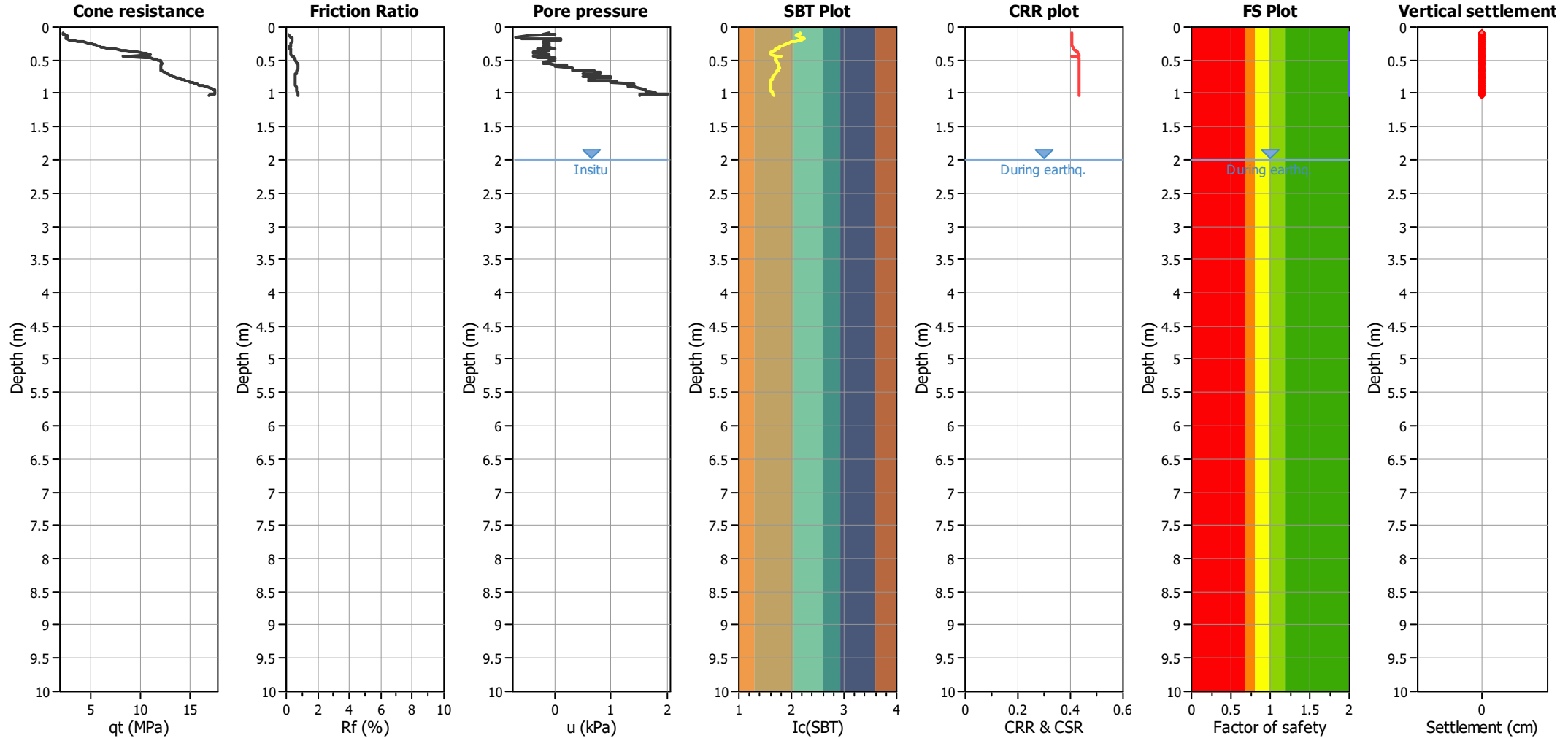
Location:

CPT: S2005 ULS_ISH

Total depth: 6.35 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	5.00 m	Use fill:	No	Clay like behavior
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.00 m	Fill height:	N/A	applied:
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	No
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:
						Method based



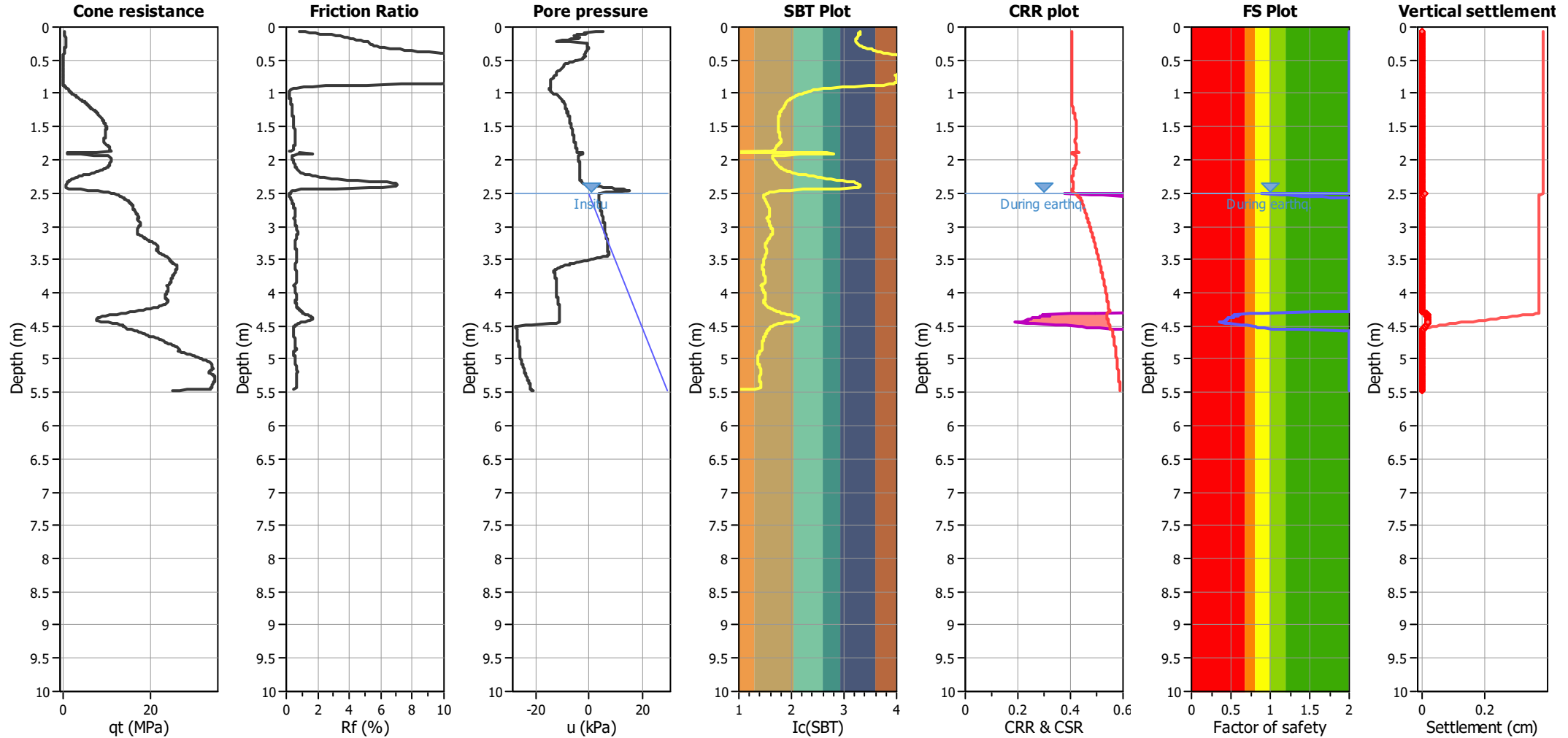
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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S5007 ULS_ISH

Total depth: 5.48 m



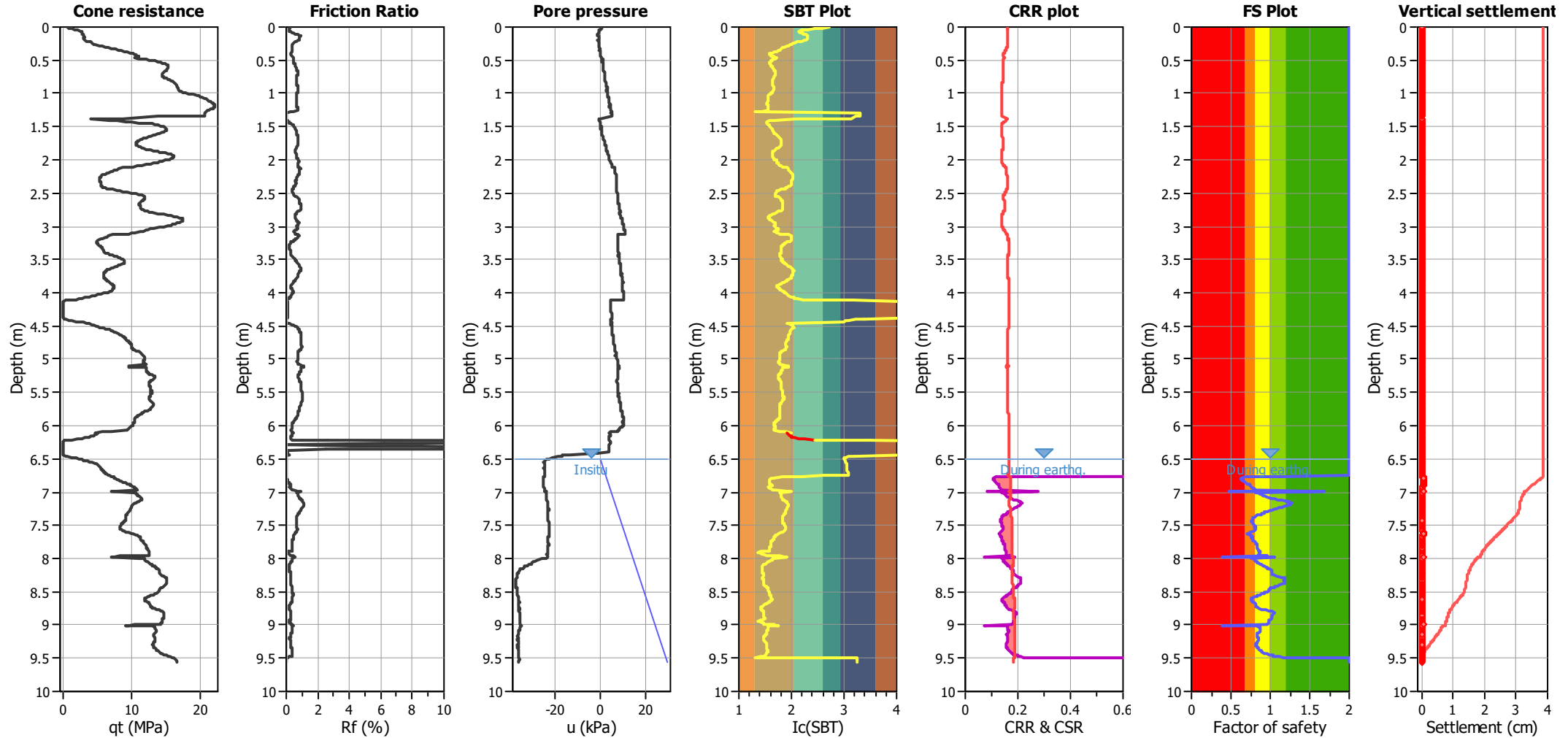
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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.70	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.68	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2001 IE_ISH

Total depth: 9.55 m



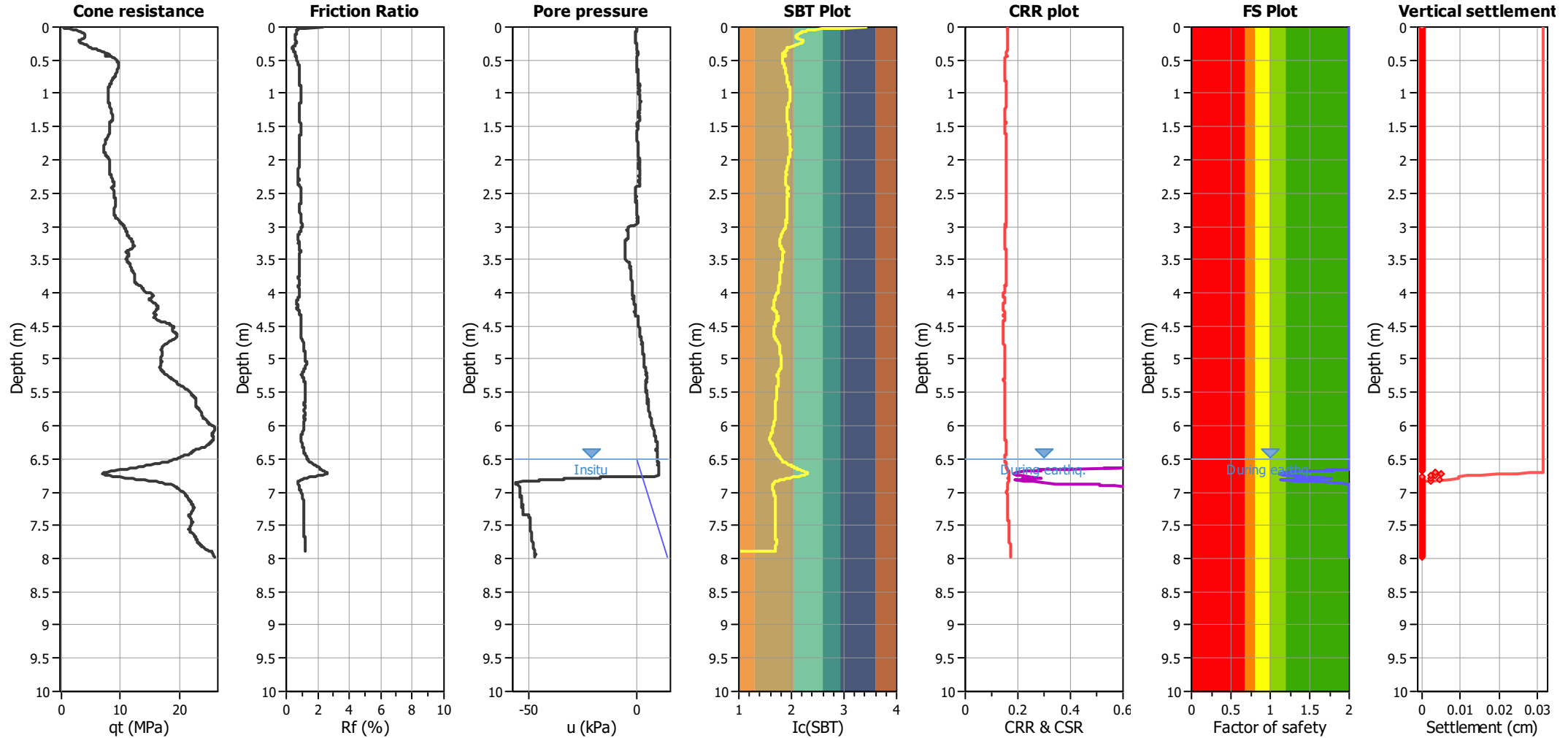
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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2002 IE_ISH

Total depth: 7.97 m



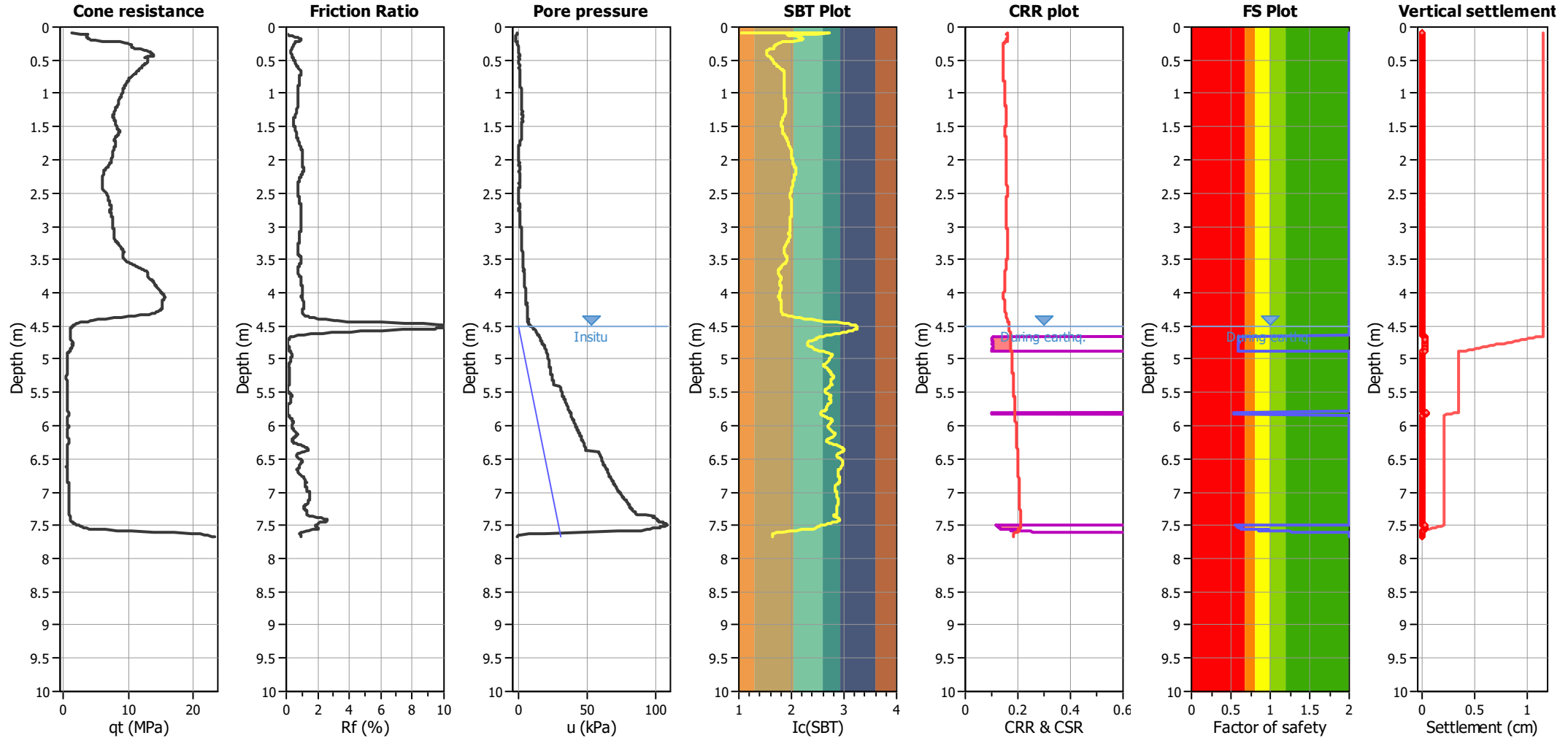
Analysis method:	B&I (2014)	G.W.T. (in-situ):	6.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	6.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

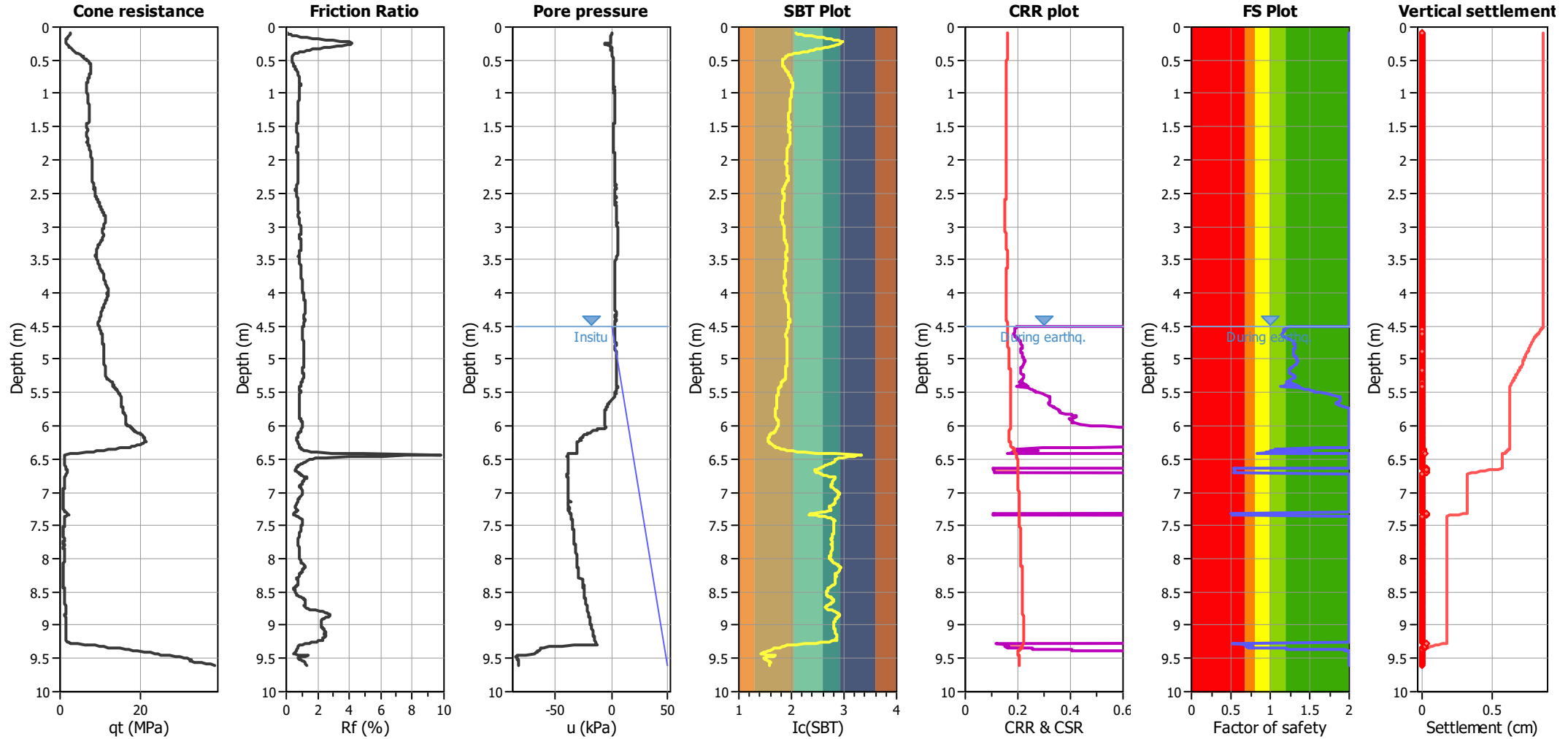
Location:

CPT: S2003 IE_ISH

Total depth: 7.67 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based



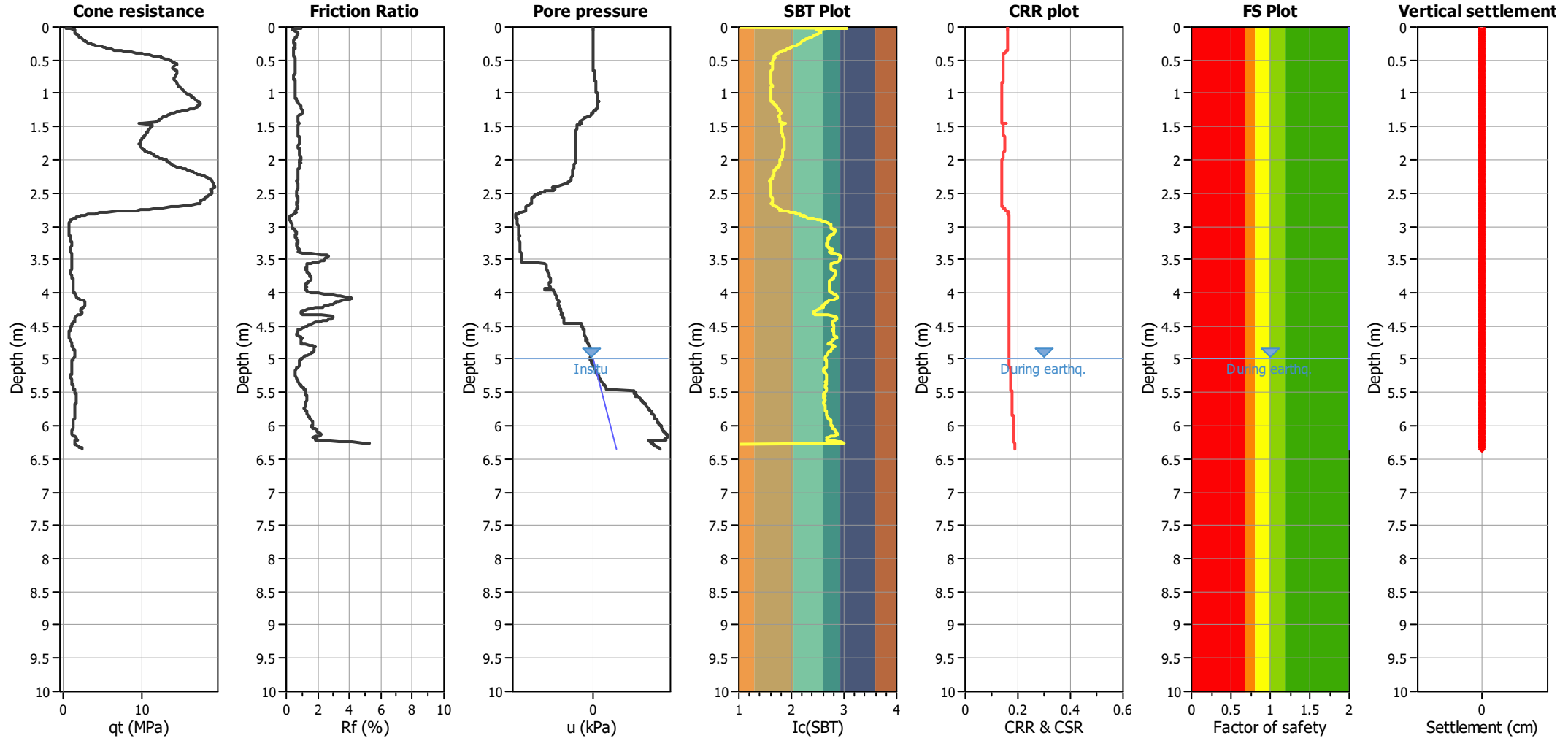
Analysis method:	B&I (2014)	G.W.T. (in-situ):	4.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	4.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2005 IE_ISH

Total depth: 6.35 m



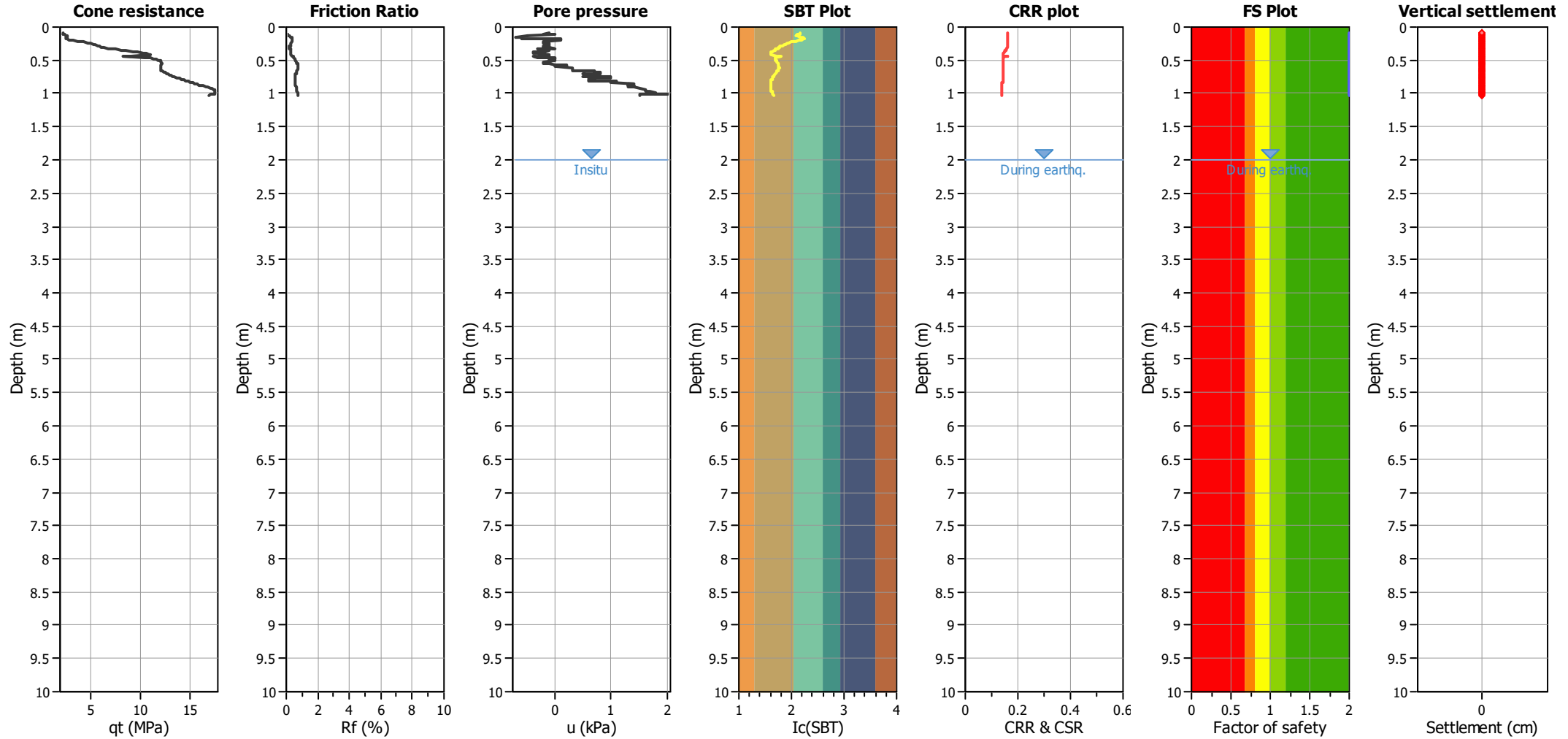
Analysis method:	B&I (2014)	G.W.T. (in-situ):	5.00 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	5.00 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S2006 IE_ISH

Total depth: 1.03 m



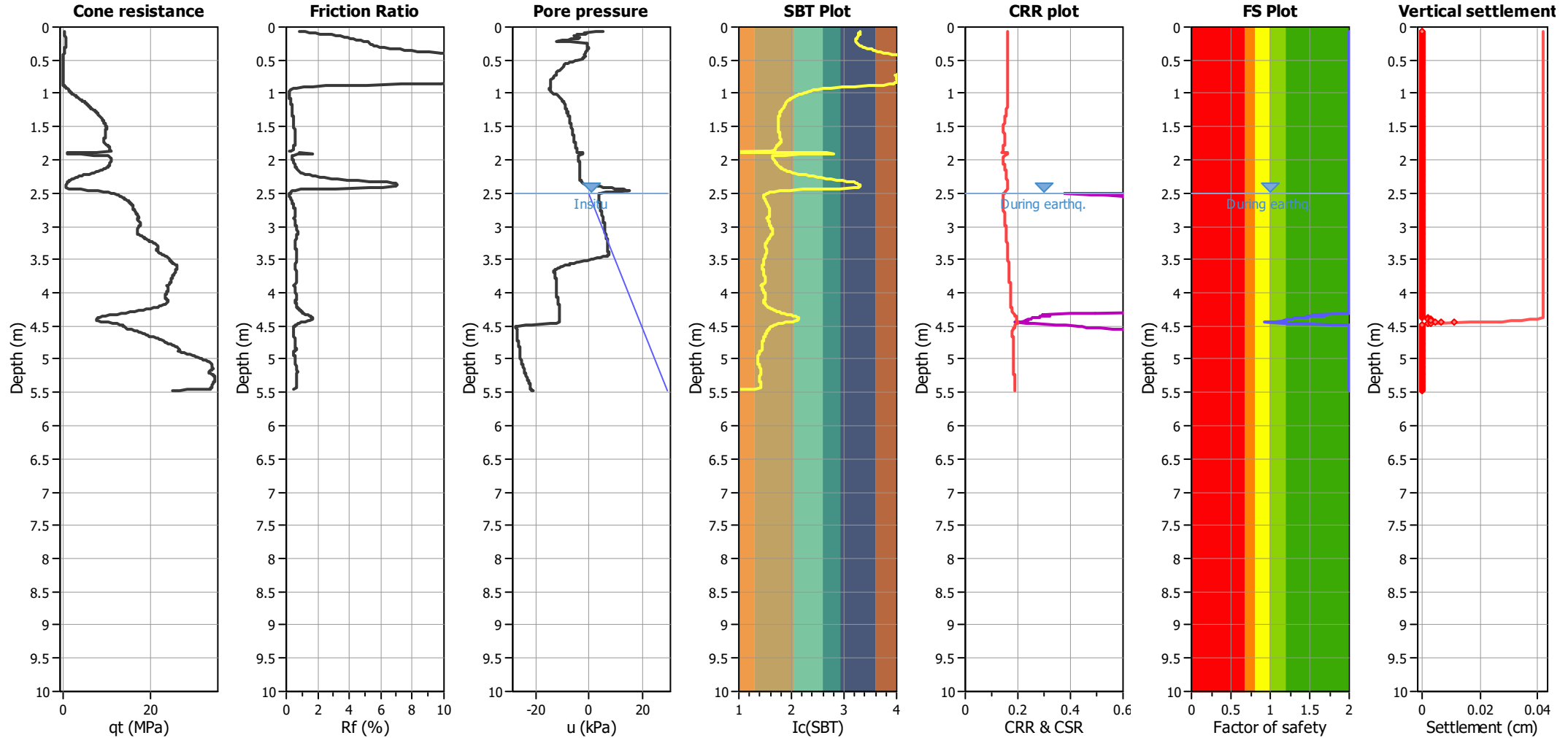
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Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

Project: MINZ210292 | Manu Park - Stage 2

Location:

CPT: S5007 IE_ISH

Total depth: 5.48 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.50 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	7.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.28	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

BRANZ NZS 4218:2009 CALCULATION METHOD TOOL

PROJECT SUMMARY

Project name	Parsons
Address	168 Karuhiruhi Street, Waikanae
Designer	Coastal Architecture Ltd
Address	11 Epiha Street, Paraparaumu
Phone	272499519
Date	16/02/2023
Reference number	

Climate zone	2: Rest of North Island not in zones 1 or 3	
Wall construction type	1: Any wall type	
If mixed wall types	0	Percentage of wall area solid timber construction
	0	Percentage of wall area high thermal mass construction
	100	Percentage of wall area "Any wall type"
If solid timber wall	1: External 75 mm thick solid timber and timber framed internal walls	
Is there just one wall construction R-value (R_{Wall}) and one door (R_{Door}) construction R-value (but different to the walls) for the building?	no	

Summary of calculation method heat loss

Element	Area (m ²)	Proposed building heat loss (W/°C)	Reference building heat loss (W/°C)
Roofs/ceilings	145.0	36.1	50.0
Walls	133.0	59.5	70.0
Floors	183.0	80.3	140.8
Vertical glazing	34.5	132.7	193.3
Skylights	0.0	0.0	-
Doors (Attributable)	0.0	0.0	-
Total		308.5	454.0 W/°C

Glazing percentage: 21%
Glazing <50%: Yes
Minimum R-values OK: Yes
Issues to check:

230147
Received by
Kapiti Coast District Council
06/03/23

PASS/FAIL

PASS

BRANZ NZS 4218:2009 CALCULATION METHOD TOOL

BUILDING ELEMENTS

Roofs/ceilings: Skylights are not included here. Enter them in the skylights table below.

Roof/ceiling element	Description	Area (m ²)	Construction R-value	Heat loss
1	Pressed Metal Tile roofing	145	4.29	33.8
2				
3				
4				
5				
Total area		145.0 m ²		

Total roofs/ceilings heat loss W/°C

Skylights: Skylights are at an angle of 60° or less to the horizontal. If the skylight R-value is not known, use a value of 0.15.

Skylight	Description	Area (m ²)	Construction R-value	Heat loss
1				
2				
3				
4				
From Skylight Schedule		0.0		0.0
Total area		0.0 m ²		

Total skylight heat loss W/°C

Walls: Doors are not included here. Enter them in the door table.

Each wall area is the total wall area less the glazing and door area for that wall

Wall element	Description	Area (m ²)	Construction R-value	Heat loss
1	Timber Bevelback weatherboard on cavity	27.0	2.38	11.3
2	70 Series Brick Veneer	106.0	2.34	45.3
3				
4				
5				
6				
7				
8				
9				
10				
Total area		133.0 m ²		

Total wall heat loss W/°C

Floors: Only include the ground or exterior floors. Intermediate floors not exposed to the exterior are excluded.

H1/AS1 is not perm

Floor element	Description	Area (m ²)	Construction R-value	Heat loss
1	Rib-Raft slab	183.0	2.28	80.3
2				
3				
4				
5				
Total area		183.0 m ²		

Floor heat loss W/°C

Vertical glazing: Vertical glazing only (steeper than 60°), including glazing in doors. Skylights are on the Skylight table.

If the glazing R-value is not known, use a value of 0.15

Glazing element	Description	Area (m ²)	Construction R-value	Heat loss
1	Double Glazing	34.5	0.26	132.7
2				
3				
4				
5				
6				
7				
8				
9				
10				
From Glazing Schedule		0.0		0.0
Total area		34.5 m ²		

Total vertical glazing heat loss W/°C

Doors: Only the non-glazed area of doors is included. The glazed area of doors must be entered in the Glazing table.

The heat loss of doors is automatically set to 0 if the total door area is ≤ 6m² or 6% of the total wall area.

If the area of doors are above 6m² or 6% of the total wall area then the marginal heat loss needs to be considered.

If the insulation values of the walls are different or the insulation value of the doors are different then

the assignable heat loss due to doors can not be calculated using this tool.

If the R-value of a door is not entered a default value of R 0.18 is automatically used.

Door element	Description	Area (m ²)	Construction R-value	Heat loss
1				0.0
2				0.0
3				0.0
4				0.0
5				0.0
From Door Schedule		0.0		0.0
Total area		0.0 m ²		

10.05

Attributable 0.0

W/°C



Construction R-value Calculator

This webpage calculates the R-value of walls, roofs and suspended floors for most insulation material R-values. It uses the "isothermal planes" method, the same method as used in NZS4214:2006.

I have recently implemented some changes to the way assemblies with multiple adjacent insulation layers such as truss roofs with a second layer of insulation are calculated. Check out the details [here](#).

Some of the possible material combinations may not be suitable for actual constructions, i.e. EPS based claddings directly fixed on timber framing. Please make sure to select only appropriate material combinations.

If your construction is not listed, please send an e-mail to designnavigator@gmail.com with a description and a detail drawing (pdf) of it.

Please select the element type. Then choose the construction details and enter the R-value of the insulation either directly in the text box or by choosing a product from the right panel [\[i\]](#).

- Floors
- Walls
- Roofs

230147
Received by
Kapiti Coast District Council
06/03/23

Date: 16/02/2023

Element Name (optional)	4.29 m ² C/W
Type: Roof: Timber framed truss Roof, direct fixed or battened flat Ceiling ▼	
Timber framed truss Roof, direct fixed or battened flat Ceiling view detail	
external surface 0.03	
Roofing : generic - Metal Tiles with building paper ▼ <i>R-value: 0.01</i>	
Insulation : <input style="width: 50px;" type="text"/>	
Timber Frame & Cavity :	
90mm rafters or joists @ 900mm, battens covered with insulation ▼	
<small>Roof Frame Area: 5.0%</small>	<small>Cavity Area: 95.0%</small>
Roof space (still air) 0.11	Roof space (still air) 0.11
Framing : <i>R-value: 0.75</i>	Pink®Batts® Ultra R5.0 Ceiling 5
Roof Lining : generic - gypsum Plasterboard 13mm ▼ <i>R-value: 0.06</i>	
internal surface 0.09	
Non-IC-rated recessed downlights	
Ceiling Area [m ²]: <input style="width: 50px;" type="text"/>	Number of downlights: <input style="width: 50px;" type="text"/>
Clearance from lamp holder side [m]: <input style="width: 50px;" type="text"/>	[i]

Print Page





Construction R-value Calculator

This webpage calculates the R-value of walls, roofs and suspended floors for most insulation material R-values. It uses the "isothermal planes" method, the same method as used in NZS4214:2006.

I have recently implemented some changes to the way assemblies with multiple adjacent insulation layers such as truss roofs with a second layer of insulation are calculated. Check out the details [here](#).

Some of the possible material combinations may not be suitable for actual constructions, i.e. EPS based claddings directly fixed on timber framing. Please make sure to select only appropriate material combinations.

If your construction is not listed, please send an e-mail to designnavigator@gmail.com with a description and a detail drawing (pdf) of it.

Please select the element type. Then choose the construction details and enter the R-value of the insulation either directly in the text box or by choosing a product from the right panel [i](#).

- Floors
- Walls
- Roofs

Date: 16/02/2023

<input type="text" value="Element Name (optional)"/>	2.38 m ² °C/W
Type: <input type="text" value="Wall: Timber Frame with vented Cavity"/>	
Timber Frame with vented Cavity <input type="button" value="view detail"/>	
external surface 0.03	
Cladding : <input type="text" value="generic - Weatherboard Bevelled"/>	
<i>R-value: 0.14</i>	
Air Barrier : <input type="text" value="generic - Plywood 7.5mm"/>	
<i>R-value: 0.06</i>	
Timber Frame & Cavity : <input type="text" value="90mm, studs @ 600mm, dwangs @ 800mm"/>	
<i>Wall Frame Area: 14.4%</i> <i>Cavity Area: 85.6%</i>	
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08	15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08
Framing : <i>R-value: 0.75</i>	Pink@Batts@ Ultra R2.6 Wall <input type="text" value="2.6"/>
still Airgap: <input type="text" value="20-90mm airgap (non-reflective)"/>	
<i>R-value: 0.16</i>	
Wall Lining : <input type="text" value="generic - gypsum Plasterboard 10mm"/>	
<i>R-value: 0.04</i>	
internal surface 0.09	





Construction R-value Calculator

This webpage calculates the R-value of walls, roofs and suspended floors for most insulation material R-values. It uses the "isothermal planes" method, the same method as used in NZS4214:2006.

I have recently implemented some changes to the way assemblies with multiple adjacent insulation layers such as truss roofs with a second layer of insulation are calculated. Check out the details [here](#).

Some of the possible material combinations may not be suitable for actual constructions, i.e. EPS based claddings directly fixed on timber framing. Please make sure to select only appropriate material combinations.

If your construction is not listed, please send an e-mail to designnavigator@gmail.com with a description and a detail drawing (pdf) of it.

Please select the element type. Then choose the construction details and enter the R-value of the insulation either directly in the text box or by choosing a product from the right panel [i](#).

- Floors
- Walls
- Roofs

Date: 16/02/2023

Element Name (optional)	2.34 m ² °C/W
Type: Wall: Timber Frame with vented Cavity ▼	
Timber Frame with vented Cavity view detail	
external surface 0.03	
Cladding : generic - Brick 70mm ▼	<i>R-value: 0.06</i>
Air Barrier : generic - Plywood 7.5mm ▼	<i>R-value: 0.06</i>
Timber Frame & Cavity : 90mm, studs @ 600mm, dwangs @ 800mm ▼	
<small>Wall Frame Area: 14.4%</small>	<small>Cavity Area: 85.6%</small>
15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08	15-90mm vented cavity (all R-values on ext. side of cavity will be halved), R: 0.08
Framing : <i>R-value: 0.75</i>	Pink@Batts@ Ultra R2.6 Wall 2.6
	still Airgap: 20-90mm airgap (non-reflective) ▼
	<i>R-value: 0.16</i>
Wall Lining : generic - gypsum Plasterboard 10mm ▼	
	<i>R-value: 0.04</i>
internal surface 0.09	

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BRANZ Appraised

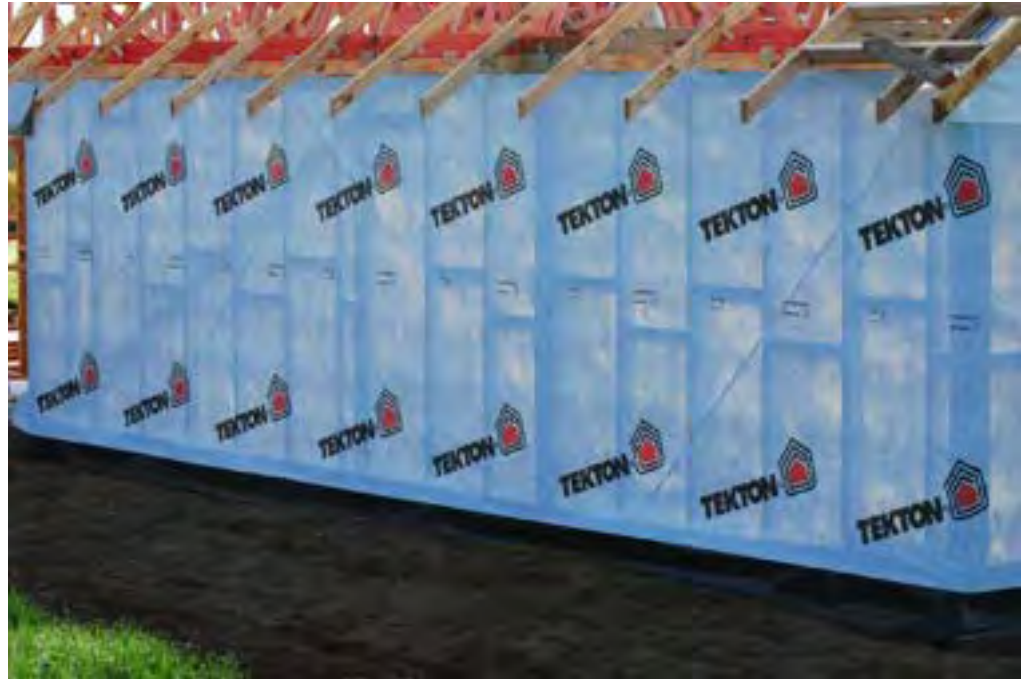
Appraisal No. 548 [2019]

TEKTON® BUILDING WRAP

Appraisal No. 548 [2019]

This Appraisal replaces BRANZ Appraisal No. 548 [2013]

Amended 04 August 2021



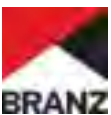
BRANZ Appraisals

Technical Assessments of products for building and construction.



Marshall Innovations Limited

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BRANZ

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Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz



Product

- 1.1 Tekton® Building Wrap is a synthetic breather-type flexible wall underlay and air barrier for use under direct and non-direct fixed wall cladding on timber and steel-framed buildings. The product is manufactured of a coated spun-bonded polypropylene.

Scope

- 2.1 Tekton® Building Wrap has been appraised for use as a flexible wall underlay on timber-framed buildings within the following scope:
- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
 - with absorbent wall claddings directly fixed to framing; and,
 - with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
 - with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1; and,
 - situated in NZS 3604 Wind Zones up to, and including, Very High.
- 2.2 Tekton® Building Wrap has been appraised for use as a flexible wall underlay on steel-framed buildings within the following scope:
- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
 - with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
 - with masonry veneer subject to specific design; and,
 - situated in NZS 3604 Wind Zones up to, and including, Very High.
- 2.3 Tekton® Building Wrap has been appraised for use as a flexible wall underlay over rigid wall underlays on timber and steel-framed buildings within the following scope:
- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
 - with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
 - with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1 for timber-framed buildings or specific design for steel-framed buildings; and,
 - situated in NZS 3604 Wind Zones up to, and including, Extra High.
- 2.4 Tekton® Building Wrap has also been appraised for use on buildings subject to specific weathertightness design. Building designers are responsible for the building design and for the incorporation of Tekton® Building Wrap into their design in accordance with the declared properties and the instructions of Marshall Innovations Limited.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Tekton® Building Wrap, if used, designed, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet, or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years, B2.3.1 (b) 15 years and B2.3.2. Tekton® Building Wrap meets these requirements. See Paragraphs 9.1 and 9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the cladding system, Tekton® Building Wrap will contribute to meeting this requirement. See Paragraphs 12.1–12.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Tekton® Building Wrap meets this requirement.

Technical Specification

4.1 Tekton® Building Wrap is a 100 g/m² light grey sheet polypropylene membrane material approximately 0.6 mm thick.

4.2 The product is supplied in rolls 1.37 m x 37 m and 2.743 m x 37 m. The product is printed with the Tekton® logo repeated along the length of the roll. The rolls are wrapped with an instruction sticker.

Accessories

4.3 Accessories used with Tekton® Building Wrap which are supplied by the installer are:

- **Fixings** – staples, clouts, screws or proprietary wrap fixings, or other temporary fixings to attach the wall wrap to the framing.
- **Wall underlay support** – polypropylene strap, 75 mm galvanised mesh or galvanised wire, or vertical cavity battens where required to support the wall wrap in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

Handling and Storage

5.1 Handling and storage of the product, whether on-site or off-site, is under the control of the installer. The rolls must be protected from damage and weather. They must be stored on end, under cover, in clean, dry conditions and must not be crushed.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Tekton® Building Wrap. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Timber and Steel Framing

7.1 Studs must be provided at maximum 600 mm centres. Dwargs must be fitted flush between the studs at maximum 1,200 mm centres.

General

7.2 Tekton® Building Wrap is intended for use as an alternative to conventional building papers which are fixed over timber and steel-framed walls in order to limit the entry of wind into building cavities, and to act as a secondary barrier to wind-driven rain.

7.3 The material also provides a degree of temporary weather protection during early construction. However, the product will not make the building weathertight and some wetting of the underlying structure is always possible before the building is closed in. Hence, the building must be closed-in and made weatherproof before moisture sensitive materials such as wall or ceiling linings and insulation materials are installed.

- 7.4 Tekton® Building Wrap must not be exposed to the weather or ultraviolet (UV) light for a total of more than 60 days before being covered by the wall cladding.
- 7.5 Tekton® Building Wrap is suitable for use under wall claddings as a wall underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23, except that it must not be used with non-absorbent wall claddings such as vinyl or metal-based sidings or weatherboards in direct fixed installations. Tekton® is suitable for use under cavity-based wall claddings as a non-absorbent synthetic wall underlay as called up in NZS 2295, Table 2.4 on steel-framed buildings. Refer to Table 1.
- 7.6 Tekton® Building Wrap is also suitable for use as an air barrier to walls that are not lined, such as attic spaces at gable ends, as called up in NZBC Acceptable Solution E2/AS1, Paragraph 9.1.4 c). Refer to Table 1.

Table 1: NZBC E2/AS1 Table 23 Requirements

NZBC E2/AS1 Table 23 Wall Wrap Properties	Property Performance Requirement	Actual Property Performance
Absorbency	$\geq 100 \text{ g/m}^2$	Classified as non-absorbent [See Paragraph 7.5]
Vapour Resistance	$\leq 7 \text{ MN s/g}$	Pass
Water Resistance	$\geq 20 \text{ mm}$	Pass
pH of Extract	≥ 5.5 and ≤ 8	9.78 [Note 1]
Shrinkage	$\leq 0.5\%$	Pass
Mechanical	Edge tear and tensile strength	Edge tear: Machine direction = 228 N Cross direction = 186 N Tensile strength: Machine direction = 4.4 kN/m Cross direction = 3.9 kN/m
Air Barrier	Air resistance: $\geq 0.1 \text{ MN s/m}^3$	Pass

Note 1: Further testing of Tekton® Building Wrap was completed to determine the effect of the high pH level on the wall underlay and materials it is likely to come into contact with during its serviceable life. The testing confirmed that the high pH had no adverse effects on the wall underlay performance, or the performance of other materials.

- 7.7 In cavity installations where the cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens to prevent the wall underlay bulging into the cavity space when bulk insulation is installed in the wall frame cavity in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

Stucco Plaster

- 7.8 Tekton® Building Wrap is suitable for use as a non-rigid backing material for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.5.1. The wall underlay must be supported with 75 mm galvanised mesh or plastic tape or wire at 150 mm centres run across the cavity battens to limit deflection to a maximum of 5 mm.
- 7.9 Tekton® Building Wrap may also be used as a slip layer over rigid backings for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.3.1 b).

Structure

- 8.1 Tekton® Building Wrap is suitable for use in all Wind Zones of NZS 3604 up to, and including, Very High when used as a flexible building underlay, and all Wind Zones of NZS 3604 up to, and including, Extra High when used as an overlay for rigid building underlays.

Durability

- 9.1 Tekton® Building Wrap meets code compliance with NZBC Clause B2.3.1 (a), not less than 50 years for building wraps used where the cladding durability requirement or expected serviceable life is not less than 50 years, and code compliance with NZBC Clause B2.3.1 (b), 15 years for building wraps used where the cladding durability requirement is 15 years.

Serviceable Life

- 9.2 Provided it is not exposed to the weather or ultraviolet (UV) light for a total of more than 60 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, Tekton® Building Wrap is expected to have a serviceable life equal to that of the cladding.

Control of Internal Fire and Smoke Spread

- 10.1 Tekton® Building Wrap has an AS 1530 Part 2 flammability index of not greater than 5 and therefore meets the requirements of NZBC Acceptable Solution C/AS2, Paragraph 4.17.8 b), for the surface finish requirements of suspended flexible fabric used as an underlay to exterior cladding that is exposed to view in occupied spaces. It may therefore be used with no restrictions in all buildings.

Prevention of Fire Occurring

- 11.1 Separation or protection must be provided to the Tekton® Building Wrap from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 12.1 Tekton® Building Wrap must be used behind claddings that meet the requirements of the NZBC, e.g. such as those covered by NZBC Acceptable Solution E2/AS1, or claddings covered by a valid BRANZ Appraisal.
- 12.2 Tekton® Building Wrap, when installed in accordance with the Technical Literature and this Appraisal, will assist in the total cladding systems compliance with NZBC Clause E2.
- 12.3 When used as an air barrier, particular care must be taken to ensure an air tight barrier is achieved, and weather sealing at all openings and penetrations through the cladding meets the requirements of the NZBC.

Installation Information

Installation Skill Level Requirements

- 13.1 Installation must always be carried out in accordance with the Tekton® Building Wrap Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant Licence Class.

Wrap Installation

- 14.1 Tekton® Building Wrap must be fixed to all framing members at maximum 300 mm centres with hot-dip galvanised, large-head clouts 20 mm long, zinc plated 6-8 mm staples, self-drilling screws, or proprietary wrap fixings. The membrane must be pulled taut over the framing before fixing.
- 14.2 Tekton® Building Wrap must be run horizontally and must extend from the upper-side of the top plate to the under-side of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs. Horizontal laps must be no less than 75 mm wide, with the direction of the lap ensuring that water is shed to the outer face of the membrane. End laps must be made over framing and be no less than 150 mm wide.
- 14.3 The wall underlay should be run over openings and these left covered until windows and doors are ready to be installed. Openings are formed in the membrane by cutting on a 45 degree diagonal from each corner of the penetration. The flaps of the cut membrane must be folded inside the opening and stapled to the penetration framing. Excess wall underlay may be cut off flush with the internal face of the wall frame.
- 14.4 Tekton® Building Wrap can be added as a second layer over head flashings in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.3.
- 14.5 When fixing the product in windy conditions, care must be taken due to the large sail area created by wide roll widths.
- 14.6 Any damaged areas of Tekton® Building Wrap, such as tears, holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping, or by taping small tears.

Inspections

- 14.7 The Technical Literature must be referred to during the inspection of Tekton® Building Wrap installations.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 15.1 The following tests have been carried out on Tekton® Building Wrap by Scion: folding strength of paper in accordance with AS/NZS 1301.423; edge tear resistance and tensile strength in accordance with AS/NZS 4200.1 and air resistance in accordance with BS 6538-3.
- 15.2 The following tests have been carried out on Tekton® Building Wrap by BRANZ: absorbency in accordance with AS/NZS 4201.6, vapour transmission in accordance with ASTM E 96B, shrinkage in accordance with AS/NZS 4201.3, water barrier in accordance with AS/NZS 4201.4 and pH of extract in accordance with AS/NZS 1301.421. A range of these tests were completed before and after Tekton® Building Wrap was exposed to UV light.
- 15.3 The flammability index of Tekton® Building Wrap has been evaluated in accordance with AS 1530.2.

Other Investigations

- 16.1 A durability opinion was given by BRANZ technical experts.
- 16.2 Site inspections were carried out by BRANZ to assess methods used for the installation of Tekton® Building Wrap, and to examine completed installations.
- 16.3 The marketer's Technical Literature, including installation instructions, have been examined by BRANZ and found to be satisfactory.

Quality

- 17.1 The manufacture of Tekton® Building Wrap has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ has taken note of product certification by ICC-ES and CCMC covering quality aspects associated with the product.
- 17.2 The quality of supply to the market is the responsibility of Marshall Innovations Limited.
- 17.3 Building designers are responsible for the design of the building, and for the incorporation of the wall wrap into their design in accordance with the instructions of Marshall Innovations Limited.
- 17.4 Quality of installation is the responsibility of the installer, in accordance with the instructions of Marshall Innovations Limited.

Sources of Information

- AS 1530.2-1993 Test for flammability of materials.
- AS/NZS 1301.421s: 1998 Determination of the pH value of aqueous extracts of paper, board and pulp – cold extraction method.
- AS/NZS 4200.1:1994 Pliable building membranes and underlays – materials.
- AS/NZS 4201.1:1994 Pliable building membranes and underlays – Methods of test – Resistance to dry delamination.
- AS/NZS 4201.2:1994 Pliable building membranes and underlays – Methods of test – Resistance to wet delamination.
- AS/NZS 4201.3:1994 Pliable building membranes and underlays – Methods of test – Shrinkage.
- AS/NZS 4201.4:1994 Pliable building membranes and underlays – Methods of test – Resistance to water penetration.
- AS/NZS 4201.6:1994 Pliable building membranes and underlays – Methods of test – Surface water absorbency.
- BS 6538.3:1987 Method for determination of air permeance using the Garley apparatus.
- NZS 2295:2006 Pliable, permeable building underlays.
- NZS 3604:2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 04 August 2021.

This Appraisal has been amended to reflect building code updates relating to fire.



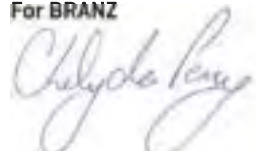
In the opinion of BRANZ, **Tekton® Building Wrap** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Marshall Innovations Limited**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Marshall Innovations Limited:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Marshall Innovations Limited**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Marshall Innovations Limited** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

Date of Issue:

14 June 2019



BRANZ Appraised

Appraisal No. 714 [2017]

FASTWRAP FLAMESPEC HEAVY WEIGHT ROOFING UNDERLAY

Appraisal No. 714 [2017]

This Appraisal replaces BRANZ
Appraisal No. 714 [2011]

Amended 21 April 2021



FlameSpec HW

SYNTHETIC HEAVY WEIGHT ROOFING UNDERLAY

BRANZ Appraisals

Technical Assessments of products
for building and construction.



J & F Holdings NZ Ltd T/A

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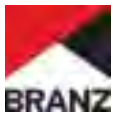
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Product

- 1.1 Fastwrap Flamespec Heavy Weight Roofing Underlay is a synthetic building underlay for use under roof claddings. The product consists of a micro-porous water-resistant film laminated to two layers of non-woven spun-bonded polyolefin.

Scope

- 2.1 BFastwrap Flamespec Heavy Weight Roofing Underlay has been appraised for use as a self-supporting roof underlay on buildings within the following scope:
- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
 - with masonry tile roof cladding; and,
 - with metal tile roof cladding; and,
 - with profiled metal roof cladding; and,
 - situated in NZS 3604 Wind Zones up to, and including, Extra High.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Fastwrap Flamespec Heavy Weight Roofing Underlay, if used, designed, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet, or contribute to meeting the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 [a] not less than 50 years, B2.3.1 [b] 15 years and B2.3.2. Fastwrap Flamespec Heavy Weight Roofing Underlay meets these requirements. See Paragraphs 9.1 and 9.2.

Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE: Performance C3.4 [c]. Fastwrap Flamespec Heavy Weight Roofing Underlay meets this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the roof cladding system, Fastwrap Flamespec Heavy Weight Roofing Underlay contributes to meeting this requirement. See Paragraphs 12.1 and 12.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Fastwrap Flamespec Heavy Weight Roofing Underlay meets this requirement .

Technical Specification

- 4.1 Fastwrap Flamespec Heavy Weight Roofing Underlay is a synthetic building underlay for use under roof claddings. The product consists of a micro-porous water-resistant film laminated to two layers of non-woven spun-bonded polyolefin. Fastwrap Flamespec Heavy Weight Roofing Underlay is coloured grey on the top face and white on the bottom face.
- 4.2 Fastwrap Flamespec Heavy Weight Roofing Underlay is supplied in rolls 1.35 m wide x 55.56 m long. The product is printed with laying lines repeated along the length of the roll. The rolls are wrapped in clear polythene film.

Accessories

- 4.3 Accessories used with Fastwrap Flamespec Heavy Weight Roofing Underlay, which are supplied by the installer are:
- **Fixings** - stainless steel staples, clouts, screws or proprietary underlay fixings, or other temporary fixings to attach the roof underlay to the framing.

Handling and Storage

- 5.1 Handling and storage of the product, whether on-site or off-site, is under the control of the installer. The rolls must be protected from damage and weather. They must be stored on end, under cover, in clean, dry conditions and must not be crushed.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Fastwrap Flamespec Heavy Weight Roofing Underlay. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 Fastwrap Flamespec Heavy Weight Roofing Underlay is suitable for use at roof pitches 3° and above. When used at pitches less than 10°, Fastwrap Flamespec Heavy Weight Roofing Underlay can be installed horizontally or vertically when fully supported by a corrosion resistant roof underlay support. At pitches 10° and greater, Fastwrap Flamespec Heavy Weight Roofing Underlay can be installed vertically or horizontally, spanning no greater than 1,200 mm between supports.
- 7.2 Fastwrap Flamespec Heavy Weight Roofing Underlay is intended for use as an alternative to conventional kraft paper roof underlays, which are fixed over timber or steel-framed roofs in order to limit the entry of wind into the roof cavity, and to assist in the moisture management of the roof cladding system.
- 7.3 The material also provides a degree of temporary weather protection during early construction. However, the product will not make the roof weathertight and some wetting of the underlying structure is always possible before the roof cladding is installed. Hence, the entire building must be closed-in and made weatherproof before moisture sensitive materials such as ceiling linings and insulation materials are installed.
- 7.4 Fastwrap Flamespec Heavy Weight Roofing Underlay must not be exposed to the weather or ultraviolet (UV) light for a total of more than 7 days before being covered by the roof cladding.
- 7.5 Fastwrap Flamespec Heavy Weight Roofing Underlay is suitable for use under roof claddings on buildings as a roof underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23. Refer to Table 1 for the material properties of the Fastwrap Flamespec Heavy Weight Roofing Underlay.

Table 1: NZBC E2/AS1, Table 23 Requirements

NZBC E2/AS1, Table 23 Roof Underlays Properties	Property Performance Requirement	Results
Absorbency	$\geq 150 \text{ g/m}^2$	Pass
Vapour Resistance	$\leq 7 \text{ MN s/g}$	Pass
Water Resistance	$\geq 100 \text{ mm}$	Pass
pH of Extract	≥ 5.5 and ≤ 8	Pass
Shrinkage	$\leq 0.5\%$	Pass
Mechanical	Edge tear and tensile strength	<p>Edge tear [Average]: Machine direction = 192 N Cross direction = 106 N</p> <p>Tensile strength [Average]: Machine direction = 3.84 kN/m Cross direction = 2.05 kN/m</p>

Structure

- 8.1 Fastwrap Flamespec Heavy Weight Roofing Underlay is suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High.

Durability

- 9.1 Fastwrap Flamespec Heavy Weight Roofing Underlay meets code compliance with NZBC Clause B2.3.1 [a] not less than 50 years for roof underlays used where the roof cladding durability requirement or expected serviceable life is not less than 50 years, e.g. behind masonry roof tile cladding, and code compliance with NZBC Clause B2.3.1 [b] 15 years for roof underlays used where the roof cladding durability requirement is 15 years.

Serviceable Life

- 9.2 Provided it is not exposed to the weather or UV light for a total of more than 7 days, and provided the roof cladding is maintained in accordance with the cladding manufacturer's instructions and the roof cladding remains weather-resistant, Fastwrap Flamespec Heavy Weight Roofing Underlay is expected to have a serviceable life equal to that of the roof cladding.

Control of Internal Fire and Smoke Spread

- 10.1 Fastwrap Flamespec Heavy Weight Roofing Underlay has an AS 1530 Part 2 flammability index of not greater than 5 and therefore meets the requirements of NZBC Acceptable Solutions C/AS2, Paragraph 4.17.8 b), for the surface finish requirements of suspended flexible fabric used as an underlay to exterior cladding that is exposed to view in occupied spaces. It may therefore be used with no restrictions in all buildings.

Prevention of Fire Occurring

- 11.1 Separation or protection must be provided to Fastwrap Flamespec Heavy Weight Roofing Underlay from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 12.1 Fastwrap Flamespec Heavy Weight Roofing Underlay must only be used under roof claddings that meet the requirements of the NZBC, such as those covered by NZBC Acceptable Solution E2/AS1, or roof claddings covered by a valid BRANZ Appraisal.
- 12.2 Fastwrap Flamespec Heavy Weight Roofing Underlay, when installed in accordance with the Technical Literature and this Appraisal, will assist in the total cladding system's compliance with NZBC Clause E2.

Installation Information

Installation Skill Level Requirements

- 13.1 Installation must always be carried out in accordance with the Fastwrap Flamespec Heavy Weight Roofing Underlay Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant Licence Class.

Underlay Installation

- 14.1 Fastwrap Flamespec Heavy Weight Roofing Underlay must be fixed at maximum 300 mm centres to all framing members with large-head clouts 20 mm long, 6-8 mm stainless steel staples, self drilling screws or proprietary underlay fixings. The membrane must be pulled taut over the framing before fixing.
- 14.2 Fastwrap Flamespec Heavy Weight Roofing Underlay may be installed horizontally or vertically at roof pitches 3° and above [refer to Paragraph 7.1 for further guidance]. It must extend from the ridge and overhang the fascia board by 20-25 mm. Vertical laps must be no less than 150 mm wide. Horizontal laps must also be no less than 150 mm, with the direction of the lap ensuring that water is shed to the outer face of the underlay. End laps must be made over framing and be no less than 150 mm wide.
- 14.3 When fixing the product in windy conditions, care must be taken due to the large sail area created.
- 14.4 Any damaged areas of Fastwrap Flamespec Heavy Weight Roofing Underlay, such as tears, holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping, or by taping small tears.

Inspections

- 14.5 The Technical Literature must be referred to during the inspection of Fastwrap Flamespec Heavy Weight Roofing Underlay installations.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 15.1 The following tests have been carried out on Fastwrap Flamespec Heavy Weight Roofing Underlay in accordance with NZBC Acceptable Solution E2/AS1, Table 23: tensile strength, edge-tear resistance and resistance to water vapour transmission in accordance with AS/NZS 4200.1, shrinkage in accordance with AS/NZS 4201.3, resistance to water penetration in accordance with AS/NZS 4201.4, surface water absorbency in accordance with AS/NZS 4201.6 and pH of extract in accordance with AS/NZS 1301.421s. A range of these tests were completed before and after Fastwrap Flamespec Heavy Weight Roofing Underlay was exposed to UV light.
- 15.2 The flammability index of Fastwrap Flamespec Heavy Weight Roofing Underlay has been evaluated in accordance with AS 1530.2.

Other Investigations

- 16.1 A durability opinion has been given by BRANZ technical experts.
- 16.2 An evaluation of the expected performance of Fastwrap Flamespec Heavy Weight Roofing Underlay in direct contact with metal roof cladding has been completed by BRANZ.
- 16.3 The practicability of installation of Fastwrap Flamespec Heavy Weight Roofing Underlay has been assessed by BRANZ and found to be satisfactory.
- 16.4 The Technical Literature, including installation instructions, has been examined by BRANZ and found to be satisfactory.

Quality

- 17.1 The manufacture of Fastwrap Flamespec Heavy Weight Roofing Underlay has not been examined by BRANZ, but details of the methods adopted for quality control and the quality of the materials used, have been obtained and found to be satisfactory.
- 17.2 The quality of supply to the market is the responsibility of J & F Holdings NZ Ltd T/A Bayonet.
- 17.3 Building designers are responsible for the design of the building, and for the incorporation of the roof underlay into their design in accordance with the instructions of J & F Holdings NZ Ltd T/A Bayonet.
- 17.4 Quality of installation is the responsibility of the installer in accordance with the instructions of J & F Holdings NZ Ltd T/A Bayonet.

Sources of Information

- AS 1530.2: 1993 Test for Flammability of Materials.
- AS/NZS 1301.421s: 1998 Determination of the pH value of aqueous extracts of paper, board and pulp - cold extraction method.
- AS/NZS 4200.1: 1994 Pliable building membranes and underlays - Materials.
- AS/NZS 4201.3: 1994 Pliable building membranes and underlays - Methods of test - Shrinkage.
- AS/NZS 4201.4: 1994 Pliable building membranes and underlays - Methods of test - Resistance to water penetration.
- AS/NZS 4201.6: 1994 Pliable building membranes and underlays - Methods of test - Surface water absorbency.
- AS/NZS 4534: 2006 Zinc and zinc/aluminium-alloy coatings on steel wire.
- NZS 3604: 2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No.1, dated 25 May 2018

This Appraisal has been amended to update the product classification to self-supporting and to update the requirements for support at roof pitches less than 10°.

Amendment No. 2, dated 21 April 2021

This Appraisal has been amended to update the Appraisal Holder and NZBC reference documents.



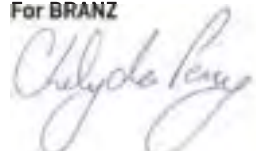
In the opinion of BRANZ, **Fastwrap Flamespec Heavy Weight Roofing Underlay** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **J & F Holdings NZ Ltd T/A Bayonet**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **J & F Holdings NZ Ltd T/A Bayonet:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **J & F Holdings NZ Ltd T/A Bayonet**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **J & F Holdings NZ Ltd T/A Bayonet** or any third party.

For BRANZ



Chelydra Percy
Chief Executive
Date of Issue:
24 August 2017



BRANZ Appraised
Appraisal No. 665 [2017]

SOLATUBE DAYLIGHT SYSTEMS AND ROOF PENETRATIONS

Appraisal No. 665 [2017]

This Appraisal replaces BRANZ
Appraisal No. 665 [2009]

Amended 06 September 2021

BRANZ Appraisals

Technical Assessments of
products for building and
construction.



HomeTech Ltd

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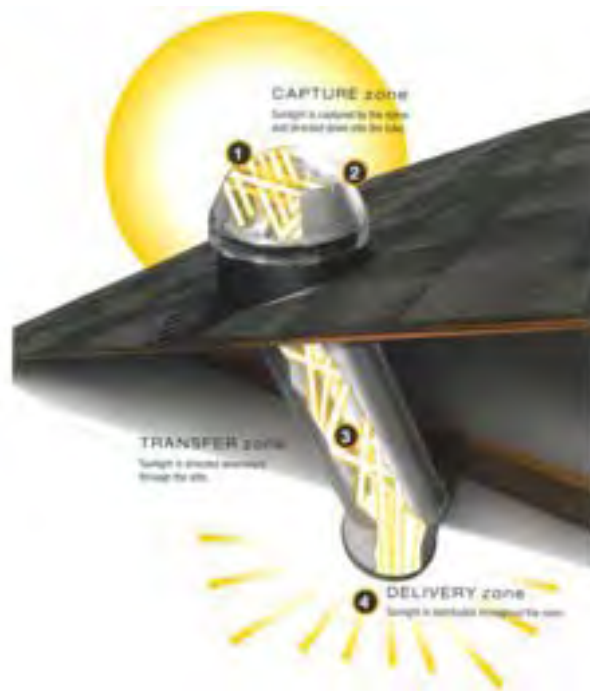
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Product

- 1.1 Solatube Daylight Systems and Roof Penetrations are for use on domestic and commercial buildings, providing a roof penetration system allowing natural light or ventilation to the interior. The system is supplied as a kit providing a tubular roof to ceiling light channel or ventilation duct and a roof flashing system matching the roof type.

Scope

- 2.1 Solatube Daylight Systems and Roof Penetrations have been appraised as a skylight and roof penetration system on domestic and commercial buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with respect to building height and maximum floor plan areas; and,
 - with building structures designed and constructed to meet the requirements of the NZBC; and,
 - situated in NZS 3604 Wind Zones up to, and including, Very High; and,
 - with roof cladding types and profiles specified in NZBC Acceptable Solution E2/AS1; and,
 - for use on flat or nominally flat roofs making use of membrane roof systems.
- 2.2 Installation of Solatube Daylight Systems and Roof Penetrations must only be carried out by installers registered by HomeTech Ltd.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Solatube Daylight Systems and Roof Penetrations, if designed, used, installed, and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:
 - Clause B2 DURABILITY:** Performance B2.3.1 (b) 15 years. Solatube Daylight Systems and Roof Penetrations meet this requirement. See Paragraph 8.1.
 - Clause E2 EXTERNAL MOISTURE:** Performance E2.3.1 and E2.3.2. Solatube Daylight Systems and Roof Penetrations meet these requirements. See Paragraph 11.1.
 - Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. Solatube Daylight Systems and Roof Penetrations meet this requirement.
 - Clause G4 VENTILATION:** Performance G4.3.3 (a), G4.3.3 (b), and G4.3.3 (c). Solatube Daylight Systems and Roof Penetrations, when installed as a ventilation duct, will contribute to meeting these requirements. See Paragraph 13.1.

Clause G7 NATURAL LIGHT: Performance G7.3.1 and G7.3.2. Solatube Daylight Systems and Roof Penetrations will contribute to meeting these requirements. See Paragraph 15.1.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 [a]. Solatube Daylight Systems and Roof Penetrations will contribute to meeting this requirement. See Paragraph 16.1.

Technical Specification

- 4.1 Solatube Daylight Systems and Roof Penetrations are a complete roof to ceiling skylight system. The system incorporates a light-capture dome above roof level attached to a highly reflective aluminium light transmission tube providing light to the interior via a diffuser unit mounted in the ceiling below. The rigid aluminium 'light-tube' is made up of straight and adjustable-angle tube sections to allow passage through the roof-space. The systems are supplied as a kit complete with the required flashing components to allow for penetration through various roof cladding types.
- 4.2 The system is available in a range of diameter options – 250 mm, 350 mm and 400mm. A 350 mm tube can also be compatible with a 400 mm diameter flashing, by making use of a reducer made from the same material as the flashing, and can be supplied as a component of the installation kit to create a match between a tube penetration size and flashing size.
- 4.3 Components and accessories supplied by HomeTech Ltd include:
 - **Capture Dome** – manufactured from impact modified acrylic, mounted above the roof level. This dome incorporates light capture and tracking technology designed to optimise the level of captured light.
 - **Transfer Zone** – tubes formed from rolled aluminium sheet with a very high-polish finish, and a proprietary multi-layer polymer coating on the inside of the tube to optimise light-volume transmitted through the tube from the Capture Dome. Tubes are formed either as straight sections, or sections with adjustable incorporated angles allowing for different roof pitches or angled travel through the roof space to avoid obstacles.
 - **Light Diffuser** – these are fitted to the end of the transfer tubing where it exits the roof-space through the ceiling. They are flush-mounted and optically designed to disperse light to as much of the interior space as possible. The polycarbonate diffusers are double-glazed to reduce heat loss into the tubing and roof-space above.
 - **Flashing elements** – the system includes a series of pre-manufactured proprietary flashing elements to accommodate both the alternative sizes of the Solatube Daylight Systems, and the different types of roof claddings. Flashing elements are manufactured in black injection moulded polypropylene, or gel-coated reinforced polyester depending on the roof type. Also supplied as parts of the installation kit are foam sealing tape and appropriate galvanised Class 4 roof fixing screws.
- 4.4 The Solatube Daylight System can be adapted and installed as a ventilation system. A powered fan can be installed in the roof vent unit that replaces the light capture dome. Vents are also tubular and interchangeable with domes and use the same flashing component sizes. Ducting for ventilation can be completed with flexible ventilation tube. This allows air extraction via a ventilation grill or ceiling-light to a water-tight roof-vent.
- 4.5 Solatube Daylight Systems and Roof Penetrations are delivered to site as a complete kit containing all of the components required to complete a particular installation type, including relevant installation instructions.

Handling and Storage

- 5.1 Handling and storage of all components of Solatube Daylight Systems and Roof Penetrations, is under the control of HomeTech Ltd, and its registered installers. Components must be kept dry and under cover at all times. Care must be taken to avoid surface damage to Solatube components and flashings during the installation process.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Solatube Daylight Systems and Roof Penetrations. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 Solatube Daylight Systems and Roof Penetrations are a means of transferring natural daylight to the interior of both new and existing buildings. The flashings are manufactured in a variety of formats and shapes to accommodate differing of profiles and materials used in both commercial and domestic roofing. The range of flashings is also designed to accommodate a range of penetration sizes. The tubular penetration and flashing system through the roof may also be adapted for use as a ventilation system making use of a fan mounted within the vent.
- 7.2 When installed into a new roof, if possible the installation should be completed at the same time as the roof making installation easier and quicker to complete.
- 7.3 When installed as a mechanical ventilation system incorporating a fan within the tubing, installation must satisfy the mechanical ventilation requirements of NZBC Acceptable Solution G4/AS1 Paragraph 1.5.1 c). The fan, it's control, and the electrical installation requirements are outside the scope of this Appraisal.

Impact Resistance

- 7.4 Solatube Daylight Systems and Roof Penetrations light capture domes have been tested to AS 4285 and have demonstrated adequate resistance to concentrated loads. Examination for impact damage on the domes of older installations in both Australia and New Zealand proved satisfactory. The likelihood of any impact damage to internal light diffusers mounted in ceilings, when installed in commercial situations, should be considered at the design stage.

Durability

Serviceable Life

- 8.1 Solatube Daylight Systems and Roof Penetrations installations will remain effective with a serviceable life in excess of 15 years, provided they are installed following the instructions of HomeTech Ltd and this Appraisal.

Maintenance

- 9.1 Solatube Daylight Systems and Roof Penetrations do not require any maintenance, however, the light capture domes should be kept clean for optimum effectiveness and should be periodically inspected as part of normal roof cladding inspection.

Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to the Solatube Daylight Systems and Roof Penetrations from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 11.1 The Solatube Daylight Systems and Roof Penetrations, when installed in accordance with this Appraisal and the Technical Literature, will prevent the penetration of moisture that could cause undue dampness or damage to building elements.
- 11.2 Installation and weathertightness details must accurately follow the installation instructions provided by HomeTech Ltd for each flashing detail type.



Internal Moisture

- 12.1 Adequate thermal resistance is provided by the Solatube Daylight Systems and Roof Penetrations interior diffuser to resist condensation forming in areas where moisture may be generated.

Ventilation

- 13.1 When a Solatube Daylight System and Roof Penetration is installed and used as a ventilation duct, incorporating a fan, the ventilation system must satisfy the mechanical ventilation requirements of NZBC Acceptable Solution G4/AS1.

Electricity

- 14.1 When the Solatube system is installed for the purposes of ventilation, and a fan is installed as a component of the system, the electrical installation must comply with requirements of NZBC Acceptable Solution G9/AS1 and installation of the electrical wiring must be in accordance with AS/NZS 3000.

Natural Light

- 15.1 The Solatube Daylight Systems and Roof Penetrations can assist in meeting the NZBC requirements for provision of sufficient natural light to building interiors.

Energy Efficiency

- 16.1 The polycarbonate light diffusion units mounted on the ceiling inside the building are constructed as double glazed units giving an R value of 0.41 m²K/W, thus satisfying the higher skylight R value requirement of 0.34 m²K/W.

Installation Information

Installation Skill Level Requirements

- 17.1 Installation of Solatube Daylight Systems and Roof Penetrations and associated components supplied by HomeTech Ltd must be installed by installers registered with HomeTech Ltd.

System Installation

- 18.1 Installation of Solatube Daylight Systems and Roof Penetrations must be completed in accordance with the instructions of HomeTech Ltd.
- 18.2 Particular attention must be paid to the sizing and creation of apertures in the roofing material and associated placing and installation of the flashing elements supplied as part of the kit.
- 18.3 Care must be taken during transportation and installation to avoid damage to the Solatube elements and associated flashing components.

Health and Safety

- 19.1 There are no special Health and Safety issues relating to the installation or the use of Solatube Daylight Systems and Roof Penetrations. Installers must however observe safe working practices for working on roofs.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Investigations

- 20.1 BRANZ has assessed Solatube Daylight Systems and Roof Penetrations for function, fitness for purpose and resistance to impact, based on in-service performance.
- 20.2 An assessment was made of the durability of the components of Solatube Daylight Systems and Roof Penetrations by BRANZ technical experts.
- 20.3 The double glazed light diffusion units have been assessed for thermal resistance by BRANZ experts and were found to be satisfactory.



- 20.4 Site inspections have been carried out by BRANZ staff to assess fitness for purpose and the practicability of installation, and to assess in-service performance.
- 20.5 Weathertightness installation detailing of the Solatube Daylight Systems and Roof penetrations has been assessed by BRANZ and found to be satisfactory. Instructions for the installation of units and associated flashing components for different roof types have also been reviewed and found to be satisfactory.
- 20.6 The Technical Literature for Solatube Daylight Systems and Roof Penetrations has been examined by BRANZ and found to be satisfactory.
- 20.7 Solatube Daylight Systems and Roof Penetrations Capture Domes have been tested in Australia to AS 4285 for resistance to concentrated loads, resistance to wind pressures (non cyclonic regions), and water-tightness. The results of these tests were examined by BRANZ and found to be satisfactory.

Quality

- 21.1 Components of the Solatube Daylight Systems and Roof Penetrations have been examined by BRANZ and details of the quality and composition of the materials used were obtained and found to be satisfactory.
- 21.2 The manufacturing quality system of Solatube Inc. has been assessed by BRANZ and found to be satisfactory.
- 21.3 The quality management system of the manufacturer of the polypropylene flashing units has been assessed and registered as meeting the requirements of ISO 9001 by Bureau Veritas.
- 21.4 The quality of materials, components and accessories supplied to the market is the responsibility of HomeTech Ltd.
- 21.5 Quality of installation on-site of components and accessories is the responsibility of installers registered with HomeTech Ltd.
- 21.6 Designers are responsible for the building design, and specification of natural lighting and ventilation systems.
- 21.7 Building owners are responsible for any required maintenance of Solatube Daylight Systems and Roof Penetrations in accordance with the instructions of HomeTech Ltd.

Sources of Information

- AS 4285:1995 Skylights.
- AS/NZS 3000:2007 Australia/New Zealand Wiring Rules.
- NZS 3604:2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 06 September 2021.

This Appraisal has been amended to reflect building code updates relating to fire.



BRANZ Appraised
Appraisal No. 665 [2017]

BRANZ Appraisal
Appraisal No. 665 [2017]
20 December 2017

SOLATUBE DAYLIGHT SYSTEMS
AND ROOF PENETRATIONS



In the opinion of BRANZ, **Solatube Daylight Systems and Roof Penetrations** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **HomeTech Ltd**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **HomeTech Ltd:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **HomeTech Ltd**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **HomeTech Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

20 December 2017



BRANZ Appraised
Appraisal No. 472 [2022]

ARDEX UNDERTILE INTERNAL LIQUID WATERPROOFING MEMBRANES

Appraisal No. 472 [2022]

This Appraisal replaces BRANZ
Appraisal No. 472 [2017]



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 ARDEX Undertile Liquid Membranes are premixed and two-part liquid-applied waterproofing membranes for use under ceramic or stone tile finishes in internal wet areas.

Scope

- 2.1 ARDEX Undertile Liquid Membranes have been appraised for use as waterproofing membranes for the internal wet areas of buildings, within the following scope:
 - on floor substrates of concrete, reconstituted wood panel flooring, plywood, compressed fibre cement sheet and fibre cement sheet tile underlay, and on wall substrates of concrete, concrete masonry, wet area fibre cement sheet lining systems and wet area plasterboard lining systems; and,
 - when protected from physical damage by ceramic or stone tile finishes; and,
 - where floors are designed and constructed such that deflections do not exceed 1/360th of the span.
- 2.2 The use of ARDEX Undertile Liquid Membranes on concrete slabs where hydrostatic or vapour pressure is present from below is outside the scope of this Appraisal.
- 2.3 Movement and control joints in the substrate must be carried through the membrane and tile finish. The design and construction of the substrate and movement and control joints is specific to each building, and is therefore the responsibility of the building designer and building contractor and is outside the scope of this Appraisal.
- 2.4 The ceramic or stone tile finishes are outside the scope of this Appraisal.
- 2.5 The membranes must be installed by trained installers, approved by ARDEX New Zealand Limited.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, ARDEX Undertile Internal Liquid Waterproofing Membranes, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.2. ARDEX Undertile Liquid Membranes meet these requirements. See Paragraph 9.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.6. Internal wet area floors and walls incorporating ARDEX Undertile Liquid Membranes meet this requirement. See Paragraphs 11.1-11.6.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. ARDEX Undertile Liquid Membranes meet this requirement.



Technical Specification

4.1 Materials supplied by ARDEX New Zealand Limited are as follows:

- **ARDEX WPM 001** is a one-part, polymer-based, ready-to-use, liquid-applied membrane containing micro-fibres. It is supplied as a light blue thixotropic paste in 20 kg (approximately 15 L) pails.
- **ARDEX WPM 002** is a fast drying, two-part, flexible, cementitious-based, liquid-applied membrane containing micro-fibres. It is supplied as ARDEX WPM 002 Part A Liquid in 20 kg pails and ARDEX WPM 002 Part B Powder in 10 kg multi-wall bags. When dry, the membrane is light grey in colour.
- **ARDEX WPM 155 Rapid** is a one-part, water-based polyurethane acrylic, ready-to-use, liquid-applied, rapid setting membrane. It is supplied as a blue colour in 4 and 15 L pails.
- **ARDEX STB Tape** is an uncured butyl tape with a fleece layer that is used in the ARDEX WPM 155 Rapid under tile waterproofing system.
- **ARDEX Multiprime** is a water-based primer used to seal substrates and enhance the adhesion of the membranes. It is supplied as a red coloured liquid in 1, 4 and 20 L plastic containers.

Handling and Storage

5.1 All materials must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and freezing conditions. The membrane products have a shelf life of 12 months from date of manufacture in the original unopened packaging. Once opened, the products must be used within 3 months.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- ARDEX WPM 001 Superflex Bathroom and Balcony Premixed, March 2012.
- ARDEX WPM 002 Superflex Bathroom and Balcony Two Part, Jan 2022.
- ARDEX WPM 155 Rapid, May 2013.

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

- 7.1 ARDEX Undertile Liquid Membranes are for use in buildings where an impervious waterproof membrane is required to floors and walls to prevent damage to building elements and adjoining areas.
- 7.2 ARDEX WPM 002 and ARDEX WPM 155 Rapid are designed to be used where a quicker curing time is required, such as in cool or humid conditions.
- 7.3 The membrane must be protected from physical damage by the application of ceramic or stone tile finishes.
- 7.4 Movement and control joints may be required depending on the shape and size of the building or room, and the tile finish specified. Design guidelines can be found in the BRANZ Good Practice Guide: Tiling.
- 7.5 Timber framing systems must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases, framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and all sheet edges are fully supported. Timber framing systems supporting the substrates must be constructed such that deflections do not exceed $1/360^{\text{th}}$ of the span. Where NZS 3604 is used, the allowable joist spans given in Table 7.1 shall be reduced by 20%.

Substrates

Plywood

- 8.1 Plywood must be a minimum of 17 mm thick complying with AS/NZS 2269, CD Grade Structural with the sanded C face upwards and treated to H3 [CCA treated]. LOSP treated plywood must not be used.
- 8.2 The plywood must be supported with dwangs or framing with a maximum span of 400 mm in each direction, fixed with 10 g x 50 mm stainless steel countersunk head screws at 150 mm centres along the sheet edges and 200 mm centres through the body of the sheets.

Fibre Cement Compressed Sheet/ Fibre Cement Sheet Tile Underlay

- 8.3 Fibre cement compressed sheet and tile underlay must be manufactured to comply with the requirements of AS/NZS 2908.2 and must be specified by the manufacturer as being suitable for use as a wet area membrane substrate. Installation must be carried out in accordance with the instructions of the manufacturer.

Reconstituted Wood Panel Flooring

- 8.4 Non-oriented strand board panels that are bonded with PMDI resin, are water-repellent, have an average density of 680 kg/m³, are treated to H3 with a waterborne treatment not LOSP, and are suitable for use as the timber substrate under wet area waterproof membrane systems.

Concrete and Concrete Masonry

- 8.5 Concrete and concrete masonry substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101, concrete slab-on-ground to NZS 3604 or NZS 4229, and concrete masonry to NZS 4229 and NZS 4230.

Wet Area Wall Linings

- 8.6 Plasterboard wall linings must be manufactured to comply with AS/NZS 2588 and be suitable for use in internal wet areas.
- 8.7 Fibre cement sheet must be suitable for use in wet areas and comply with AS/NZS 2908.2.
- 8.8 Installation of plasterboard or fibre cement wall linings must be carried out in accordance with the instructions of the manufacturer.

Durability

Serviceable Life

- 9.1 ARDEX Undertile Liquid Membranes, when subjected to normal conditions of environment and use, are expected to have a serviceable life of at least 15 years and be compatible with ceramic or stone tile finishes with a design serviceable life of 15-25 years.

Maintenance

- 10.1 No maintenance of the membrane will be required provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiled areas to ensure they are sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiles, grout and sealant.
- 10.2 In the event of damage to the membrane, the tiling must be removed and the membrane repaired by removing the damaged portion and applying a patch as for new work.
- 10.3 Drainage outlets must be maintained to operate effectively, and tile finishes must be kept clean.

Internal Moisture

- 11.1 ARDEX Undertile Liquid Membranes are impervious to water, and when appropriately designed and installed will prevent water from penetrating behind linings or entering concealed spaces.
- 11.2 Surfaces must be finished with ceramic or stone tiles. A means of compliance with NZBC Clauses E3.3.3 and E3.3.4 is given in NZBC Acceptable Solution E3/AS1 Paragraph 3.1.1 b), 3.1.2 b) and 3.3.1 b).



- 11.3 Falls in showers and shower areas must be a minimum of 1 in 50. In unenclosed showers, falls must extend a minimum of 1,500 mm out from the shower rose. Floor wastes and drainage flanges must be provided and the floor must fall to the outlet.
- 11.4 ARDEX Undertile Liquid Membranes are suitable for use to contain accidental overflow to meet NZBC Clause E3.3.2. A means of compliance for overflow is given in NZBC Acceptable Solution E3/AS1, Section 2.
- 11.5 The waterproofing membranes must completely cover shower bases, and for unenclosed showers it must extend a minimum of 1,500 mm out from the shower rose. Further design guidance on waterproofing wet areas, including waterproofing walls and junctions can be obtained from AS 3740, the BRANZ Good Practice Guide: Tiling, and the flooring and wall lining manufacturers.
- 11.6 Where water-resistant wall finishes such as prefinished sheet materials are used, they must overlap the membrane a minimum of 30 mm.

Installation Information

Installation Skill Level Requirement

- 12.1 Installation of the membranes must be completed by trained installers, approved by ARDEX New Zealand Limited.
- 12.2 Installation of substrates must be completed by, or under the supervision of, Licensed Building Practitioners [LBP] with the relevant Licence Class, in accordance with instructions given within the ARDEX New Zealand Limited Technical Literature and this Appraisal.

Preparation of Substrates

- 13.1 Substrates must be dry, clean and stable before installation commences. Surfaces must be even and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents.
- 13.2 The relative humidity of concrete substrates must be 75% or less before membrane application. The concrete can be checked for dryness by using a hygrometer as set out in BRANZ Bulletin No. 585.
- 13.3 All voids, cracks, holes, joints and excessively rough areas must be filled to achieve an even and uniform surface. Junctions of substrate abutments, such as at wall/floor and wall/wall junctions must have reinforcements installed as set out in the Technical Literature.
- 13.4 The moisture content of reconstituted wood flooring at the time of priming must not exceed 16%. All face surfaces and edges must be primed prior to membrane installation.
- 13.5 Substrates must be primed with ARDEX Multiprime and allowed to dry fully before the membrane is installed.

Membrane Installation

- 14.1 Installation must not be undertaken where the substrate surface temperature is below 10°C or above 35°C.
- 14.2 ARDEX WPM 002 liquid and dry components must be mixed and left to stand for 5 minutes before re-mixing, then applying. ARDEX WPM 001 and ARDEX WPM 155 Rapid must be thoroughly stirred before application.
- 14.3 The membranes must be applied in a minimum of two coats at the rates set out in the Technical Literature to give a total finished thickness of 0.5-1.2 mm. Subsequent coats must be applied at an opposite direction to the previous coat.
- 14.4 Application can be made by roller (medium/long nap), brush (long bristle), or a flat steel trowel.
- 14.5 Reinforcement fabric is bedded into the wet layer between coats to provide movement protection at wall/wall and wall/floor junctions, and at any other areas such as joints in the flooring substrate, floor cracks or around penetrations in the membrane. ARDEX STB Tape must be used with ARDEX WPM 155 Rapid to take advantage of the rapid/fast drying features.
- 14.6 Clean up may be undertaken with water.

Tiling

- 15.1 The membrane must be fully cured before tiling. The cured membrane must be protected at all times to prevent mechanical damage, so may require temporary covers until the finishing is completed.
- 15.2 Tiling must be undertaken in accordance with AS 3958.1 and the BRANZ Good Practice Guide: Tiling. The compatibility of the tile adhesive must be confirmed with the adhesive manufacturer or ARDEX New Zealand Limited.

Inspections

- 16.1 Critical areas of inspection are:
- Construction of substrates, including crack control and installation of bond breakers and movement control joints.
 - Moisture content of the substrate prior to the application of the membrane.
 - Acceptance of the substrate by the membrane installer prior to application of the membrane.
 - Installation of the membrane to the supplier's instructions, particularly installation to the correct thickness and use of reinforcement.
 - Membrane curing and integrity prior to the installation of tiles including protection from mechanical damage during curing and prior to tile installation.

Health and Safety

- 17.1 Safe use and handling procedures for the membrane are provided in the Technical Literature. The materials must be used in conjunction with the relevant Material Safety Data Sheet.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

- 18.1 The following testing of ARDEX WPM 001 and ARDEX WPM 002 has been undertaken by ARDEX Australia Pty Limited research and development laboratory: water vapour transmission, water absorption, tensile strength and elongation before and after UV exposure, immersion in bleach, immersion in industrial detergent and immersion in water. Test methods and results were reviewed by BRANZ and found to be satisfactory.
- 18.2 The following testing of ARDEX WPM 001 was undertaken by the Commonwealth Scientific Industrial Research Organisation [CSIRO] Australia:
- In accordance with ANSI A118.10 for ICBO Evaluation Service - dimensional stability, waterproofness, shear strength to ceramic tile and cement mortar, and fungal and micro-organism resistance.
 - In accordance with AS 1145 - behaviour under cyclic strain.
- 18.3 Testing of ARDEX WPM 001 and ARDEX WPM 002 has been undertaken by BRANZ for low temperature flexibility and peel adhesion after heat/humidity aging.
- 18.4 The following testing of ARDEX WPM 155 Rapid was undertaken by various organisations:
- Durability testing to AS/NZS 4858 Appendix A including effect of heat aging, bleach, detergent and water on tensile strength and elongation.
 - Cyclic movement resistance requirements of AS/NZS 4858:2004 Appendix B.
 - Water vapour transmission using both wet and dry cup methods from ASTM E96.
 - Water transmission behaviour following the procedures of AS/NZS 4858 Appendix C.
- 18.5 The above test methods and results have been reviewed by BRANZ and found to be satisfactory.



Other Investigations

- 19.1 An assessment was made of the durability of the ARDEX Undertile Liquid Membranes by BRANZ technical experts.
- 19.2 Site inspections have been carried out by BRANZ to examine the practicability of installation.
- 19.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

- 20.1 The manufacture of the membrane has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 20.2 The quality management system of membrane's manufacturer has been assessed and found to be satisfactory.
- 20.3 The quality of supply of the membrane system materials to the market is the responsibility of ARDEX New Zealand Limited.
- 20.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of the framing systems and substrate.
- 20.5 Quality on-site is the responsibility of the trained installers, approved by ARDEX New Zealand Limited.
- 20.6 Building owners are responsible for the maintenance of the ceramic or stone tiles in accordance with the instructions of ARDEX New Zealand Limited.

Sources of Information

- AS 3740:2021 Waterproofing of domestic wet areas.
- AS 3958.1:2007 Ceramic tiles - Guide to the installation of ceramic tiles.
- AS/NZS 1170:2002 Structural design actions
- AS/NZS 2908.2:2000 Cellulose-cement products - Flat sheets.
- AS/NZS 4858:2004 Wet area membranes.
- AS/NZS 2269:2012 Plywood - Structural.
- BRANZ Good Practice Guide: Tiling (Third Edition), April 2015.
- NZS 3101:2006 Concrete Structures Standard.
- NZS 3602:2003 Timber and wood-based products for use in buildings.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4229:2013 Concrete masonry buildings not requiring specific engineering design.
- NZS 4230:2004 Code of practice for the design of masonry structures.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



BRANZ Appraised
Appraisal No. 472 [2022]

BRANZ Appraisal
Appraisal No. 472 [2022]
02 August 2022

ARDEX UNDERTILE INTERNAL
LIQUID WATERPROOFING
MEMBRANES



In the opinion of BRANZ, **ARDEX Undertile Internal Liquid Waterproofing Membranes** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **ARDEX New Zealand Limited**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **ARDEX New Zealand Limited:**
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **ARDEX New Zealand Limited**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **ARDEX New Zealand Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

02 August 2022



INSTALLATION INSTRUCTIONS & OWNERS GUIDE

RHEEM MAINS PRESSURE ELECTRIC HOT WATER HEATERS

Congratulations for choosing a Rheem Water Heater

It is important that you take a few minutes to read this booklet as it may save you time and trouble later.

If you require any further information or your water heater needs to be serviced, please contact the Rheem Service Department on 0800 657 335, or the nearest service centre (look in the Yellow Pages under Plumbers)
Or visit www.rheem.co.nz

Important to the Installer

Do not leave this booklet inside the element cover after installation
Please leave the booklet with the water heater's owner

IMPORTANT INFORMATION

GENERAL

- The information contained in this manual, and all other information or advice given at any time by Rheem New Zealand Limited in connection with the purchase, installation or use of a Rheem water heater, is given in good faith. Subject to any rights the owner may have under the "Consumer Guarantees Act 1993", Rheem New Zealand Limited will not be liable to any person for any inaccuracy or omission in the information or advice arising through the fault or negligence of Rheem New Zealand Limited or any other person or through any other cause whatsoever.
- This water heater is not intended to be operated, adjusted or tampered with by young children or infirm persons. Young children should be supervised to ensure they do not play with the water heater.

ABOUT YOUR WATER HEATER

Q. DOES THE WATER QUALITY AFFECT THE WATER HEATER?

- A. Your water heater is suitable for most public water supplies, however, some water qualities may have a detrimental effect on it. **If you are in a known harsh water area please read page 6.**

Q. HOW HOT SHOULD THE WATER BE?

- A. The Optima features a user adjustable thermostat (temperature range of 60 – 75°C), which allows you to choose the most suitable temperature for your hot water needs.
- The Vitreous enamel models (temperature range 60 - 70°C) require an authorised person to make any temperature adjustments.
- For reasons of safety and economy, we advise the thermostat is adjusted to the lowest setting that meets your needs.
- The New Zealand Building Code requires a stored temperature setting of not less than 60°C. A tempering valve set at 55°C must be used on domestic wet areas.

Q. HOW DO I KNOW IF THE WATER HEATER IS INSTALLED CORRECTLY?

- A. Refer to the installation requirements on page 4.

Q. HOW LONG WILL THE WATER HEATER LAST?

- A. There are a number of factors that affect the life of the water heater. These include; the water quality, water pressure, water temperature and the usage pattern, however, your Rheem water heater is supported by a comprehensive warranty (refer to page 8).
- The life of the water heater may be extended by arranging for an authorised person to inspect the anode and replace it, if required.
- The suggested time after installation when the anode should be inspected is:
- | | |
|-----------------|----------|
| Vitreous enamel | 8 years |
| Optima | 10 years |
- For softened water supplies or in areas of poor water quality, it is recommended the anode be inspected 3 years earlier than shown (refer to "Water Quality" on page 6).

HOW THE WATER HEATER WORKS

SINGLE AND TWIN ELEMENT MODELS

Water stored within the water heater is heated by the electric heating element. The thermostat controls the electricity supply to the heating element so that a constant water temperature is maintained. As the cold water is heated it expands approximately 1/50 of its volume and, as a result, a small amount of water is discharged from the cold water expansion valve.

NON-SIMULTANEOUS ELEMENT MODELS

The two heating elements are wired for non-simultaneous operation, so that only one heating unit can operate at a time. The bottom heating unit is usually connected to an off-peak (overnight) supply and the top heating unit to a continuous supply. **The red link wire must be removed from the terminal block during installation if two separate power supplies are to be used.** Leaving the link in place ensures both elements operate correctly with a single power supply.

The basic operation is as follows: when the water temperature at the top of the water heater has reached the set temperature, the thermostat switches the top element off. This creates a circuit to the bottom heating element by switching the neutral.

SAFETY

On all models, a Temperature and Pressure Relief valve is supplied with each water heater. It can be found inside the front cover and must be mounted on top of the water heater.

Also fitted to the water heater is a thermostat, which incorporates an over-temperature thermal cut-out device.

Warning: *The operation of the thermal cut-out indicates a possible dangerous situation. Do not reset the thermal cut-out until the water heater has been serviced by an authorised service person.*

These safety devices must not be tampered with, or removed, and under no circumstances operate the water heater unless both devices are fitted.

REGULAR CARE

MANUALLY OPERATING THE TEMPERATURE AND PRESSURE RELIEF VALVE:

Valve manufacturers recommend that you operate the easing lever (see diagram. 1) on the Temperature and Pressure Relief valve once every six months. **It is very important that you raise and lower the lever gently.**

Warning: *To ensure the relief valve is working correctly, operate the relief valve easing lever at least every six months. Failure to do this may result in the water heater over-pressurising.*

DIAGRAM 1

Lift until
water flows
from the
drain line –
lower gently

Drain line



Water Heater

If water does not flow freely from the drain line or the valve fails to completely close and water continues to be discharged, contact the Rheem Service Department, phone **0800 657 335**, or the nearest Rheem Service Centre (look in the Yellow Pages under "Plumbers").

GOING ON HOLIDAYS:

If you plan to be away from home for one or two nights, we suggest that you leave the water heater switched on. However, if you plan to stay away more than a few nights, conserve energy by switching the water heater off at the isolating switch, or at the main switchboard. In locations where freezing could occur, you should leave the water heater turned on.

SAVE A SERVICE CALL

CHECK THE ITEMS BELOW BEFORE MAKING A SERVICE CALL. YOU MAY BE CHARGED FOR SERVICE IF THE FAULT IS NOT RELATED TO THE WATER HEATER MANUFACTURE OR PARTS SUPPLIED WITH THE WATER HEATER BY RHEEM.

WATER DISCHARGING FROM EXPANSION CONTROL VALVES

It is normal for the cold water expansion valve and the temperature and pressure relief valve to discharge a small quantity of water during the heating cycle. If either of these valves discharge more than a bucket full of water in 24 hours, one of the following may be the cause.

- **Continuous dribble**
Try gently raising the easing lever on the relief valve for a few seconds. This may dislodge small particles of foreign matter and clear the fault.
- **Heavy flow of hot water until the water is cold – then stops while the water reheats**
Immediately turn off the electricity supply to the water heater. Call the Rheem Service Department or look in the Yellow Pages under "Plumbers" for your nearest Rheem Service Centre or www.rheem.co.nz to arrange an inspection.
- **A steady flow of water (often at night)**
This may indicate that your cold water pressure sometimes rises above the design pressure of the water heater. A Pressure Limiting valve should be installed, or if one is installed, it may need replacing.

NOT ENOUGH HOT WATER (or no hot water)

- **Is the electricity turned on?**
Check the switch marked 'water heater' at the switchboard and the water heater isolating switch.
Check the fuse or circuit breaker marked 'water heater'.

WHERE THE WATER HEATER IS CONNECTED TO AN OFF PEAK (NIGHT RATE) ELECTRICAL TARIFF, THE SUPPLY MAY NOT BE AVAILABLE AT CERTAIN TIMES OF THE DAY.

- **Do you have the correct size heater for your requirements?**
Refer to the sizing guide in the Rheem sales literature or the Rheem website.
- **Is one outlet (especially the shower) using more hot water than you think?**
Carefully review the family's hot water usage and if necessary, check the shower flow rate. For maximum efficiency we recommend the flow rate through the shower is between 8 to 10 litres per minute. This can be achieved by installing a flow control valve if provision is not made to fit a flow restrictor in the shower rose.
- **Ensure the thermostat setting is appropriate. Note, some models require an authorised person to make electrical thermostat adjustments.**

HIGH ELECTRICITY BILLS

- **Is one outlet (especially the shower) using more hot water than you think?**
- **Is there a leaking hot water pipe, dripping hot water tap, etc?**
Even a small leak will waste a surprisingly large quantity of hot water and energy. Replace faulty tap washers, and have your plumber rectify any leaking pipe-work.
- **Is either of the expansion valves discharging too much water?**
- **Consider recent changes to your hot water usage pattern and check if there has been an increase in tariffs since your previous account.**

INSTALLATION

Please take careful notice of the advice given as Rheem New Zealand Limited will not be liable for any loss or damage suffered as a result of the incorrect installation of the water heater, or any failure to check the capability of the electrical supply, wiring to the water heater.

The water heater must be installed by a certified person or registered plumber and the installation must comply with the New Zealand Building Code, Rheem Installation Instructions, AS/NZS 3000 electrical installations and all local codes and regulatory authority requirements. Note that no warranty costs will be payable where the water heater is located in a position that does not comply with the Rheem water heater installation instructions or relevant statutory requirements, causing the need for major dismantling or removal of cupboards, doors or walls, or use of special equipment to bring the water heater to floor or ground level or a serviceable position.

- **WATER HEATER LOCATION**

Water heaters with a galvanised outer casing are only suitable for indoor installations, whereas water heaters with a painted casing are suitable for both indoor and outdoor installations.

Clearance must be allowed for servicing and removal of the water heater and it must be accessible without the use of a ladder or scaffold. (Typical clearances are: TPR valve removal 135 mm, Element Cover and Element Removal 400 mm). Also, you must be able to read the information on the rating plate and if possible, leave headroom of one water heater length so the anode can be inspected or replaced.

- **CONNECTION SIZES**

- Hot water connection: RP $\frac{3}{4}$ /20.
- Cold water connection: RP $\frac{3}{4}$ /20.
- Relief valve connection: RP $\frac{1}{2}$ /15.

- **INLET/OUTLET CONNECTIONS**

A union must always be provided at the cold water inlet and hot water outlet for disconnection reasons. All connection sockets on the water heater are parallel threaded and therefore tapered brass nipples must be used to ensure watertight connections. Both connections are fitted with plastic liners and it is important that they remain in situ for the water heater to function properly. These liners will be pushed into the correct position as the fitting is being screwed in.

- **NON RETURN VALVE**

A non return valve must be installed on the cold water line to the water heater.

PIPE SIZES

The cold water line to the water heater should be the same size or bigger than the hot water line from the water heater. For best results, choose the most suitable pipe size for each individual application.

COLD WATER EXPANSION VALVE

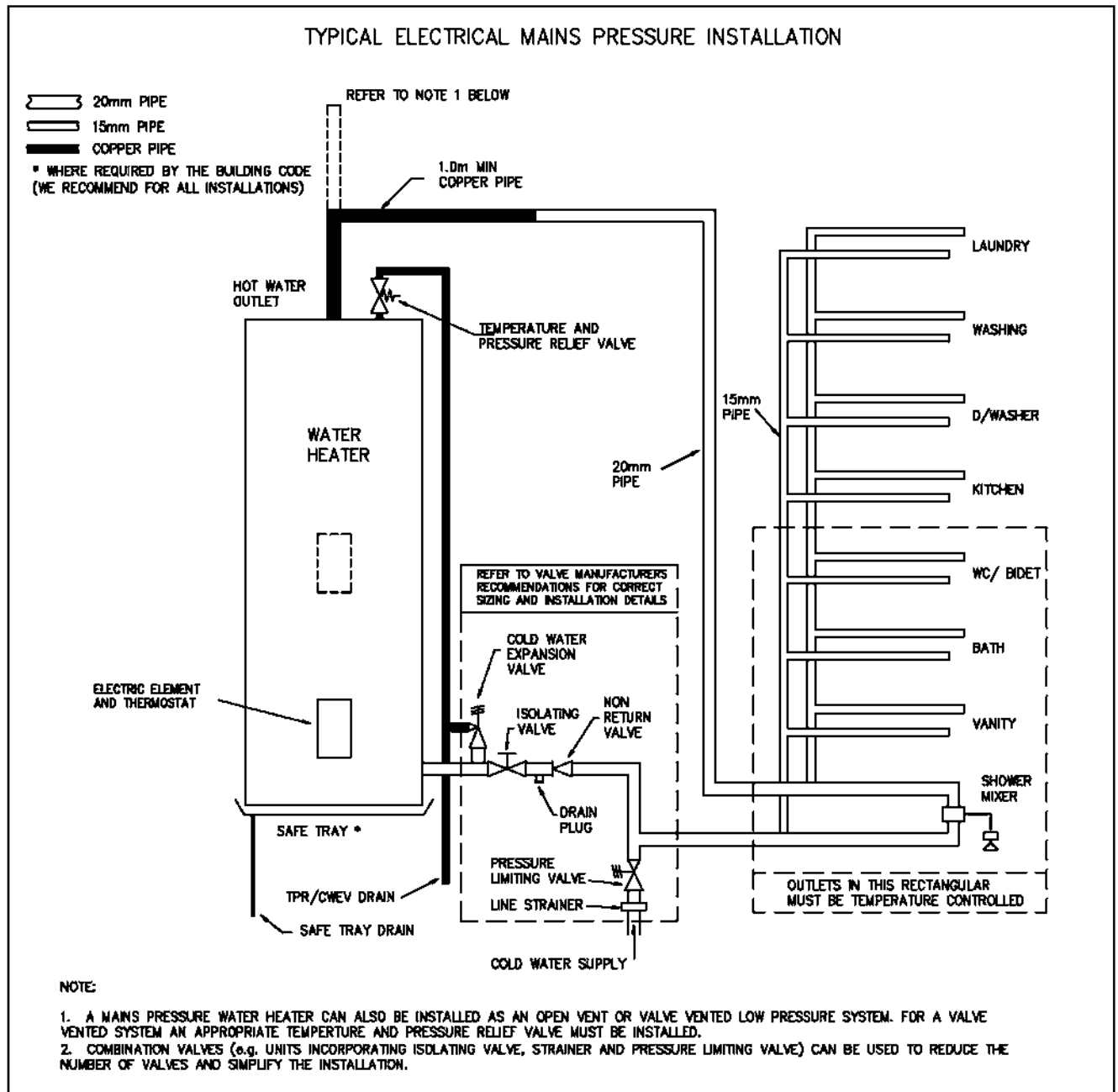
A cold water expansion valve must be fitted to the cold water line to the water heater.

TEMPERATURE AND PRESSURE RELIEF VALVE

When fitting the temperature and pressure relief valve, ensure the probe has not been bent. Seal the thread with PTFE tape, or similar, as recommended by the valve manufacturer and screw the valve into the off-centre socket. Do not use a wrench on the valve body – use the spanner flats provided. Drain the TPR valve with a pipe the same size as the valve outlet. The drain must run downwards to a visible point outside the house, preferably over a gully trap. In locations where the pipe exceeds 3 metres unbroken length, or freezing could occur, an air break must be provided within 300 mm of the TPR valve.

Warning: The drain line from the TPR valve must be in copper. A Rheem mains pressure water heater must **not** be installed and operated without a suitable (valve that complies with AS 1357.1) temperature and pressure relief valve. Under no circumstances block the outlet of this valve or its drain pipe.

DIAGRAM 2:



WATER SUPPLY PRESSURE

Maximum permitted mains water pressure - refer product label and Table 5.2 AS/NZS 3500.4. Note inlet pressure control valve is required where maximum permitted mains pressure is likely to be exceeded.

Minimum inlet pressure: 60 kPa

- **PRESSURE LIMITING/REDUCING VALVE**

If the water supply pressure exceeds the requirements of Table 5.2 AS/NZS 3500.4, a pressure limiting valve with a maximum setting of 500 kPa is to be fitted in the installation.

- **SAFE TRAY AND SEISMIC RESTRAINTS**

The water heater must be installed with a properly drained safe tray where there is the possibility of water damage to furniture, carpets or building. All water heaters must be restrained to protect against seismic forces. (Refer to the Zealand Building Code for acceptable solutions.)


CONNECTIONS - ELECTRICAL

The electrical installation must be completed in accordance with AS/NZS 3000. All water heaters are designed for 230 VAC, 50 Hz mains operation and a means of disconnection from the power supply must be incorporated in the fixed wiring during installation.

A flexible 20 mm conduit is required for the electrical cable to the water heater. The conduit is to be connected to the unit with a 20 mm plain to screw adaptor. Connect the power supply wires directly to the terminal block and earth tab connection, ensuring there are no excess wire loops inside the front cover. For details, refer to the wiring diagram on the inside of the element cover. **A separate heating element earth wire is not required because the element earths by the thread of the element boss or the flange being in contact with the element socket.**

COMMISSIONING

TO FILL AND TURN ON THE WATER HEATER

 **Warning:** *The power supply to the water heater must not be switched on until the water heater is filled with water and an "earth continuity test", as outlined in Annex A of AS/ANZ 60335.1 has been carried out. Failure to do so will damage the element and shorten its life and may create a dangerous situation.*

- Open all of the hot water taps in the house (don't forget the shower). Open the cold water isolation valve fully to the water heater to force the air out of the taps. As water flows freely from each tap, close it. Check the pipe-work for leaks.
- Switch on the electrical supply at the isolating switch to the water heater.

TO TURN OFF THE WATER HEATER

If it is necessary to turn off the water heater on completion of the installation, such as on a building site or where the premises is vacant, then;

- Switch off the electrical supply at the isolating switch to the water heater.
- Close the cold water isolation valve at the inlet to the water heater.


DRAINING THE WATER HEATER

- Switch off the electrical supply at the isolation switch to the water heater.
- Close the cold water isolation valve.
- Operate the relief valve easing lever to release the pressure in the water heater.
- Drain the water heater through the drain valve or plug.
- Undo the top outlet union or operate the relief valve easing lever again to let air into the water heater and allow the water to drain

WHAT YOU SHOULD KNOW ABOUT WATER QUALITY

WATER SUPPLY CHEMISTRY

Water quality can have a detrimental effect on water heater operation, components and life expectancy and may affect the warranty.

 **Warning:** *This water heater must be installed in accordance with advice given to be covered by the Rheem warranty.*

Your Rheem water heater is manufactured to suit the water condition of most local authority water supplies. However, some water supplies can have a detrimental effect on the water heater and its operation and/or life expectancy. This water heater must only be connected to a water supply which complies with these specifications for the Rheem warranty to apply. If you are unsure of your water chemistry you may be able to obtain information from your local water supply authority or you can contact Rheem and we will provide you with contact details of a suitable agency capable of testing your water for compliance with Rheem standards. Water quality tests must be carried out at the owner's cost.

HARSH WATER AREAS

Rheem water heaters are designed for use in areas where the Total Dissolved Solids (TDS) content of the water supply is less than 2500 mg/L.

In areas where the TDS exceeds 600 mg/L it is possible the standard magnesium anode fitted to the water heater, may be excessively active. To alleviate this, the magnesium anode should be replaced with an aluminium anode. Where the TDS of the water is less than 40 mg/L, such as when the water has been deionised or is from an alpine supply, a high potential anode should be used. The changing of anodes must be carried out by a plumber or qualified service person.

CAUTION

If your water supply has a TDS greater than 600 mg/L and the anode has not been changed, there is a possibility of hydrogen gas accumulating in the top of the water heater during long periods of no use.

If, under these conditions, the water heater has not been used for two or more weeks the following procedure should be carried out before using any electrical appliances (e.g. automatic washing machines and dishwashers) which are connected to the hot water supply.

The hydrogen, which is highly flammable, should be vented safely by opening a hot tap and allowing the water to flow. There should be no smoking or naked flames near the tap whilst it is turned on. Any hydrogen gas will be dissipated as indicated by an unusual spurting of the water from the tap. Once the water runs freely again any hydrogen in the system will have been released.

SATURATION INDEX

The saturation index is used as a measure of the water's corrosive or scaling properties. In a scaling water supply calcium carbonate is deposited out of the water onto any hot metallic surface. When scaling water has a saturation index greater than +0.40 an expansion control valve must be fitted on the cold water line after the non-return valve.

Where the saturation index exceeds +0.80, low watts density elements should be used. Where the saturation index is less than -1.0, a corrosive resistant heating unit should be used (contact your local Rheem Service Department or an authorised service person).

Scaling water is water that containing levels of calcium carbonate (total hardness in excess of 200 mg/litre at any time when the water heater is operating) Scaling water can block and prevent the pressure & temperature relief valve from operating, resulting in damage to the water heater storage cylinder and water components.

A cold water expansion control valve must be fitted where in all areas with scaling water to assist in preventing blockage of the pressure and temperature relief valve.



Warning: *Failure to install an expansion control valve where scaling water conditions occur may result in the water storage cylinder failing or under certain circumstances exploding.*

To avoid damage to the storage cylinder and components Rheem strongly recommends scaling water be treated before entering the water heater by fitting appropriate water filters, conditioners, etc – refer to your local water authority for information on water in your area. A build up of white sediment on the hot taps or shower rose can be indicative of scaling water. Contact Rheem if this condition is observed.



Warning: *Damage caused by scaling water can affect the Rheem warranty.*

The Rheem warranty of this water heater will not cover resultant faults on components, including storage tank, due to the effects of sludge and/or sediment as a result of connection to a water supply from silted or untreated sources, i.e. springs, dams, bores, rivers or town supplied from a bore.

WATER HEATERS NOT INSTALLED IN ACCORDANCE WITH THE ABOVE ADVICE WILL NOT BE COVERED BY THE RHEEM WARRANTY.

RHEEM WARRANTY

Mains Pressure Electric Water Heater Product Warranty New Zealand Only

In addition to your legal right, in New Zealand Rheem New Zealand Limited makes the following promise to the owner. We will repair, or if necessary, replace a defective water heater or part of it which has failed due to faulty manufacture on the following terms and conditions:

1. THE RHEEM WARRANTY GENERAL

- 1.1 This warranty is given in respect of sales in New Zealand by Rheem New Zealand Ltd company number 1175771, 475 Rosebank Road, Avondale, Auckland.
- 1.2 Rheem offers a trained and qualified national service network that will repair or replace components at the address where the water heater is installed subject to terms of Rheem warranty in New Zealand – contact your Rheem Service Centre on 0800 657 335
- 1.3 For details about this warranty you can contact us in New Zealand at rheem@rheem.co.nz or phone your Rheem Service Centre on 0800 657 335.
- 1.4 The terms of this warranty are set out in Section 2 and apply to water heaters manufactured after 1st July 2012.
- 1.5 If a subsequent version of this warranty is published the terms of that warranty will apply to water heaters manufactured after the date in the subsequent version.

2. TERMS OF THE RHEEM WARRANTY AND EXCLUSION TO IT

- 2.1 The decision of whether to repair or replace a faulty component is at Rheem New Zealand sole discretion.
- 2.2 Where the water heater is installed outside the boundaries of a metropolitan area as defined by Rheem New Zealand limited or further than 25 km from a Rheem New Zealand accredited service centres office the cost of transport insurance and travelling between the Rheem New Zealand accredited service centre and the installed site shall be the owners responsibility.
- 2.3 Where the water heater is installed in a position that does not allow safe or ready access the cost of that access including the cost of additional materials handling and/or safety equipment shall be the owners responsibility. In other words the cost of dismantling or removing cupboards doors or walls and the cost of any special equipment to bring the water heater to floor or ground level or to a serviceable position.
- 2.4 This warranty only applies to the original and genuine Rheem New Zealand Limited water heater in its original installed location and any genuine Rheem replacement parts.
- 2.5 The Rheem New Zealand limited warranty does not cover faults that are the result of:
 - (a) Accidental damage to the water heater or any component (for example:
 - (i) Acts of god such as floods, storms, fires, lightning, strikes and the like and
 - (ii) Third party acts of omission.
 - (b) Misuse or abnormal use of the water heater.
 - (c) Installation or use not in accordance with the owners Guide and installation Instructions or the relevant statutory and local requirements including failure to install a properly drained safe tray where required by the Owners Guide and Installation Instructions.
 - (d) Connection at any time to a water supply that does not comply with the water supply guidelines as outlined in the owners guide and installation instructions, or poor water quality outside the limits specified in the owners guide and installation Instructions.
 - (e) Service repair work or attempts to repair or modifications to the water heater by a person other than Rheem Service or Rheem accredited service centre.
 - (f) Faulty plumbing or faulty power supply.
 - (g) Failure to maintain the water heater in accordance with the owners guide and Installation instructions.
 - (h) Transport damage.

- (i) Fair wear and tear from adverse conditions (for example corrosion).
- (j) Cosmetic defects .

2.6 If you require a call out and we find the fault is not covered by Rheem Warranty you are responsible for Rheem Service Centre call out costs if you wish to have the relevant component repaired or replaced by Rheem that service will be at your cost.

2.7 Subject to statutory provisions to the contrary this warranty excludes any and all claims however arising including under contract or tort for damage to furniture carpet walls foundations or any other consequential loss or incidental expenses either directly or indirectly due to leakage from the Rheem water heater or due to leakage from fittings and/or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure that were not reasonably foreseeable as liable to result from the failure.

2.8 This warranty excludes to the extent permissible all implied warranties set out in the sale of goods act 1908 (new Zealand) and all guarantees set out in the consumers guarantees act 1933 (New Zealand) to the extent that the goods are acquired for the purpose of resupply in trade consumption in the course of a process of production or manufacture or repairing or treating in trade other goods or fixtures on land.

1. WHAT IS COVERED BY THE RHEEM WARRANTY FOR THE WATER HEATERS DETAILED IN THIS DOCUMENT

1.1 Rheem will repair or replace a faulty component of your water heater if it fails to operate in accordance with its specifications as follows:

Product Model	Application	Period from installation in which the fault must appear in order to be covered	
		All components including inner tank.	Inner tank only
Standard Mains Pressure VE (Vitreous Enamel) and Calorifier VE and Standard Low Pressure VE (Vitreous Enamel)	Installed in a single-family domestic dwelling. (Thermostat setting must be below 76°C)	Year 1: Repair and/or replacement of the faulty component, free of charge, including labour.	Year 2 to 3: Replacement water heater, free of charge. including labour costs. Year 4 to 7: Replacement water heater, free of charge. Installation and repair labour costs are the responsibility of the owner.
	All applications other than single-family domestic dwelling. (Thermostat setting must be below 76°C)	Year 1: Repair and/or replacement of the faulty component, free of charge, including labour.	Year 2 to 3: Replacement water heater, free of charge. Installation and repair labour costs are the responsibility of the owner.
Mains Pressure SS (Stainless Steel) All models.	Installed in a single-family domestic dwelling.	Year 1: Repair and/or replacement of the faulty component, free of charge, including labour.	Year 2 to 4: Replacement water heater, free of charge. including labour costs. Year 4 to 10: Replacement water heater, free of charge. Installation and repair labour costs are the responsibility of the owner.
	All applications other than single-family domestic dwelling.	Year 1: Repair and/or replacement of the faulty component, free of charge, including labour.	Year 2 to 3: Replacement water heater, free of charge. Installation and repair labour costs are the responsibility of the owner.
Optima VE (Vitreous Enamel)	Installed in a single-family domestic dwelling (Thermostat setting must be below 76°C)	Year 1 to 4: Repair and/or replacement of the faulty component, free of charge, including labour.	Year 5 to 10: Replacement water heater, free of charge. Installation and repair labour costs are the responsibility of the owner.
	All applications other than single-family domestic dwelling. (Thermostat setting must be below 76°C)	Year 1: Repair and/or replacement of the faulty component, free of charge, including labour.	Year 2 to 5: Replacement water heater, free of charge. Installation and repair labour costs are the responsibility of the owner.

WARRANTY CONDITIONS

- The water heater must be installed and maintained in accordance with the Rheem Installation Guides supplied with the water heater, and comply fully with all the requirements of the New Zealand Building Code.
- The warranty applies to the faulty manufacture of the water heater only and does not cover any plumbing, gas fitting or electrical parts supplied by the installer, that are not an integral part of the water heater, e.g. pipe-work, pressure limiting valve, stop valves, non-return valves, electrical switches, pumps and fuses.

WARRANTY INFORMATION**WARRANTY EXCLUSIONS:**

The Rheem Warranty does not cover repair or replacement work to the water heater or its components caused directly or indirectly by:

1. Accidental damage
2. Acts of God
3. Failure due to misuse
4. Incorrect installation
5. Attempts to repair the water heater, other than by a Rheem Authorised Service Centre, or the Rheem Service Department
6. Excessive water pressure, negative pressure or excessive heat input
7. Non compliance with a) the Rheem Installation Instructions, b) relevant statutory regulations, c) New Zealand Building Code requirements.

This warranty does not include any additional costs, for removing a heater where dismantling or removal of other materials is required, that is, walls, doors or roofs or trap doors. Where the water heater is installed in a position that does not allow ready and safe access the cost of that access including the cost of materials and/or safety equipment shall be the owner's responsibility, including equipment to bring the water heater to the floor or ground level. Rheem New Zealand Limited will not pay claims for damage to furniture, carpets, walls, foundations or any other consequential loss either directly or indirectly due to leakage or other causes from a water heater.

Repairs to the water heater due to chemical/scale formation in waterways when the heater has been connected to a harmful water supply as outlined on page 7 of the Owner's Manual.

Service under this warranty can be provided by a **RHEEM AUTHORISED SERVICE CENTRE**.

Such services will be provided during their normal business hours.

Additional mileage and cartage charges shall be made for any water heater installed in a location exceeding 25km from the nearest Rheem Service Centre.

Note: You may have other rights in addition to this warranty under the "Consumer Guarantees Act 1993".

RHEEM SERVICE DEPARTMENT, 475 Rosebank Road, Avondale, Auckland

Phone: 0800 657 335, Fax: 09 829 0222

Or consult the Yellow Pages under "Plumbers" for your nearest Rheem Authorised Service Centre



PRODUCER STATEMENT - PS1 -DESIGN

ISSUED BY: McDonald Concrete Group
TO: Coast Arch Design
IN RESPECT OF: 168 Karuhiruhi Street, Waikanae

We have been engaged by the designer referred to above to provide services in the respect of the requirements of
 10,000 L Eletank Supply and installation into prepared site

Clause(s) AS/NZS 3106: 2009 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: AS/NZS 3106:2009 & AS/NZS 1546.1;2012

On behalf of the design firm, and subject to:

- (i) Site verification of the following design assumptions; Tank to have maximum of 300mm Soil Loading
- (ii) All propriety products meeting their performance specification requirements;

I believe on reasonable grounds the building, if constructed in accordance with the drawings, specifications and other documents provided or listed in the schedule, will comply with relevant provisions of the building code.

I,.....Stuart Ian McDonald am principal designer for McDonald Concrete Group.
 designer for Septech New Zealand

SIGNED BY

Date:...17/03/23

BC220926
 Received by
 Kapiti Coast District Council
 16/03/2023



RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy



R. W. Muir
Registrar-General
of Land

Identifier **1089923**
Land Registration District **Wellington**
Date Issued 21 December 2023
Prior References
920990

Estate Fee Simple
Area 782 square metres more or less
Legal Description Lot 68 Deposited Plan 582129

Registered Owners

Lynn Christine Parsons and Maurice Glen Parsons

Interests

9099897.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 1.10.2012 at 11:53 am
9099897.8 Encumbrance to Charles Fleming Retirement Village Limited - 1.10.2012 at 11:53 am
10089378.1 Variation of Consent Notice 9099897.6 pursuant to Section 221(5) Resource Management Act 1991 -
10.6.2015 at 9:54 am
10089378.2 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 10.6.2015 at 9:54 am
10268001.2 Variation of Consent Notice 9099897.6 pursuant to Section 221(5) Resource Management Act 1991 -
19.1.2016 at 4:29 pm
10936482.1 Variation of Consent Notice 10089378.2 pursuant to Section 221(5) Resource Management Act 1991 -
2.11.2017 at 11:25 am
12643497.5 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 21.12.2022 at 5:28 pm
Land Covenant in Covenant Instrument 12663739.1 - 8.2.2023 at 9:01 am

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Consent No: **230147**

Applicant: **Bill Francis**

Site Address: **168 Karuhiruhi Street, Waikanae**

Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Postline / Wet area Pre Application**

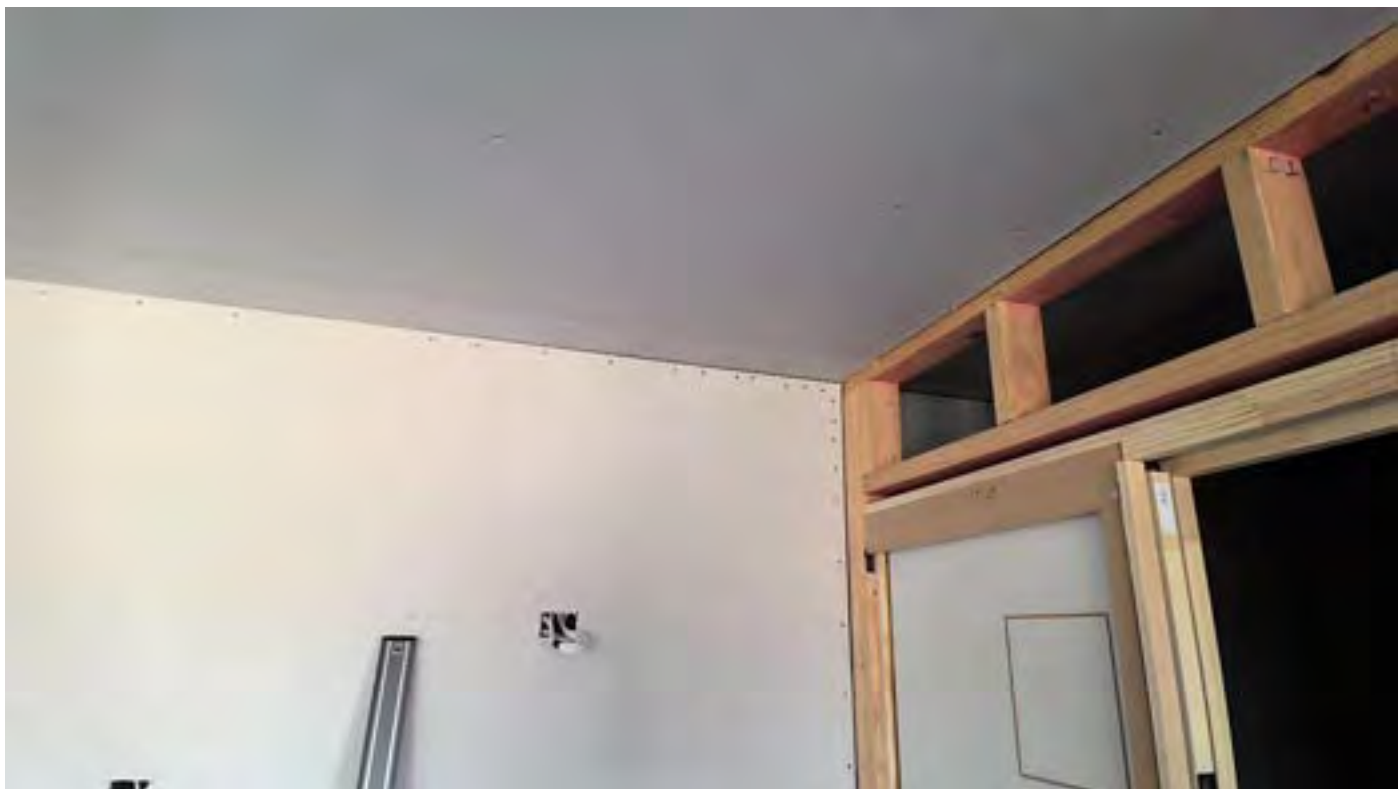
Inspection Outcome: **Pass**

Inspected By: **John Peterson**

Inspection Date: **8 September 2023 2:45 p.m.**

Duration: **15 minutes**

Inspection Element	Status
General	Pass
Sighted previous inspection notes	Pass
Post line and half height brick	
Conforms with approved drawings	Pass
Confirm additional information/amended plan	N/A
Sheet bracing	Pass
Sheet fixings	Pass
Fire/acoustic separation	N/A
Agent/owner written approval	N/A
Wet area substrate system	Pass
Aqualine to bathrooms - the shower unit are acrylic	
LBP number	Pass
non compliance discussed onsite	N/A
Next Inspection required	Pass
Drainage or final	
Other	N/A



Kitchen - typical GS fix pattern adjacent to scullery
Taken at 10:44 AM on Friday 8/09/2023



main bathroom - Note: acrylic shower units - Aqualine fixed off for tiled half height wall beyond shower
Taken at 10:45 AM on Friday 8/09/2023



East

Taken at 10:46 AM on Friday 8/09/2023



N/E corner

Taken at 10:47 AM on Friday 8/09/2023



North

Taken at 10:47 AM on Friday 8/09/2023



North slider off living area - typical tie set up for bottom course

Taken at 10:49 AM on Friday 8/09/2023



DPC at the wet/dry cavity junction
Taken at 10:51 AM on Friday 8/09/2023

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Consent No: **230147**

Applicant: **Bill Francis**

Site Address: **168 Karuhiruhi Street, Waikanae**

Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Brick Veneer**

Inspection Outcome: **Pass**

Inspected By: **John Peterson**

Inspection Date: **8 September 2023 2:49 p.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Pass
Min/max cavity achieved	Pass
Brick tie fixings	Pass
Washouts	Pass
Weep holes	Pass
Mortar strength	N/A
Mortar bedding	Pass
Flashings	Pass
Brick tie durability	Pass
Building wrap	Pass
Under window vents	Pass
Rebate	Pass
Blackseal applied	
Veneer overhang	Pass
Brick tie spacing	Pass
Head lintels	N/A
Control joints	N/A
LBP number	Pass
Agent/owner written approval	N/A
non compliance discussed onsite	N/A
Next Inspection required	Pass
Drainage or final	
Other	N/A

SITE NOTICE

Consent No: **230147**
 Applicant: **Glen Parsons**
 Site Address: **168 Karuhiruhi Street, Waikanae**
 Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**
 Building Category: **R1**

Inspection Type: **Postline / Wet area Pre Application**
 Inspection Outcome: **Pass**
 Inspected By: **John Peterson**
 Inspection Date: **8 September 2023**

Passed Items

General

Sighted previous inspection notes	Post line and half height brick
Conforms with approved drawings	
Sheet bracing	
Sheet fixings	
Wet area substrate system	Aqualine to bathrooms - the shower unit are acrylic
LBP number	
Next Inspection required	Drainage or final

Inspection Type: **Brick Veneer**
 Inspection Outcome: **Pass**
 Inspected By: **John Peterson**
 Inspection Date: **8 September 2023**

Passed Items

General

Min/max cavity achieved	
Brick tie fixings	
Washouts	
Weep holes	
Mortar bedding	
Flashings	
Brick tie durability	
Building wrap	
Under window vents	
Rebate	Blackseal applied
Veneer overhang	
Brick tie spacing	
LBP number	

Next Inspection required

Drainage or final

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Consent No: **230147**

Applicant: **Bill Francis**

Site Address: **168 Karuhiruhi Street, Waikanae**

Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Drainage**

Inspection Outcome: **Fail**

Inspected By: **Gareth McCullagh**

Inspection Date: **1 June 2023 2:04 p.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Fail
Pipe diameter Stormwater 100mm sewer 100mm	Pass
Bedding material Sandy soil	Pass
Gully trap In place	Pass
Connections/angles Swept junctions and inspection	Pass
Branch length	Pass
Direction/fall Sewer good fall lateral stormwater to tank	Pass
Holding water	Pass
Terminal vent Not assessed at this inspection	N/A
Registration number 22876	Pass
Stormwater sumps Still to complete	Fail
Elevated drainage	N/A
Soak pit Covered by engineer	Pass
Agent/owner written approval	N/A
non compliance discussed onsite	N/A
Next Inspection required	N/A
Other	N/A



Taken at 2:01 PM on Thursday 1/06/2023



Taken at 2:01 PM on Thursday 1/06/2023



Taken at 2:02 PM on Thursday 1/06/2023



Taken at 2:02 PM on Thursday 1/06/2023



Taken at 2:03 PM on Thursday 1/06/2023



Taken at 2:03 PM on Thursday 1/06/2023



Taken at 2:04 PM on Thursday 1/06/2023

SITE NOTICE

Consent No: **230147**
 Applicant: **Glen Parsons**
 Site Address: **168 Karuhiruhi Street, Waikanae**
 Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**
 Building Category: **R1**

Inspection Type: **Drainage**
 Inspection Outcome: **Fail**
 Inspected By: **Gareth McCullagh**
 Inspection Date: **1 June 2023**

Failed Items

General

Stormwater sumps **Still to complete**

Passed Items

General

Pipe diameter	Stormwater 100mm sewer 100mm
Bedding material	Sandy soil
Gully trap	In place
Connections/angles	Swept junctions and inspection
Branch length	
Direction/fall	Sewer good fall lateral stormwater to tank
Holding water	
Registration number	22876
Soak pit	Covered by engineer

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Consent No: **230147**
 Applicant: **Bill Francis**
 Site Address: **168 Karuhiruhi Street, Waikanae**
 Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Final Inspection**
 Inspection Outcome: **Pass**
 Inspected By: **Luke Natrass**
 Inspection Date: **20 December 2024 10:29 a.m.**
 Duration: **60 minutes**

Inspection Element	Status
Exterior	Pass
All previous inspections/notes passed	Pass
All passed items on this inspection have been assessed against the consented documentation.	
Drawings	Pass
Plans on site and reviewed	
Additional information/plan	Pass
All required documentation received on site and uploaded to building file	
Sub-floor ventilation	N/A
Not required as concrete slab installed	
Roof fixings	Pass
Roof has been nailed off as required for pressed metal tiles	
Spouting and down-pipes	Pass
All spouting and downpipes in place and connected to non potable water tank	
Deck structure	N/A
Flashings - roof	Pass
Roof has been flashed as required	
Penetrations - flashings	Pass
All penetrations flashed as required	
Barriers	N/A
Gully dishes	Pass
Org in place	
Stormwater and site drainage	Pass
Stripdrain and sump in place in driveway	
Handrails	N/A
Wastes to gully	Pass
Bathroom vanity waste to org	
Fixings - durability	Pass
All fixings and connections installed as required for the climate zone	
Steps/stairs	N/A
Terminal vents/AAVs	Pass
50 mm terminal vent in place and run through roof, flashed as required	
Brick veneer cladding	Pass
Brick veneer cladding has been finished as required	
Cladding painted/sealed	Pass
All cladding has been painted and sealed as required	
Flashings - windows/doors	Pass
All windows and doors flashed as required	
Cladding ground clearance	Pass
All ground clearances fine at time of final inspection	

Non compliance discussed onsite	N/A
Final check complete	Pass
Other	Pass
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.	
Interior	Pass
All previous inspections/notes passed	Pass
Sighted and failed items have been reassessed where appropriate	
Drawings	Pass
On site and reviewed	
Additional information/plan	N/A
Service areas-floors/walls	Pass
Kitchen, entry, bathrooms and laundry floors sealed as required	
Stair design	N/A
No internal stairs	
Handrails	N/A
Barriers from falling	N/A
Lighting	Pass
Windows and light fixtures in place for natural and artificial lighting	
Laundering	Pass
Laundry with washer, dryer and sink as per consented plans	
Cooking facilities	Pass
Oven and hob in place for cooking facilities	
Smoke detectors	Pass
Fitted within 3m of all sleeping areas , sited and tested, integrated system installed	
Food storage/preparation	Pass
As per consented plans	
Ventilation	Pass
Opening windows, ducted fans to bathroom and laundry and range hood to kitchen as required	
HWC flues	Pass
Hwc flued via safetray and tundish	
HWC restraint	Pass
The required number (3)of straps/blocking is fitted appropriate for the size of the cylinder	
Tempering valve	Pass
A tempering valve is fitted and the temperature of the hot water to sanitary fixtures has been checked for appropriate temperature of 52 deg	
Glazing - human impact	Pass
Safety glass installed to windows and doors where required including shower screens	
Window restrictors	N/A
Hot water temp	Pass
52 deg	
Solid fuel heater	N/A
Water supply tank	Pass
Non potable water	
Trap seals and AAVS	Pass
All vanities, sinks and tubs are trapped as required	
Cistern flushing	Pass
Toilets flushing as required and running off non potable water	
WC pan connection	Pass
Toilet bolted and sealed as required	
Non potable water signs	Pass
Non potable water signs in place above hose taps	
Septic system	N/A

Window labels	N/A
Non compliance discussed onsite	N/A
Final check complete	Pass
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.	
Other	Pass
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.	
Intertenancy/commercial	N/A
Other	N/A

Residential Documentation

Application for CCC	Received
Electrical safety certificate - Electrician	Received
As-built drainage plan	Received
Drainage (Form 126) for stormwater & private Sewer installation	Received
Plumbing (Form 125) for pressure test and installation piped services	Received
Construction review PS4 statement for structural engineering	Received
Construction review PS4 statement for geo-technical engineering	Received
Membrane applicator certificates - internal wet area	Clear



front entry

Taken at 9:53 AM on Friday 20/12/2024



Street front

Taken at 9:54 AM on Friday 20/12/2024



Dtrip drain in driveway
Taken at 9:54 AM on Friday 20/12/2024



Taken at 9:55 AM on Friday 20/12/2024



non potable water sign
Taken at 9:55 AM on Friday 20/12/2024



Taken at 9:57 AM on Friday 20/12/2024



Solar panels

Taken at 9:58 AM on Friday 20/12/2024



Taken at 9:58 AM on Friday 20/12/2024



Taken at 9:58 AM on Friday 20/12/2024



Taken at 9:58 AM on Friday 20/12/2024



Taken at 9:59 AM on Friday 20/12/2024



terminal vent

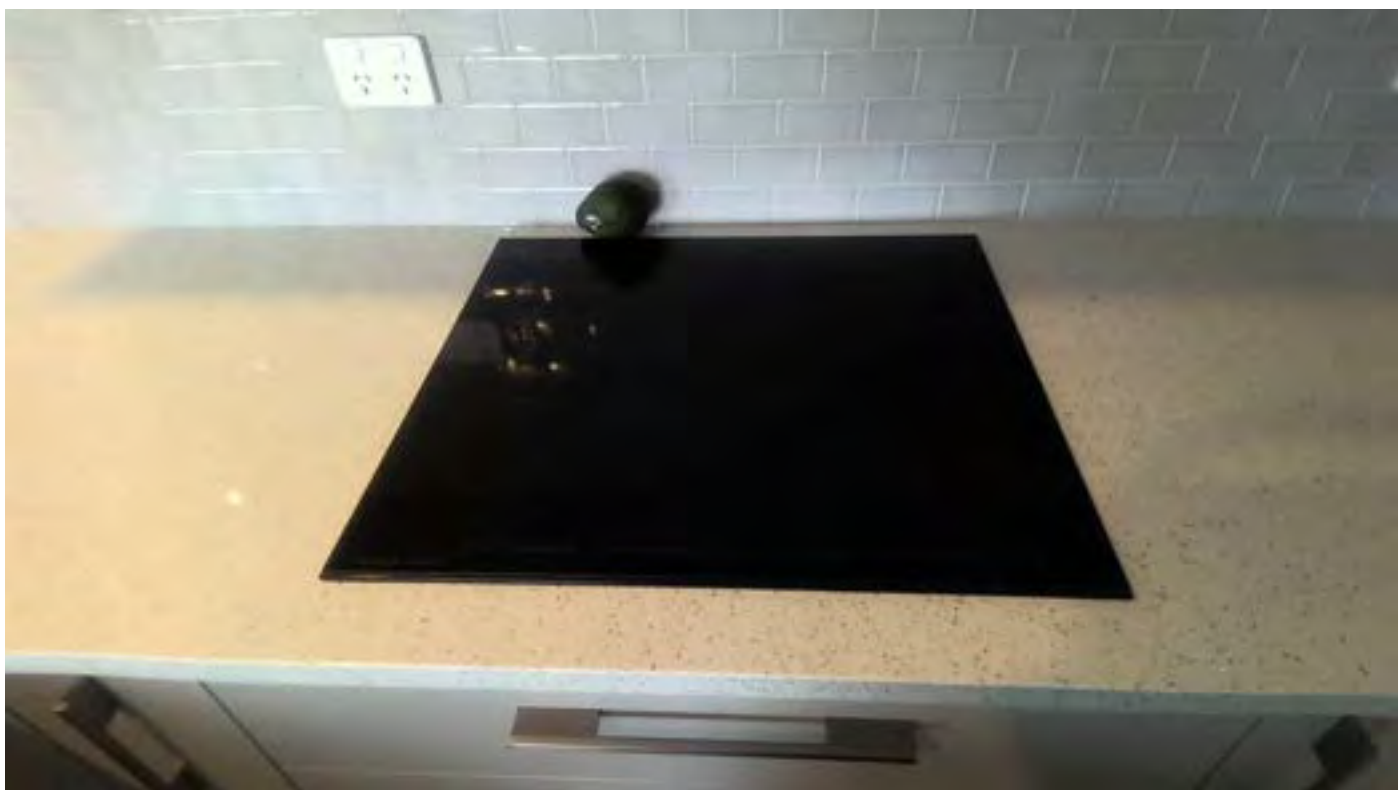
Taken at 10:00 AM on Friday 20/12/2024



Taken at 10:00 AM on Friday 20/12/2024



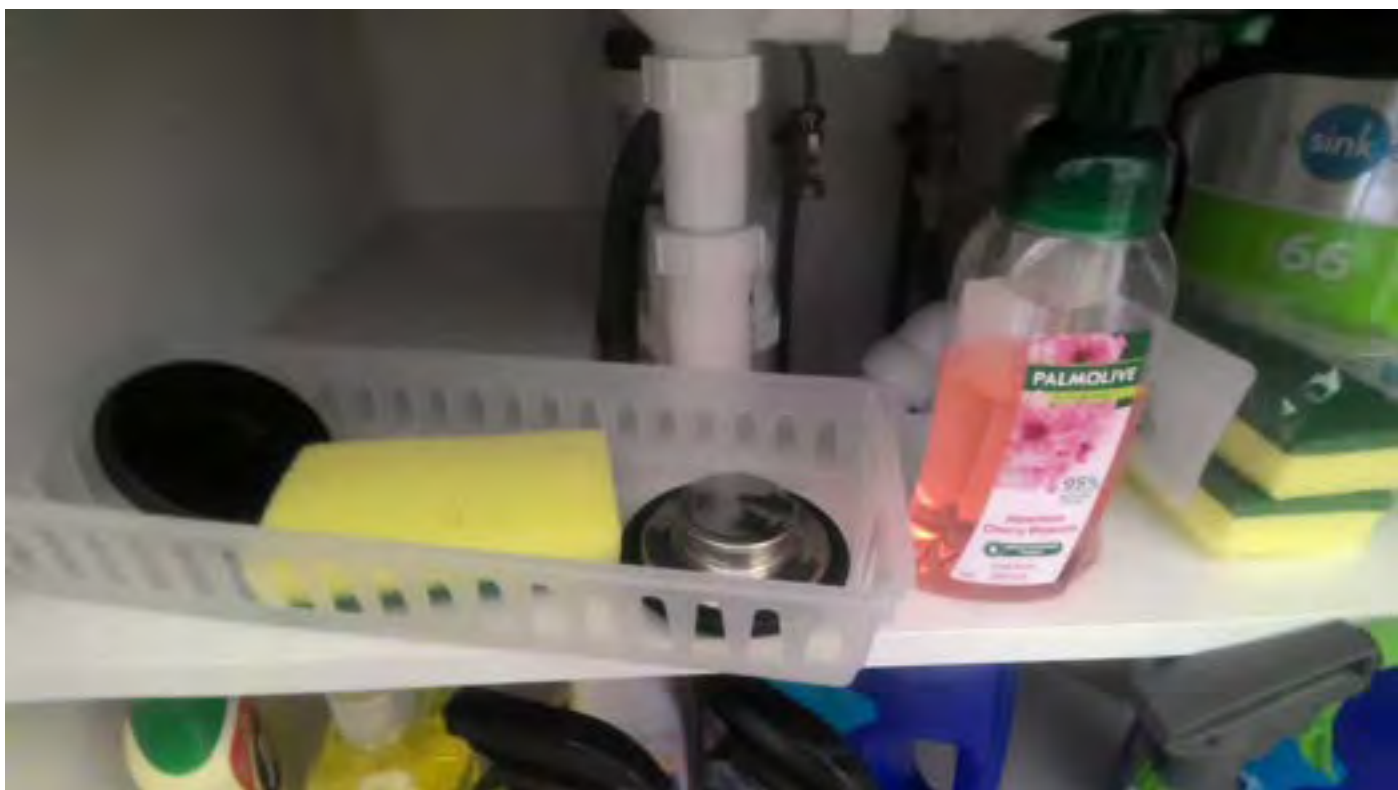
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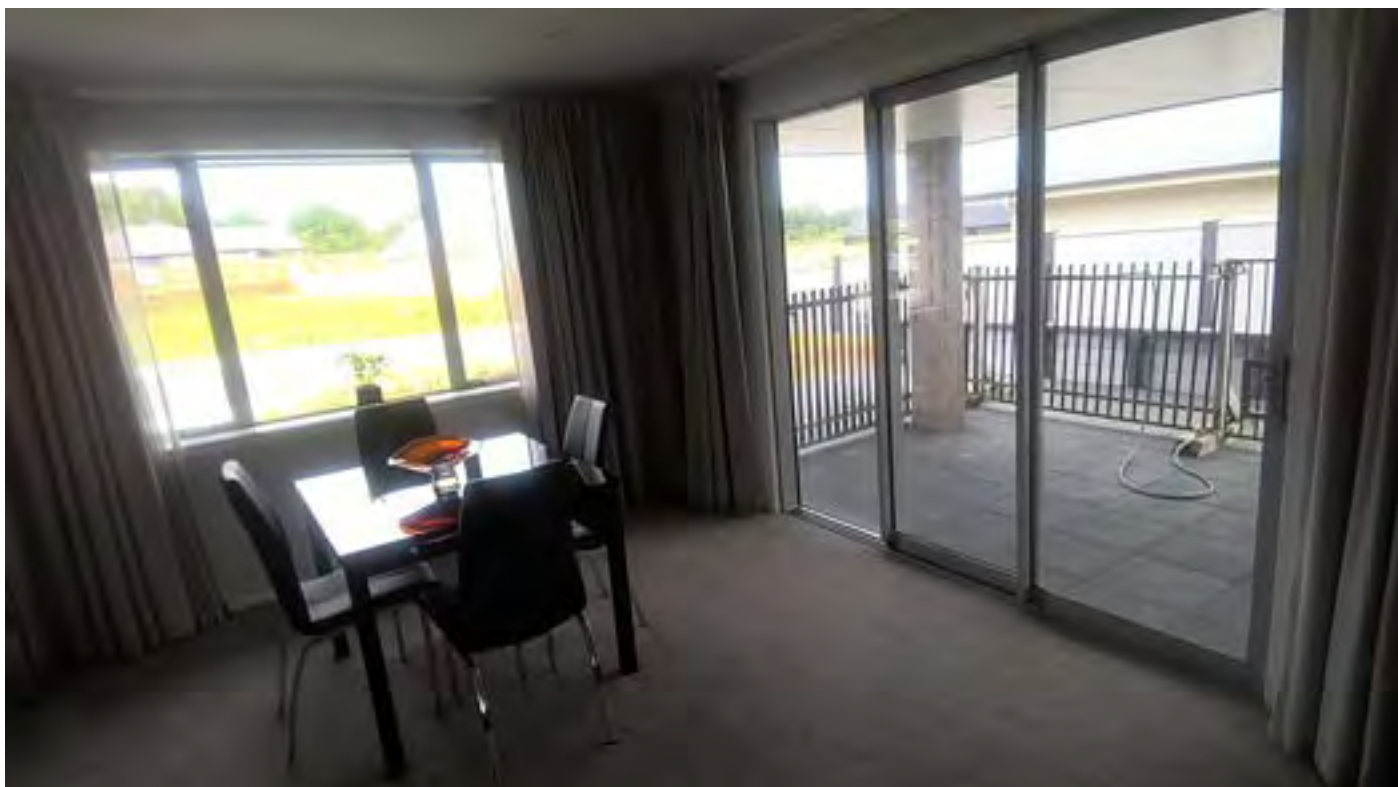
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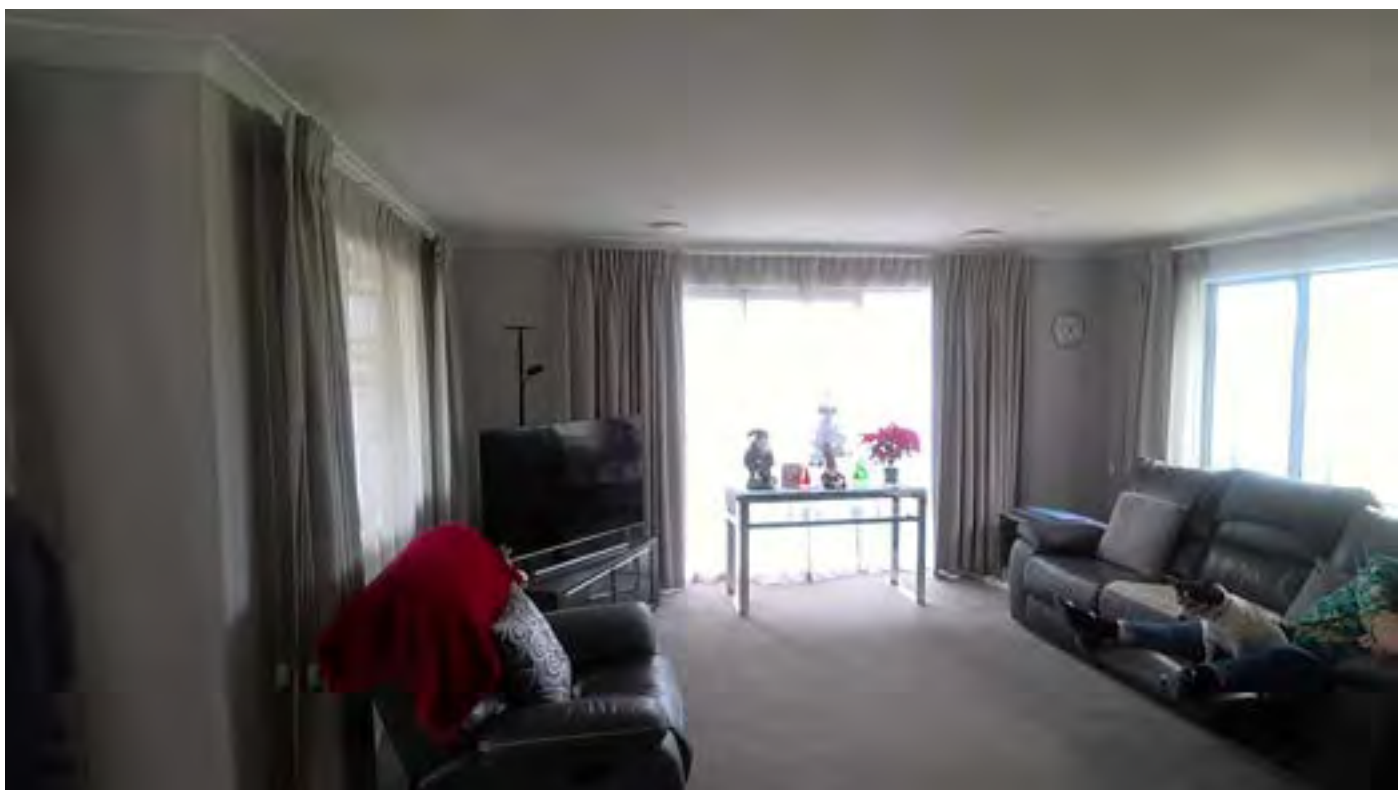
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Taken at 10:07 AM on Friday 20/12/2024



Taken at 10:07 AM on Friday 20/12/2024

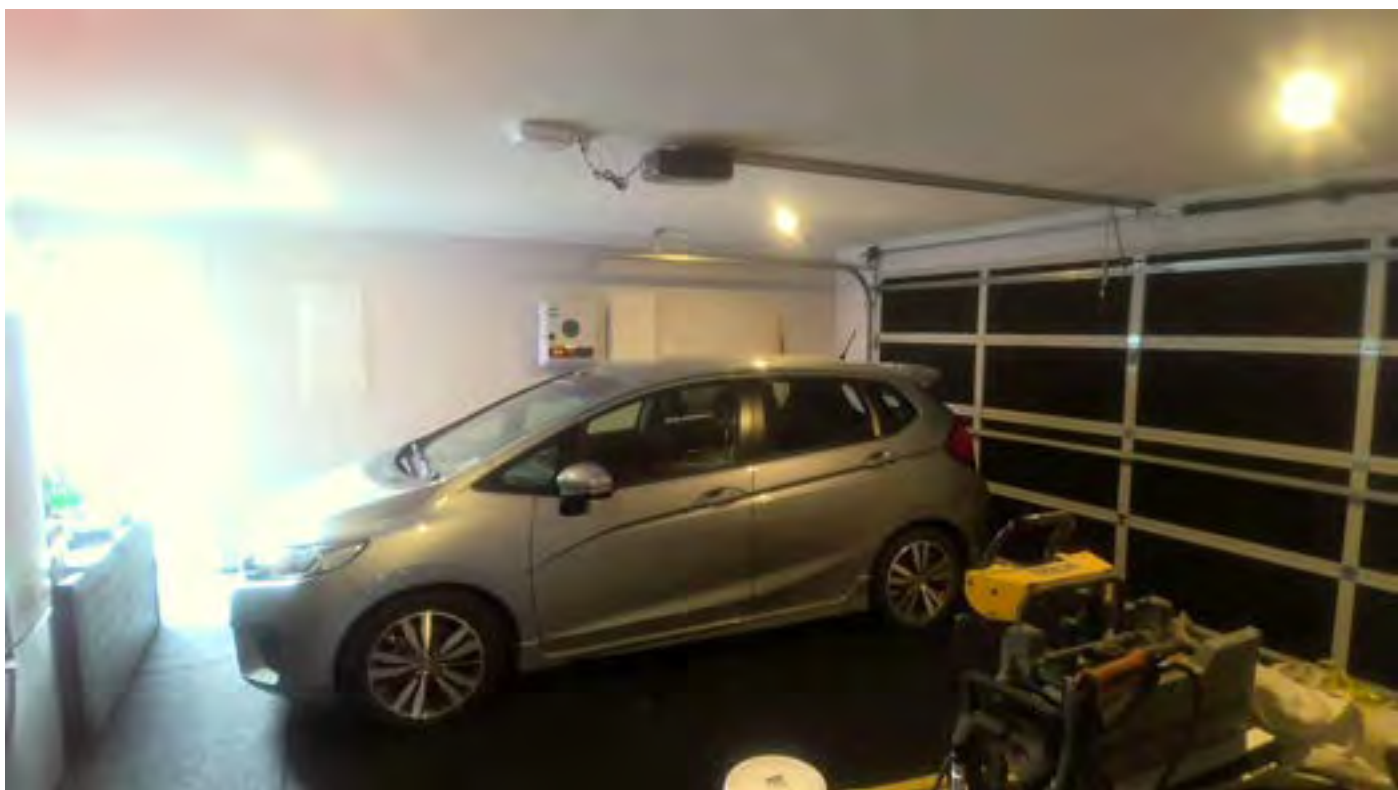


Taken at 10:08 AM on Friday 20/12/2024



front entry

Taken at 10:08 AM on Friday 20/12/2024



Taken at 10:09 AM on Friday 20/12/2024



Taken at 10:13 AM on Friday 20/12/2024



Taken at 10:13 AM on Friday 20/12/2024



Taken at 10:13 AM on Friday 20/12/2024



Taken at 10:14 AM on Friday 20/12/2024



Taken at 10:17 AM on Friday 20/12/2024



Taken at 10:17 AM on Friday 20/12/2024



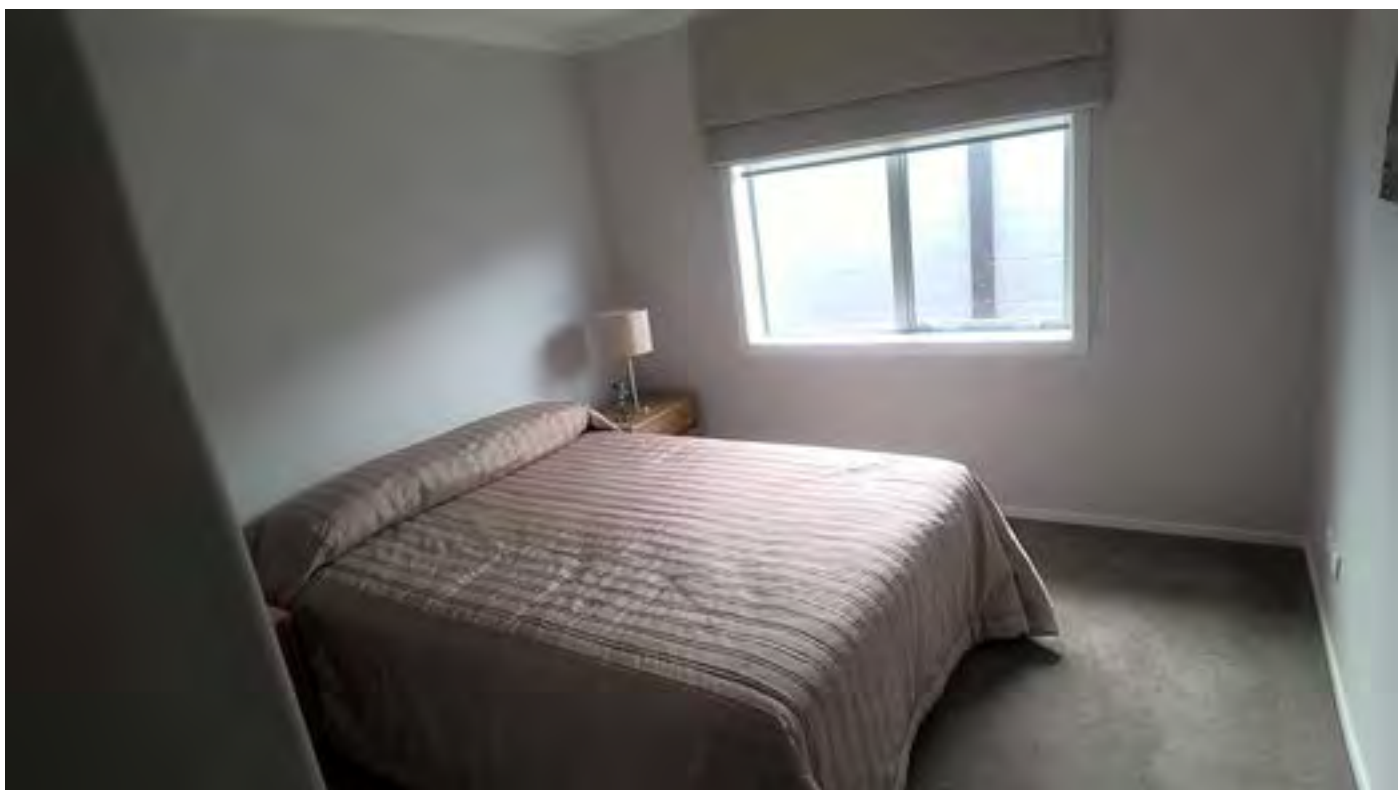
Taken at 10:17 AM on Friday 20/12/2024



Taken at 10:17 AM on Friday 20/12/2024



Taken at 10:17 AM on Friday 20/12/2024



Taken at 10:18 AM on Friday 20/12/2024



main bathroom

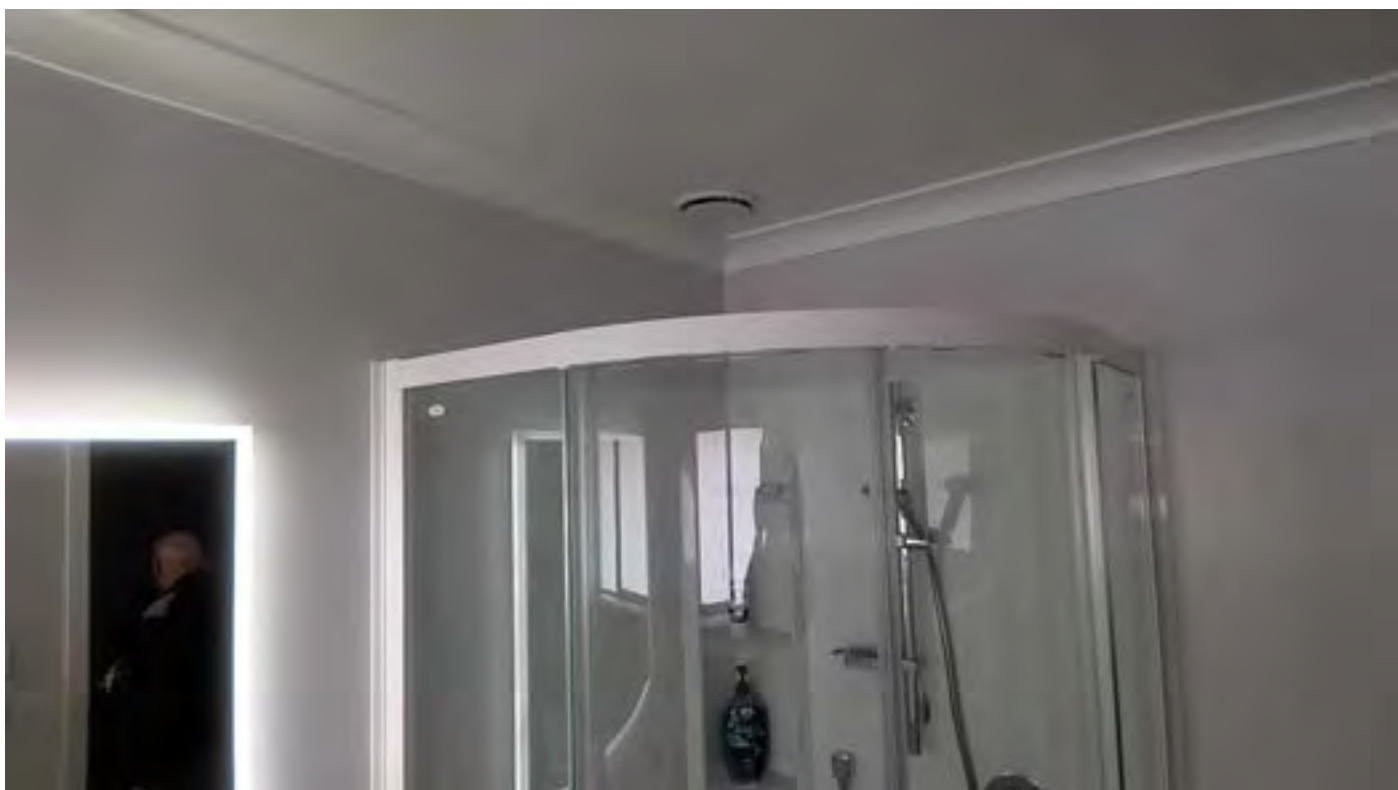
Taken at 10:18 AM on Friday 20/12/2024



Taken at 10:18 AM on Friday 20/12/2024



Taken at 10:18 AM on Friday 20/12/2024



Taken at 10:19 AM on Friday 20/12/2024



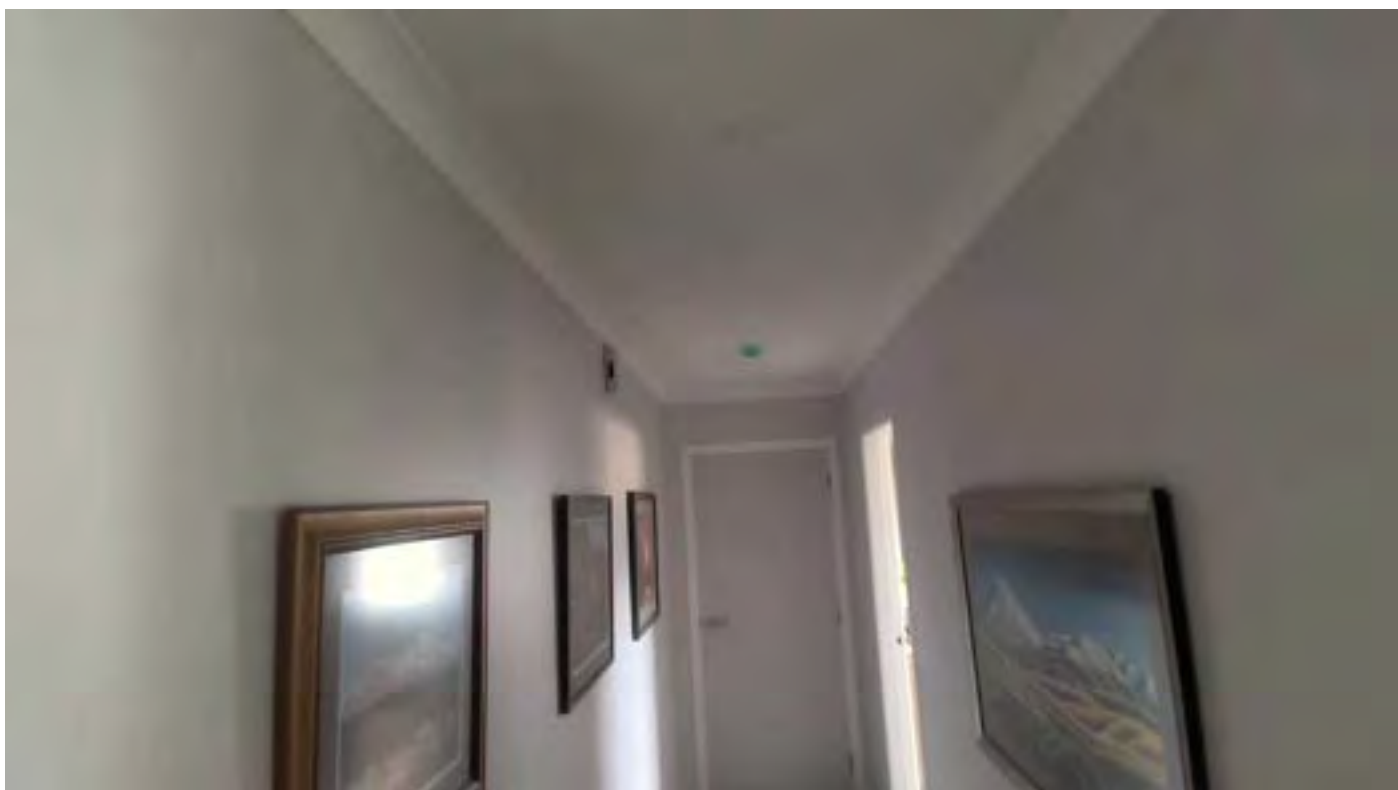
Taken at 10:19 AM on Friday 20/12/2024



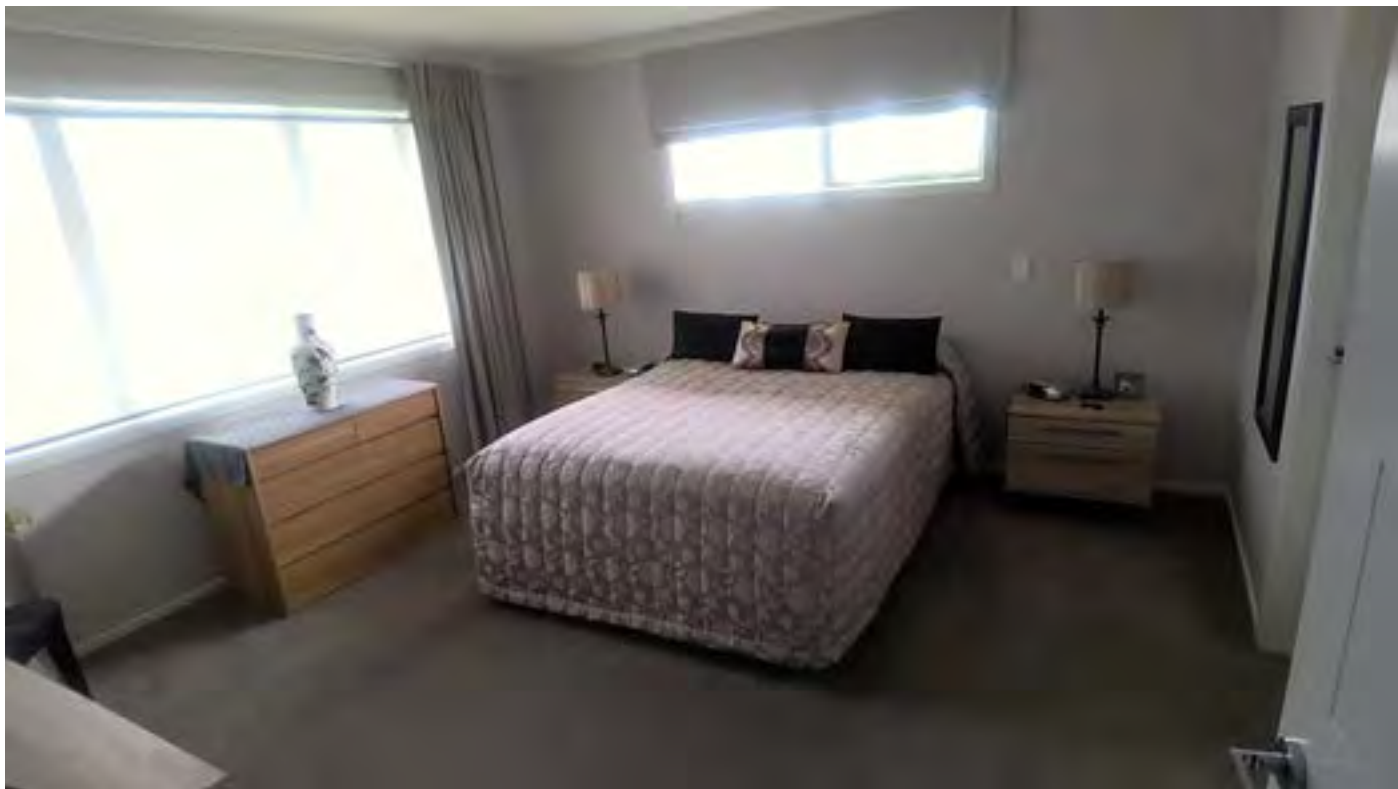
Taken at 10:19 AM on Friday 20/12/2024



Taken at 10:19 AM on Friday 20/12/2024



Taken at 10:20 AM on Friday 20/12/2024



master bedroom

Taken at 10:20 AM on Friday 20/12/2024



Taken at 10:21 AM on Friday 20/12/2024



Taken at 10:22 AM on Friday 20/12/2024



Taken at 10:22 AM on Friday 20/12/2024

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Consent No: **230147**
Applicant: **Bill Francis**
Site Address: **168 Karuhiruhi Street, Waikanae**
Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Pre-Slab Plumbing**
Inspection Outcome: **Pass**
Inspected By: **Luke Natrass**
Inspection Date: **20 December 2024 12:11 p.m.**
Duration: **0 minutes**

Inspection Element	Status
General	Pass
Agent/owner written approval	Pass
Updated as built drainage plans received	
Other	Pass
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.	

Residential Documentation

Application for CCC	Received
Electrical safety certificate - Electrician	Received
As-built drainage plan	Received
Drainage (Form 126) for stormwater & private Sewer installation	Received
Plumbing (Form 125) for pressure test and installation piped services	Received
Construction review PS4 statement for structural engineering	Received
Construction review PS4 statement for geo-technical engineering	Received
Membrane applicator certificates - internal wet area	Clear

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Consent No: **230147**

Applicant: **Bill Francis**

Site Address: **168 Karuhiruhi Street, Waikanae**

Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Drainage**

Inspection Outcome: **Pass**

Inspected By: **Luke Natrass**

Inspection Date: **20 December 2024 12:12 p.m.**

Duration: **0 minutes**

Inspection Element	Status
General	Pass
Stormwater sumps	Pass
Sump and stripdrain in driveway as required	
Correct size and type in place as per consented plans	
Other	Pass
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.	

Residential Documentation

Application for CCC	Received
Electrical safety certificate - Electrician	Received
As-built drainage plan	Received
Drainage (Form 126) for stormwater & private Sewer installation	Received
Plumbing (Form 125) for pressure test and installation piped services	Received
Construction review PS4 statement for structural engineering	Received
Construction review PS4 statement for geo-technical engineering	Received
Membrane applicator certificates - internal wet area	Clear

SITE NOTICE

Consent No: **230147**
 Applicant: **Glen Parsons**
 Site Address: **168 Karuhiruhi Street, Waikanae**
 Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**
 Building Category: **R1**

Inspection Type: **Pre-Slab Plumbing**
 Inspection Outcome: **Pass**
 Inspected By: **Luke Natrass**
 Inspection Date: **20 December 2024**

Passed Items

General

Agent/owner written approval
 Other

Updated as built drainage plans received
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.

Inspection Type: **Drainage**
 Inspection Outcome: **Pass**
 Inspected By: **Luke Natrass**
 Inspection Date: **20 December 2024**

Passed Items

General

Stormwater sumps
 Other

Sump and stripdrain in driveway as required
Correct size and type in place as per consented plans
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.

Inspection Type: **Final Inspection**
 Inspection Outcome: **Pass**
 Inspected By: **Luke Natrass**
 Inspection Date: **20 December 2024**

Passed Items

Exterior

All previous inspections/notes passed
 Drawings
 Additional information/plan
 Roof fixings

All passed items on this inspection have been assessed against the consented documentation.
Plans on site and reviewed
All required documentation received on site and uploaded to building file
Roof has been nailed off as required for pressed metal

Spouting and down-pipes	tiles All spouting and downpipes in place and connected to non potable water tank
Flashings - roof	Roof has been flashed as required
Penetrations - flashings	All penetrations flashed as required
Gully dishes	Org in place
Stormwater and site drainage	Stripdrain and sump in place in driveway
Wastes to gully	Bathroom vanity waste to org
Fixings - durability	All fixings and connections installed as required for the climate zone
Terminal vents/AAVs	50 mm terminal vent in place and run through roof , flashed as required
Brick veneer cladding	Brick veneer cladding has been finished as required
Cladding painted/sealed	All cladding has been painted and sealed as required
Flashings - windows/doors	All windows and doors flashed as required
Cladding ground clearance	All ground clearances fine at time of final inspection
Final check complete	
Other	All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.
Interior	
All previous inspections/notes passed	Sighted and failed items have been reassessed where appropriate
Drawings	On site and reviewed
Service areas-floors/walls	Kitchen, entry, bathrooms and laundry floors sealed as required
Lighting	Windows and light fixtures in place for natural and artificial lighting
Laundering	Laundry with washer, dryer and sink as per consented plans
Cooking facilities	Oven and hob in place for cooking facilities
Smoke detectors	Fitted within 3m of all sleeping areas , sited and tested, integrated system installed
Food storage/preparation	As per consented plans
Ventilation	Opening windows, ducted fans to bathroom and laundry and range hood to kitchen as required
HWC flues	Hwc flued via safetray and tundish
HWC restraint	The required number (3)of straps/blocking is fitted appropriate for the size of the cylinder
Tempering valve	A tempering valve is fitted and the temperature of the hot water to sanitary fixtures has been checked for appropriate temperature of 52 deg
Glazing - human impact	Safety glass installed to windows and doors where required including shower screens
Hot water temp	52 deg
Water supply tank	Non potable water
Trap seals and AAVS	All vanities, sinks and tubs are trapped as required
Cistern flushing	Toilets flushing as required and running off non potable water
WC pan connection	Toilet bolted and sealed as required
Non potable water signs	Non potable water signs in place above hose taps
Final check complete	All aspects relating to this inspection have been

Other

assessed and checked against the consented documentation and deemed to comply.

All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.

Residential Documentation

Status

Application for CCC	Received
Electrical safety certificate - Electrician	Received
As-built drainage plan	Received
Drainage (Form 126) for stormwater & private Sewer installation	Received
Plumbing (Form 125) for pressure test and installation piped services	Received
Construction review PS4 statement for structural engineering	Received
Construction review PS4 statement for geo-technical engineering	Received
Record of Work	Required

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Consent No: **230147**

Applicant: **Bill Francis**

Site Address: **168 Karuhiruhi Street, Waikanae**

Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Pre Wrap**

Inspection Outcome: **Fail**

Inspected By: **Jeremy Lincoln**

Inspection Date: **5 July 2023 11:11 a.m.**

Duration: **45 minutes**

Inspection Element	Status
General	Fail
Inspection notes	Pass
Drawings	Pass
Additional information/plan	N/A
Fire Separations	N/A
Cladding type identified Brick veneer & timber bevelback	Pass
Framing moisture meets cladding requirements	N/A
Stud spacing appropriate for cladding 600c	Pass
Exterior sheet bracing and angle brace fixing 7mm ecoply, nailed to specs	Pass
Bottom plate connections All bottom plate connections fixed in compliance with the building consent documentation	Pass
Building wrap type Not known yet	Fail
Roof Cross Bracing Straps & hips & valleys	Pass
Purlin fixing Tile batten Purlins fixed and screw in accordance with the building consent documentation	Pass
Decking substrate	N/A
Top Plate Connection Studlock	Pass
Lintel Connections Ply nailing & veranda beams bolted	Pass
Truss connections	Pass
Column posts Not completed, recheck required	Fail
LBP number 104118	Pass
Agent/owner written approval	N/A
non compliance discussed onsite With Mike	Pass
Next Inspection required Preclad	Pass
Other	N/A



Taken at 10:52 AM on Wednesday 5/07/2023



Taken at 11:04 AM on Wednesday 5/07/2023



Taken at 11:04 AM on Wednesday 5/07/2023



Taken at 11:07 AM on Wednesday 5/07/2023



Taken at 11:08 AM on Wednesday 5/07/2023



Taken at 3:24 PM on Wednesday 5/07/2023



Taken at 3:25 PM on Wednesday 5/07/2023



Taken at 3:27 PM on Wednesday 5/07/2023



Taken at 3:28 PM on Wednesday 5/07/2023

SITE NOTICE

Consent No: **230147**
 Applicant: **Glen Parsons**
 Site Address: **168 Karuhiruhi Street, Waikanae**
 Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**
 Building Category: **R1**

Inspection Type: **Pre Wrap**
 Inspection Outcome: **Fail**
 Inspected By: **Jeremy Lincoln**
 Inspection Date: **5 July 2023**

Failed Items

General

Building wrap type	Not known yet
Column posts	Not completed, recheck required

Passed Items

General

Inspection notes	
Drawings	
Cladding type identified	Brick veneer & timber bevelback
Stud spacing appropriate for cladding	600c
Exterior sheet bracing and angle brace fixing	7mm ecoply, nailed to specs
Bottom plate connections	All bottom plate connections fixed in compliance with the building consent documentation
Roof Cross Bracing	Straps & hips & valleys
Purlin fixing	Tile batten Purlins fixed and screw in accordance with the building consent documentation
Top Plate Connection	Studlock
Lintel Connections	Ply nailing & veranda beams bolted
Truss connections	
LBP number	104118
non compliance discussed onsite	With Mike
Next Inspection required	Preclad

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Consent No: **230147**

Applicant: **Bill Francis**

Site Address: **168 Karuhiruhi Street, Waikanae**

Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Pre Wrap**

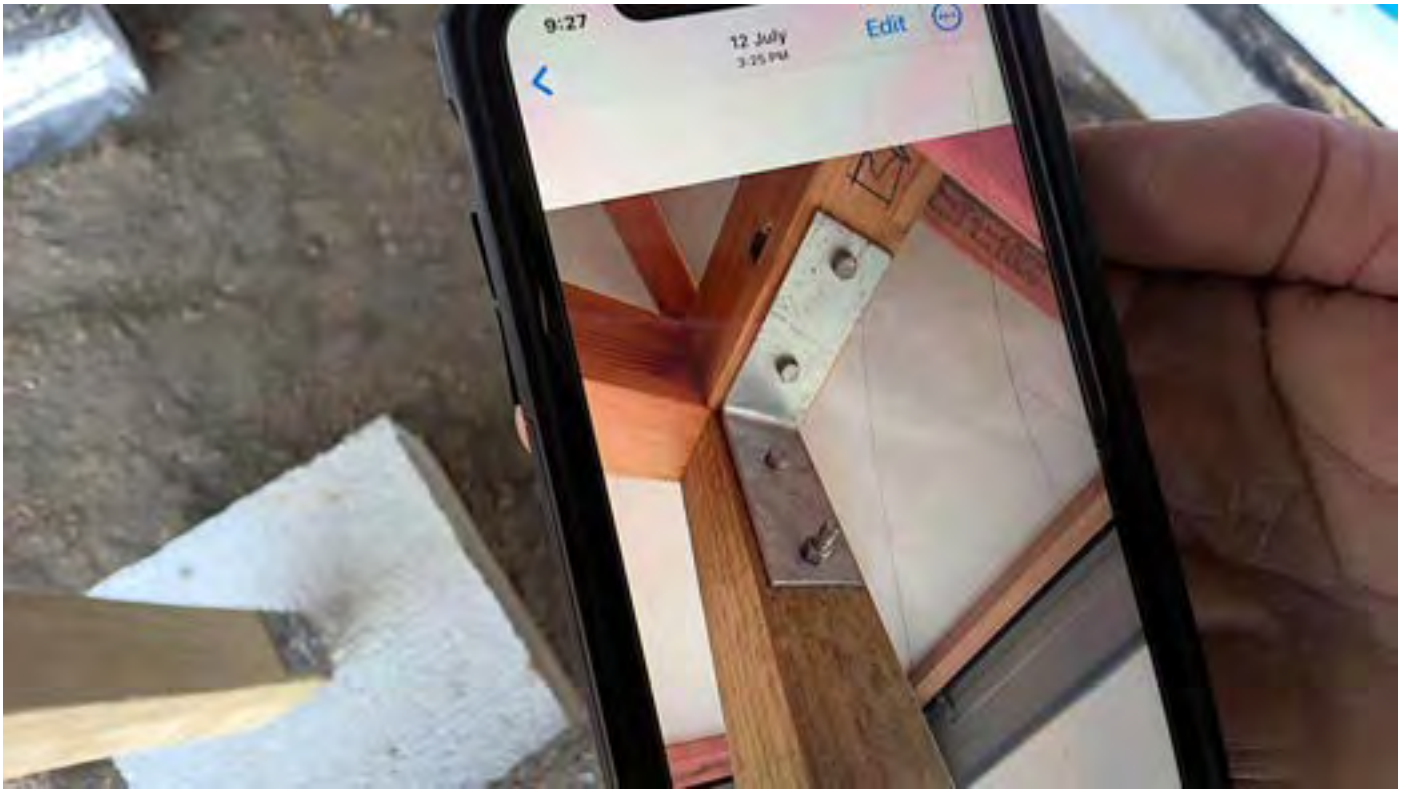
Inspection Outcome: **Pass**

Inspected By: **Gareth McCullagh**

Inspection Date: **24 July 2023 9:28 a.m.**

Duration: **0 minutes**

Inspection Element	Status
General	Pass
Building wrap type	Pass
Column posts	Pass
non compliance discussed onsite	N/A
Other	Pass
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.	



Taken at 9:27 AM on Monday 24/07/2023



Taken at 9:28 AM on Monday 24/07/2023

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Consent No: **230147**

Applicant: **Bill Francis**

Site Address: **168 Karuhiruhi Street, Waikanae**

Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Pre Clad**

Inspection Outcome: **Fail**

Inspected By: **Gareth McCullagh**

Inspection Date: **24 July 2023 9:36 a.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Fail
Inspection notes	Pass
Drawings	Pass
Additional information/plan	N/A
Fire Separations	N/A
Building wrap type Tekton over ply	Pass
Flexible sealing tape Protecto super stick	Pass
Deck membrane fixed in accordance with specification	N/A
Head flashings Head flashing's not yet installed. Reinspection required	Fail
Sill flashings Untitled Sill flashing's not installed reinspection required	Fail
Back flashings Between cavity system change	Fail
Saddle flashings	N/A
Internal/external corner flashings	N/A
Jamb flashings	N/A
Capillary clearances	N/A
Flashing penetrations	Pass
Ground/Deck Cladding Clearance	Pass
Additional strapping to wrap	N/A
Batten timber treatment H3.1	Pass
Cavity closers	Pass
Battens in place	Pass
Battens structural fixing	N/A
Cavity spacers	N/A
Cavity spacers size and slope	N/A
LBP number 104118	Pass
Agent/owner written approval	N/A
non compliance discussed onsite Spoke to builder	Pass
Next Inspection required	N/A

Other

N/A



Taken at 9:29 AM on Monday 24/07/2023



Taken at 9:30 AM on Monday 24/07/2023



Taken at 9:31 AM on Monday 24/07/2023



Taken at 9:31 AM on Monday 24/07/2023



Taken at 9:31 AM on Monday 24/07/2023



Taken at 9:31 AM on Monday 24/07/2023



Taken at 9:31 AM on Monday 24/07/2023

SITE NOTICE

Consent No: **230147**
 Applicant: **Glen Parsons**
 Site Address: **168 Karuhiruhi Street, Waikanae**
 Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**
 Building Category: **R1**

Inspection Type: **Pre Wrap**
 Inspection Outcome: **Pass**
 Inspected By: **Gareth McCullagh**
 Inspection Date: **24 July 2023**

Passed Items

General

Building wrap type
 Column posts
 Other

All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.

Inspection Type: **Pre Clad**
 Inspection Outcome: **Fail**
 Inspected By: **Gareth McCullagh**
 Inspection Date: **24 July 2023**

Failed Items

General

Head flashings
 Sill flashings
 Back flashings

Head flashing's not yet installed. Reinspection required
Untitled
Sill flashing's not installed reinspection required
Between cavity system change

Passed Items

General

Inspection notes
 Drawings
 Building wrap type
 Flexible sealing tape
 Flashing penetrations
 Ground/Deck Cladding Clearance
 Batten timber treatment
 Cavity closers
 Battens in place

Tekton over ply
Protecto super stick

H3.1

LBP number
non compliance discussed onsite

104118
Spoke to builder

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Consent No: **230147**
Applicant: **Bill Francis**
Site Address: **168 Karuhiruhi Street, Waikanae**
Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Preline Building**
Inspection Outcome: **Pass**
Inspected By: **Luke Natrass**
Inspection Date: **22 August 2023 11:11 a.m.**
Duration: **30 minutes**

Inspection Element	Status
General	Pass
Sighted previous inspection notes Sighted and updated previous inspection notes	Pass
Conforms with approved drawings As per consented plans	Pass
Confirm additional information/amended plan	N/A
Fire Separations Not part of this consent	N/A
Max moisture content 17%	Pass
Ventilation to rooms Window sizes and openings as per consented documentation	Pass
Timber treatment H 3.2 bottom plates , and rest h1.2	Pass
Lintel/beam size and fixing All lintals and beams as per consented plans	Pass
Insulation r 2.6 earthwool wall batts and r 5.2ceiling insulation	Pass
Top plate connection Stud lock screws and sighted previously	Pass
Ceiling batten spacing Timber battens at 600mm centers and double nailed	Pass
Stud spacing 600mm centers	Pass
Bracing connections Handi brackets and concrete pins at 150/300/600as required	Pass
Air seals all windows and doors foamed and sealed as required	Pass
Bottom plate fixings Concrete bolts and pins as required	Pass
Building closed in Building closed in adequately to allow lining	Pass
Grade of timber framing Sg8 pine framing	Pass
Framing cut outs Stud stiffeners in place were required	Pass
wet area substrate Not required as acrylic liners to be installed	N/A
insert or inbuilt fireplace Not part of this consent	N/A

LBP number	Pass
Mike foothed	
Agent/owner written approval	N/A
non compliance discussed onsite	N/A
Next Inspection required	Pass
Postline	
Other	Pass
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.	



Taken at 11:01 AM on Tuesday 22/08/2023



Taken at 11:01 AM on Tuesday 22/08/2023



Taken at 11:01 AM on Tuesday 22/08/2023



Taken at 11:02 AM on Tuesday 22/08/2023



Taken at 11:02 AM on Tuesday 22/08/2023



Taken at 11:02 AM on Tuesday 22/08/2023



Taken at 11:02 AM on Tuesday 22/08/2023



Taken at 11:03 AM on Tuesday 22/08/2023



Taken at 11:03 AM on Tuesday 22/08/2023



Taken at 11:03 AM on Tuesday 22/08/2023



Taken at 11:03 AM on Tuesday 22/08/2023



Taken at 11:04 AM on Tuesday 22/08/2023



Taken at 11:04 AM on Tuesday 22/08/2023

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Consent No: **230147**

Applicant: **Bill Francis**

Site Address: **168 Karuhiruhi Street, Waikanae**

Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Pre Clad**

Inspection Outcome: **Pass**

Inspected By: **Luke Natrass**

Inspection Date: **22 August 2023 12:11 p.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Pass
Head flashings Sighted both head flashings in place with stopends cavity closers and battens	Pass
Sill flashings Wans bars in place and screwed as required	Pass
Back flashings Aluminium back glazing in place to change of cladding junction	Pass



Taken at 10:57 AM on Tuesday 22/08/2023



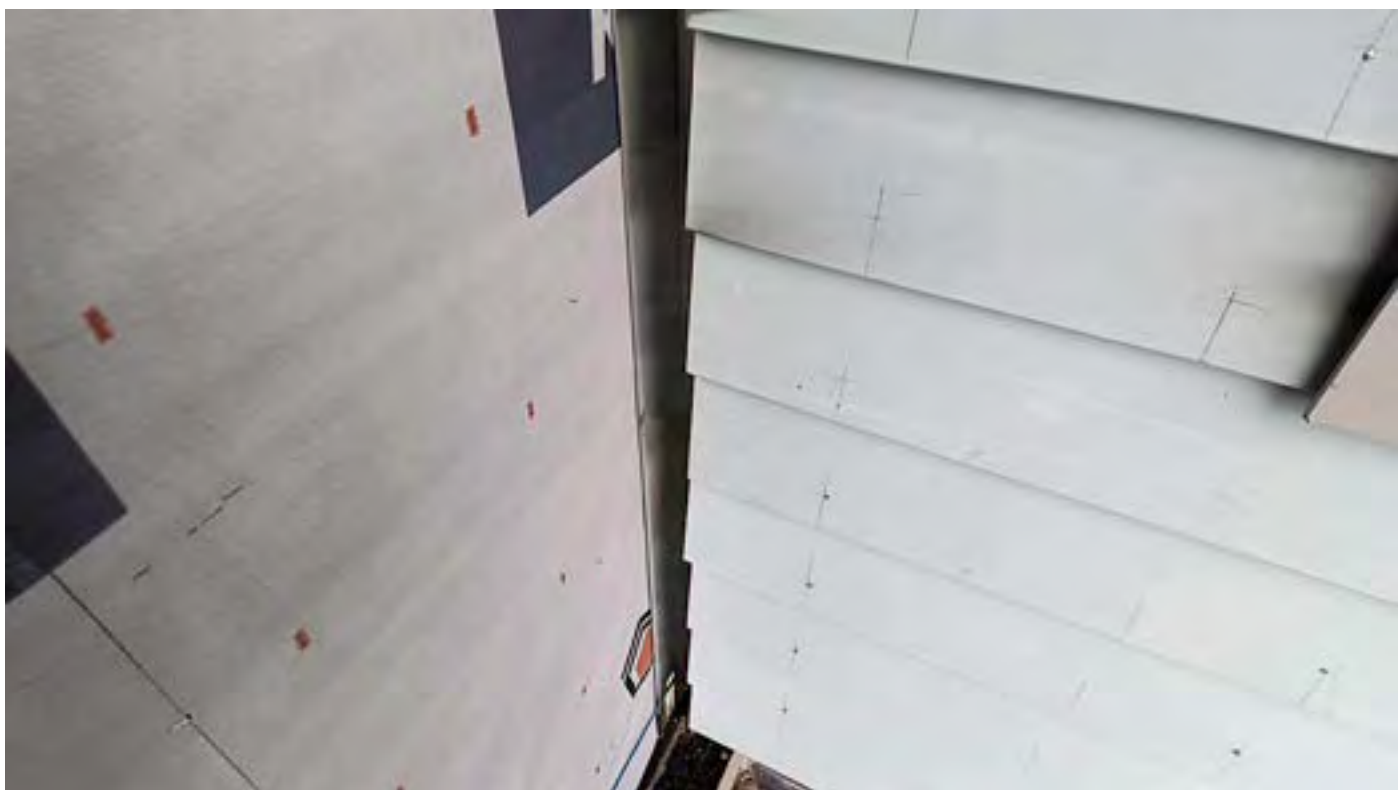
Taken at 10:57 AM on Tuesday 22/08/2023



Taken at 10:57 AM on Tuesday 22/08/2023



Taken at 10:59 AM on Tuesday 22/08/2023



Taken at 11:01 AM on Tuesday 22/08/2023

SITE NOTICE

Consent No: **230147**
 Applicant: **Glen Parsons**
 Site Address: **168 Karuhiruhi Street, Waikanae**
 Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Building Category: **R1**

Inspection Type: **Preline Building**
 Inspection Outcome: **Pass**
 Inspected By: **Luke Natrass**
 Inspection Date: **22 August 2023**

Passed Items

General

<p>Sighted previous inspection notes Conforms with approved drawings Max moisture content Ventilation to rooms</p> <p>Timber treatment Lintel/beam size and fixing Insulation Top plate connection Ceiling batten spacing Stud spacing Bracing connections</p> <p>Air seals Bottom plate fixings Building closed in Grade of timber framing Framing cut outs LBP number Next Inspection required Other</p>	<p>Sighted and updated previous inspection notes As per consented plans 17% Window sizes and openings as per consented documentation H 3.2 bottom plates , and rest h1.2 All lintals and beams as per consented plans r 2.6 earthwool wall batts and r 5.2ceiling insulation Stud lock screws and sighted previously Timber battens at 600mm centers and double nailed 600mm centers Handi brackets and concrete pins at 150/300/600as required all windows and doors foamed and sealed as required Concrete bolts and pins as required Building closed in adequately to allow lining Sg8 pine framing Stud stiffeners in place were required Mike foothed Postline All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.</p>
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Inspection Type: **Pre Clad**
 Inspection Outcome: **Pass**
 Inspected By: **Luke Natrass**
 Inspection Date: **22 August 2023**

Passed Items

General

Head flashings

**Sighted both head flashings in place with stopends
cavity closers and battens**

Sill flashings

Wans bars in place and screwed as required

Back flashings

**Aluminium back glazing in place to change of
cladding junction**

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Consent No: **230147**
 Applicant: **Bill Francis**
 Site Address: **168 Karuhiruhi Street, Waikanae**
 Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Preline Plumbing**
 Inspection Outcome: **Pass**
 Inspected By: **Luke Natrass**
 Inspection Date: **31 July 2023 10:41 a.m.**
 Duration: **45 minutes**

Inspection Element	Status
General	Pass
Sighted previous inspection notes Sighted previous inspection notes	Pass
Conforms with approved drawings All plumbing done as per consented plans	Pass
Confirm additional information/amended plan	N/A
Plumber Johny from tararua plumbing , 19525	Pass
Soil pipe size and test not accessed at this inspection	N/A
Pipes fixed/supported clipped and supported as required	Pass
System used AS3500 also non potable system in place for toilets and hose taps	Pass
TPR line not accessed at this inspection	N/A
Inbuilt S/W pipes tested Not part of this consent	N/A
Vents terminated 50mm terminal vent in place and running through roof	Pass
Pressure test Under test at time of inspection, holding pressure to 1500kpa, 20mm -15mm dux scara	Pass
Back flow preventor Not part of this consent	N/A
Waste pipe size and test	N/A
Floor wastes Not required as single house unit	N/A
Shut off valves both shut off ins garage for the non potable and mains water	Pass
Fire wraps and collars Not part of this consent	N/A
LBP number	N/A
Agent/owner written approval	N/A
non compliance discussed onsite	N/A
Next Inspection required Pre line building	Pass
Other All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.	Pass



Taken at 9:55 AM on Monday 31/07/2023



Taken at 9:55 AM on Monday 31/07/2023



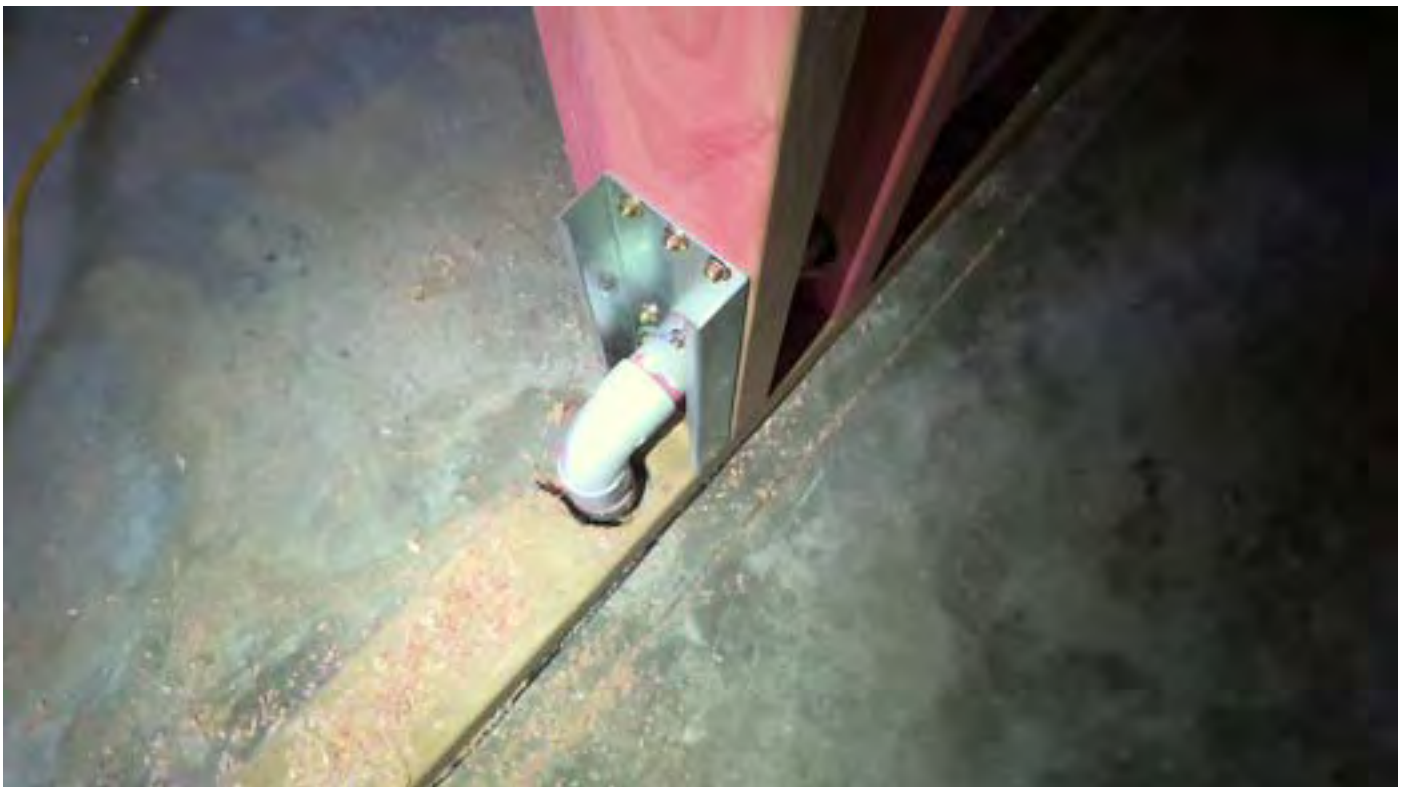
Taken at 9:56 AM on Monday 31/07/2023



Taken at 9:57 AM on Monday 31/07/2023



Taken at 9:57 AM on Monday 31/07/2023



Taken at 9:57 AM on Monday 31/07/2023



Taken at 9:58 AM on Monday 31/07/2023



Taken at 9:58 AM on Monday 31/07/2023



Taken at 9:58 AM on Monday 31/07/2023



Taken at 9:58 AM on Monday 31/07/2023



Taken at 9:59 AM on Monday 31/07/2023



Taken at 9:59 AM on Monday 31/07/2023



Taken at 9:59 AM on Monday 31/07/2023



Taken at 9:59 AM on Monday 31/07/2023



Taken at 10:00 AM on Monday 31/07/2023



Taken at 10:00 AM on Monday 31/07/2023



Taken at 10:00 AM on Monday 31/07/2023



Taken at 10:02 AM on Monday 31/07/2023



Taken at 10:03 AM on Monday 31/07/2023



Taken at 10:03 AM on Monday 31/07/2023

SITE NOTICE

Consent No: **230147**
Applicant: **Glen Parsons**
Site Address: **168 Karuhiruhi Street, Waikanae**
Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**
Building Category: **R1**

Inspection Type: **Preline Plumbing**
Inspection Outcome: **Pass**
Inspected By: **Luke Natrass**
Inspection Date: **31 July 2023**

Passed Items

General

Sighted previous inspection notes
Conforms with approved drawings
Plumber
Pipes fixed/supported
System used

Vents terminated
Pressure test

Shut off valves

Next Inspection required
Other

Sighted previous inspection notes
All plumbing done as per consented plans
Johny from tararua plumbing , 19525
clipped and supported as required
AS3500
also non potable system in place for toilets and hose
taps
50mm terminal vent in place and running through roof
Under test at time of inspection, holding pressure to
1500kpa, 20mm -15mm dux scara
both shut off ins garage for the non potable and mains
water
Pre line building
All aspects relating to this inspection have been
assessed and checked against the consented
documentation and deemed to comply.

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Consent No: **230147**

Applicant: **Bill Francis**

Site Address: **168 Karuhiruhi Street, Waikanae**

Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Pre-Slab Building**

Inspection Outcome: **Pass**

Inspected By: **Luke Natrass**

Inspection Date: **22 May 2023 12:54 p.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Pass
Engineers details required Geert from certs engineering left site report on site and it confirms ok to pour	Pass
Rebate for brick veneer Rebates in place where required	Pass
Ground clearance 300mm above cut ground	Pass
Concrete cover As required by engineers	Pass
Driveway S/W control	N/A
Sand blinding Sand blinding in place as required	Pass
Slab thickenings As required by engineers	Pass
Vapour barrier Black polythene in place and taped as required	Pass
Bottom plate fixings	N/A
Steel reinforcing As required by engineers All steel work placed and tied as per consented documentation	Pass
Bar chairs Bar chairs placed as required	Pass
DPC penetrations taped All penetrations taped as required	Pass
Minimum floor level Site ffl taken from man hole cover on footpath	Pass
Registration numbers	N/A
Siting Sighted boundary pegs and measurements taken to confirm location	Pass
Sub slab insulation	N/A
In-slab heating	N/A
LBP number Mike foothed 104118	Pass
Agent/owner written approval	N/A
non compliance discussed onsite	N/A
Next Inspection required Pre wrap	Pass
Other All aspects relating to this inspection have been assessed and checked against the	Pass

consented documentation and deemed to comply.



Taken at 12:14 PM on Monday 22/05/2023



Taken at 12:15 PM on Monday 22/05/2023



Taken at 12:15 PM on Monday 22/05/2023



Taken at 12:17 PM on Monday 22/05/2023



Taken at 12:19 PM on Monday 22/05/2023



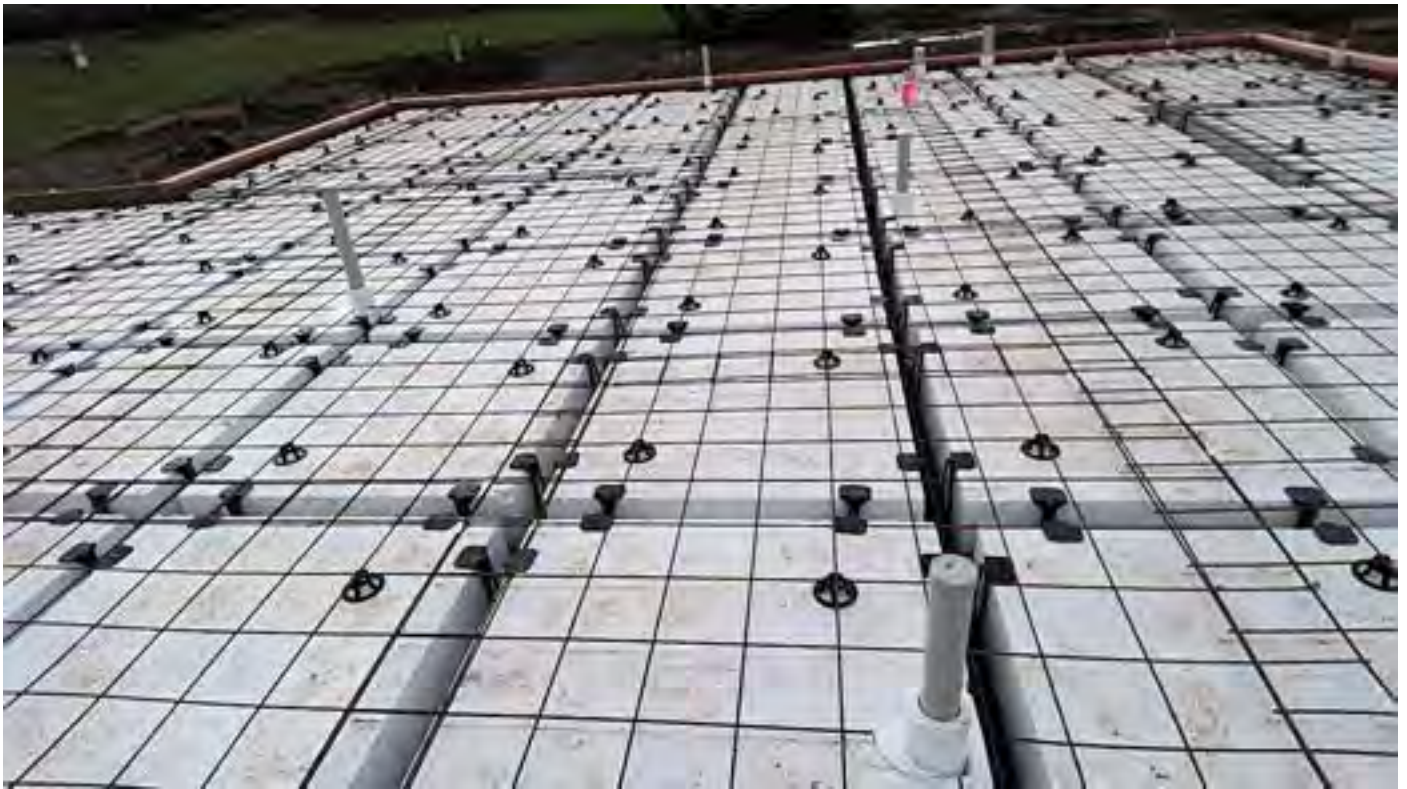
Taken at 12:20 PM on Monday 22/05/2023



Taken at 12:20 PM on Monday 22/05/2023



Taken at 12:20 PM on Monday 22/05/2023



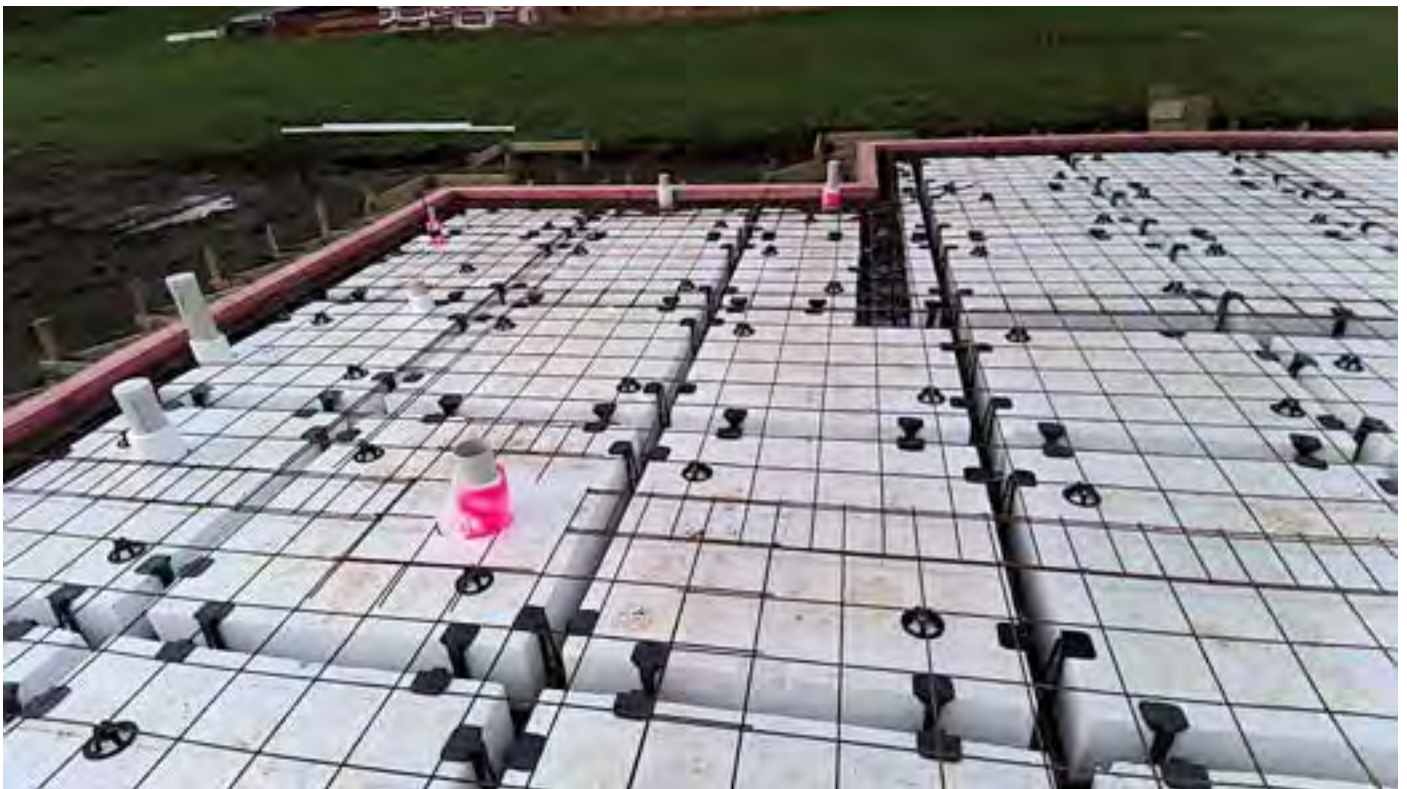
Taken at 12:20 PM on Monday 22/05/2023



Taken at 12:21 PM on Monday 22/05/2023



Taken at 12:21 PM on Monday 22/05/2023



Taken at 12:22 PM on Monday 22/05/2023

SITE NOTICE

Consent No: **230147**
 Applicant: **Glen Parsons**
 Site Address: **168 Karuhiruhi Street, Waikanae**
 Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**
 Building Category: **R1**

Inspection Type: **Pre-Slab Building**
 Inspection Outcome: **Pass**
 Inspected By: **Luke Natrass**
 Inspection Date: **22 May 2023**

Passed Items

General

<p>Engineers details required</p> <p>Rebate for brick veneer</p> <p>Ground clearance</p> <p>Concrete cover</p> <p>Sand blinding</p> <p>Slab thickenings</p> <p>Vapour barrier</p> <p>Steel reinforcing</p> <p>Bar chairs</p> <p>DPC penetrations taped</p> <p>Minimum floor level</p> <p>Siting</p> <p>LBP number</p> <p>Next Inspection required</p> <p>Other</p>	<p>Geert from certs engineering left site report on site and it confirms ok to pour</p> <p>Rebates in place where required</p> <p>300mm above cut ground</p> <p>As required by engineers</p> <p>Sand blinding in place as required</p> <p>As required by engineers</p> <p>Black polythene in place and taped as required</p> <p>As required by engineers</p> <p>All steel work placed and tied as per consented documentation</p> <p>Bar chairs placed as required</p> <p>All penetrations taped as required</p> <p>Site ffl taken from man hole cover on footpath</p> <p>Sighted boundary pegs and measurements taken to confirm location</p> <p>Mike foothead 104118</p> <p>Pre wrap</p> <p>All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.</p>
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GoGet Inspection Audit Report

Consent No: **230147**

Applicant: **Bill Francis**

Site Address: **168 Karuhiruhi Street, Waikanae**

Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**

Inspection Type: **Pre-Slab Plumbing**

Inspection Outcome: **Fail**

Inspected By: **Gareth McCullagh**

Inspection Date: **15 May 2023 10:29 a.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Fail
Secondary flow path	N/A
Pipe material Pvc primed and glued	Pass
Pipe protection Used 25mm poly sleeves	Pass
TPR line Not part of this consent	N/A
Plumbing layout In for all fixtures although changed the way pipes run	Pass
Pipes supported	Pass
Wastes and drains Sized correctly with Good fall out of slab	Pass
Water/air Water	Pass
Leak check	Pass
Registration numbers tararua plumbing	Pass
Agent/owner written approval Need updated drawing showing drain now running through slab	Fail
non compliance discussed onsite Spoke to builder	Pass
Next Inspection required	N/A
Other	N/A
Site Inspection	N/A



Taken at 10:24 AM on Monday 15/05/2023



Taken at 10:24 AM on Monday 15/05/2023



Taken at 10:24 AM on Monday 15/05/2023



Taken at 10:24 AM on Monday 15/05/2023



Taken at 10:24 AM on Monday 15/05/2023



Taken at 10:24 AM on Monday 15/05/2023



Taken at 10:24 AM on Monday 15/05/2023



Taken at 10:25 AM on Monday 15/05/2023



Taken at 10:25 AM on Monday 15/05/2023

SITE NOTICE

Consent No: **230147**
 Applicant: **Glen Parsons**
 Site Address: **168 Karuhiruhi Street, Waikanae**
 Work Type: **New single level dwelling with lab foundation, brick & weatherboard exterior cladding & pressed metal tile roofing.**
 Building Category: **R1**

Inspection Type: **Pre-Slab Plumbing**
 Inspection Outcome: **Fail**
 Inspected By: **Gareth McCullagh**
 Inspection Date: **15 May 2023**

Failed Items

General

Agent/owner written approval

Need updated drawing showing drain now running through slab

Passed Items

General

Pipe material

Pvc primed and glued

Pipe protection

Used 25mm poly sleeves

Plumbing layout

In for all fixtures although changed the way pipes run

Pipes supported

Wastes and drains

Sized correctly with Good fall out of slab

Water/air

Water

Leak check

Registration numbers

tararua plumbing

non compliance discussed onsite

Spoke to builder