Tauranga City

LIM

Land Information Memorandum



Land Information Memorandum

This Land Information Memorandum has been prepared for:

Applicant	**Bower Real Estate Limited**
Client	**Berrgage Family Trust**
Property Address	**35 Dunkeld Drive** **Papamoa**
Legal Description	**Lot 226 DP 508065**
Application Date	**2 April 2026**

This Land Information Memorandum has been prepared for the purposes of Part 6 of the Local Government Official Information and Meetings Act 1987. It is based on a search of Council records only. Additional information relevant to the property may be held on Council's property file or within other Council systems; however, is not included in this Land Information Memorandum. There may be other information relating to the land which is unknown to Council. The Council has not undertaken any inspection of the land or any building on it for the purpose of preparing this Land Information Memorandum. The applicant is solely responsible for ensuring that the land is suitable for a particular purpose. This Land Information Memorandum has been prepared for the applicant only. The Council accepts no responsibility or liability for any use of this report by third parties or for any reliance placed on its contents by persons other than the applicant. This Land Information Memorandum is valid only if reproduced in full and applies only as at the date of issue.

It is recommended that the Certificate/Record of Title, which is not held by Council, be searched by the purchaser.

Contents

Services Information

Rating/Valuation Details and Levies

Building Information

City Planning

Land Development

Natural Hazard Information

Additional Information/Licences

Services Information

Land information which is likely to be relevant includes information on private and public stormwater, water and sewer details. Please refer to the appropriate authorities for further information about network utility services.

Service Record

Service Print Attached	**Yes**
Method of Sewer Disposal	**To Public Sewer**
Existing Method of Stormwater Disposal	**Soakholes**
Drinking Water Supplied to the Land	**Yes**
Drinking Water Supplier Is:	
(I) Owner of the Land; or	**No Information Available**
(ii) Tauranga City Council [Water Supply Authority Unit (WSA)]; or	**Yes**
(iii) Another Networked Supplier	**No Information Available**
Any Information Notified under Section 206(1) Water Services Act 2021	**No Information Available**

Note:

1. Please note that the existence of a watermain along a property frontage does not necessarily mean that a connection is available. This may need to be provided at the applicant's expense.
2. If the land is supplied with drinking water by Tauranga City Council as a Water Supply Authority, any conditions (generally set out in Tauranga City Council's Supply of Water Bylaw 2019 applicable to that supply are included in this Land Information Memorandum.
3. If the land is supplied with drinking water by a networked supplier other than the WSA, any conditions that are applicable to that supply are included in this Land Information Memorandum.
4. If the land is supplied with drinking water by the owner of the land, any information Council has about the supply is included in this Land Information Memorandum.
5. Any information notified to the territorial authority by a drinking-water supplier under Section 206(1) Water Services Act 2021 is included in this Land Information Memorandum.
6. Water services legislation is transitioning from the Water Services Act 2021 to the local Government (Water Services) Act 2025 and associated amendments. Some information in this Land Information Memorandum may reflect the previous legislative framework and may be subject to change or reinterpretation under the new Act.

Rating and Valuation Details

Tauranga City Council rates are billed twice a year on the last business day of August and February. Unpaid rates for each instalment will incur a 10% penalty.

The valuation details below are based on a revision date of 1 May 2023. This has been used to assess the rates for Council's financial year beginning 1 July 2025.

Further information on property valuations can be found on Council's website at the following link: Property valuations - Tauranga City Council.

Valuation Details

Valuation Reference	**06622 080 42**
Capital Value	**$1,030,000**
Land Value	**$ 515,000**
Improvement Value	**$ 515,000**

Rating Details

Current Annual Rates	**$4,180.98**
Balance Owing	**$2,299.54**

Water Meter Details

Water Meter On Property	**Yes**
Meter Type	**Individual Meter**
Water Rates Owing	**$294.80**

A separate account is issued for water metered properties. Residential meters are read every three months. Commercial/Industrial meters vary depending on use.

Note:

Council's Water Supply Bylaw requires a final water meter reading to be undertaken when a property is sold.

Infrastructure Funding and Financing (IFF) Levy Details

The IFF levy (under the Infrastructure Funding and Financing (Western Bay of Plenty Transport System Plan Levy) Order 2022) is payable for a period of 30 years from 1 July 2024 to 30 June 2054. The method for assessing the liability for an IFF levy on the property is set out in the 2022 Order. The annual levy (as calculated under the 2022 Order) is allocated across the levy area with 50% of the overall levy coming from commercial and industrial properties and 50% coming from residential properties and with the IFF levy on the property being based on the capital value of the property. Further information on the levy is available at the following link: Infrastructure Levy - Tauranga City Council.

IFF Levy Details

Current Annual IFF Levy	**$93.82**
Balance Owing	**$51.60**

Building Information

This information is sourced from Council records and may not reflect the situation on site if work has been undertaken without consent or has been undertaken and was exempt from consent.

This Land Information Memorandum provides a summary of key building-related information and does not include all documents held by Council. It is recommended that the property file is viewed together with this Land Information Memorandum to satisfy any due diligence requirements. The property file may be ordered at the following link: Order a LIM or Property File.

Building Permits and Consents: Information related to Permits (issued prior to 1993) and Consents (issued after 1 January 1993) is listed below. Plans and other associated documents, where held by Council, are available on the property file. Where Council holds an as-built drainage plan, it will be attached to the building appendix of this Land Information Memorandum.

Solid Fuel Heaters: It is important that any solid fuel heater has been legally installed, either as part of the original dwelling or by way of a separate permit/consent.

Granny Flats: From 15 January 2026, a small standalone dwelling may be constructed without a building consent, if all exemption conditions are met under Schedule 1A of the Building Act 2004. Further information is available at the following link: Guidelines on Building a Granny Flat.

Permits and Consents

Building Consents

Date Issued	Description of Work	BC Number	CCC Issued
21/10/19	Erect single level, 3 Bedroom House with attached Double Garage	191756	Yes

Compliance Schedule	**N/A**
Requisitions	**None**

City Planning

The Operative Tauranga City Plan

The Tauranga City Plan provides the rules for how people can build or develop the land they own in our city. This can be land that is residential, commercial, industrial etc. The City Plan covers all subdivision, land use and development, how and where the city grows, how infrastructure is located and how natural and physical resources are managed. It is the blueprint by which any development in Tauranga is managed. It also includes rules on other things that are covered by the Resource Management Act - including hazards, signage, reserves, noise, heritage, etc.

There are specific rules within the City Plan that cover, amongst other matters, building height, earthworks, tree protection, bulk and scale of buildings, setbacks from coastal and harbour margins, and specific residential, commercial and industrial uses depending on location within the City.

Specific rules for each suburb and property can vary depending on the underlying zone of the area and the location of a specific property within that zone.

The majority of the City Plan became 'operative in part' on 9 August 2013. The remaining parts of the City Plan subsequently became operative on 5 July 2014.

A table showing a complete list of variations and plan changes to the operative City Plan can be found in the Table of Plan Change Dates.

It is advised that prospective purchasers of property review and consider all relevant planning rules for the specific property this Land Information Memorandum applies to prior to purchase.

To view the Operative Tauranga City Plan please click here.

If you have any specific queries on any rules or any existing or proposed use of a property, please contact the Tauranga City Council's Duty Planner (07 577 7000) for further information.

Development Contributions

Council operates a development contributions policy under the Local Government Act 2002, and also has financial contributions provisions in its City Plan. The broad purpose of these policies is to fund infrastructure costs that relate to the city's growth from those parties that undertake subdivision, building or development. These contributions are required on building consents, resource consents, service connection authorisations, certificates of acceptance and PIMs for small standalone dwellings. Contributions may remain payable on any property in circumstances where subdivision, building and development projects have not been completed, and in rare occasions where the Council has agreed to defer payment. In addition, further subdivision, building or development of a property may trigger the requirement to pay further development and/or financial contributions.

Council's development contributions team can advise further on these matters in relation to the application of development and financial contributions to the property in question.

Transportation Strategy & Planning and Reserve Management Plans

As part of Tauranga City Council's Transport strategy and planning activities and Reserves Management Plans, properties neighbouring Council-owned or administered land may be subject to transport network development such as walkways and cycleways or other development, activities or use of the land. The Tauranga Reserves Management Plan is available online at the following link: Reserve Management Plans.

Relevant Planning Information

All Planning information for this property is available online through the **City ePlan.**

Zone: Operative Tauranga City Plan	**Medium Density Residential**
Identified Plan Areas	**None Known**
Utilities/Designations	**Designations: C161 – Road or Road Widening - Refer City Plan Chapter 10 Appendix 10C**
Protected Heritage/Notable or Groups of Trees, or Protected Buildings	**None Known**
Archaeological or Heritage Sites	**None Known**

Certificates, Notices, or Orders Affecting the Land

Description	Date Issued
Consent Notice	27/07/17

Resource Consents *(Resource Management Act 1991)*

Description	Date Granted	RC Number
Land Use Consent	21/11/16	25312
Subdivision Consent	21/11/16	25312

Land Development

The following information relates to land development and landform characteristics. It is based on information held by council and may include reports, assessments, and other documentation relevant to site development. This information may not reflect the current on-site conditions, or any work undertaken that is not known to council.

The Tauranga City Council does not act as agent for network utility operators.

The landform and geology within Tauranga City have some features which demand particular attention. These features, which may or may not be relevant to the property in question, are outlined in "General Description of Landform within Tauranga District" as attached.

Comments:

Consent Notice

Refer Consent Notice dated 27 July 2017 together with the following:

1. Stage 2 Geotechnical Completion Report by Aurecon New Zealand Limited, reference 247593-210 revision 2, dated 12 July 2017.

2. Soakage Assessment for Proposed Residential Dwellings by Lysaght, reference 152870, dated 12 July 2017.

Documentation Relevant to the Subject Property

Refer the following documentation:

1. Site Inspection Record by SED Consultants Ltd reference 19/215 dated 24 October 2019.

2. Building Location Certificate by S & L Consultants Ltd dated 28 November 2019.

HAIL Sites

This site is included in the Bay of Plenty Regional Council's Selected Land Use Register which records sites that have had past or present hazardous activities located on them. This site is categorised in that register as "Suitable for Land Use – Presence of Asbestos – Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition." For further information please contact the Bay of Plenty Regional Council quoting site reference TGA_848 HAIL code E1.

Please see attached Selected Land Use Site Details reports by Bay of Plenty Regional Council, reference LUR-TGA-00848, dated 6 May 2021 and 28 August 2017.

Please contact Tauranga City Council for a copy of the following documentation if required:

1. Detailed Contaminated Site Investigation Report by Lysaght Consultants Limited, reference 152870, dated 5 November 2015 (Document ID A6682817).

2. Site Remediation and Validation Report by Lysaght Consultants Limited, reference 152870, dated 5 May 2016 (Document ID A9421727).

Natural Hazards

This information relates to nation-wide, city-wide, or region-wide studies and may not reflect the on-site situation or natural hazard investigations and mitigation done on a site-specific property level. It is recommended that hazards identified in this section of the Land Information Memorandum be considered both individually and in combination, as their cumulative effects may influence the overall level of risk.

Flooding

Flood hazard information referenced here includes modelling produced at a nation-wide scale by Earth Sciences New Zealand (ESNZ). The national tool provides consistent flood hazard data across New Zealand and is zoomable to street level, but not to individual properties. For property-specific flood hazard information that may affect this property please refer to the following section of this Land Information Memorandum titled, “Natural Hazards Relevant to the Subject Property”. The modelling produced by ESNZ is available to view at the following link: Flood Hazard Modelling.

Microzoning for Earthquake Hazards

The Council has received reports and results that assessed Tauranga City's liquefaction vulnerability during earthquakes.

Different properties face varying probability levels of liquefaction damage. The maps assess natural ground conditions only and don't consider recent human activities like earthworks, ground improvements, or foundation design that may reduce liquefaction risk. Detailed, site-specific studies by qualified practitioners may take precedence over these city-wide assessments.

Liquefaction information may affect property use and development, including building consent requirements (Building Act 2004, NZ Standard AS/NZ 1170, TCC Infrastructure Development Code Chapter 10.10.6), subdivision consents (Resource Management Act), and infrastructure design.

Further information and reports are available at: Earthquakes and Liquefaction.

Landslide Susceptibility

Council has received an assessment of Tauranga City’s susceptibility to landslides. Two maps have been prepared, one showing areas susceptible to land sliding triggered by rainfall, and the other by earthquakes. A report detailing the assessment and maps are available by accessing the following link: Landslide Susceptibility.

Shallow Groundwater

Council has received an assessment of shallow groundwater conditions in Tauranga City. The assessment analysed groundwater monitoring data from 2015-2021 across 97 monitoring sites and developed predictive models for future conditions under sea level rise.

Shallow groundwater occurs close to the surface throughout Tauranga's low-lying areas. Groundwater levels fluctuate with tides, rainfall, and seasonal variations. In some areas, groundwater sits less than 1 meter below ground surface. The assessment forecasts that rising groundwater levels will occur as sea levels rise.

Development Implications: This information may affect property use and development, including building consent requirements (Building Act 2004), subdivision consents (Resource Management Act), and infrastructure design. Site-specific geotechnical investigations may be required to assess local groundwater conditions and mitigation measures.

The full technical report and spatial datasets are available at: Groundwater.

Bay of Plenty Regional Council

Further information regarding natural hazards held by the Bay of Plenty Regional Council that may be relevant to this property can be found at the below links. Further enquiries may also be made by contacting the Bay of Plenty Regional Council on 0800 884 880.

Bay of Plenty Regional Council – Natural Hazards
Bay Hazards
Bay Explorer

Natural Hazards Relevant to the Subject Property

The following information relates to natural hazards identified at a site-specific scale. It is based on information held by Council and may not reflect the current on-site conditions or any hazard investigations or mitigation measures that have occurred since, or that are not known to Council.

Further information about natural hazards held by Tauranga City Council can be found at the following link: Tauranga City Council – Natural Hazards and may also be identified on Council's mapping website, Mapi.

Tsunami

Tsunami

Council holds information that shows this property is located in a possible tsunami inundation zone.

GNS Science (now known as Earth Science New Zealand) have prepared a report titled Comprehensive Tsunami Inundation Modelling and Evacuation Zone Mapping: Final Report (March 2025). The report was commissioned by the Bay of Plenty Regional Council.

The purpose of the report is to document the methodology, results and limitations of the modelling undertaken by GNS Science to produce comprehensive tsunami inundation mapping for the Bay of Plenty region. The scope of the report is the Bay of Plenty coastline and offshore islands.

The tsunami inundation maps show:

- The area of land that could potentially be flooded by a tsunami caused by a rare offshore earthquake that has a wave height ranging between 8m and 15m along the Bay of Plenty coast.

  The likelihood of a tsunami like this occurring in any year is calculated as 0.04% (which is a 1 in 2,500 chance).

The technical report can be accessed from the Bay of Plenty Regional Council website: Natural hazards.

Further information is available on the Tsunami pages of Tauranga City Council's website and Bay of Plenty Regional Council's website. Information explaining the difference between evacuation zones and inundation zones is also available in the Frequently Asked Questions.

Please see attached tsunami evacuation zone map.

Additional Information

Licences Affecting the Land or Buildings

None

Signed for and on behalf of the Council:



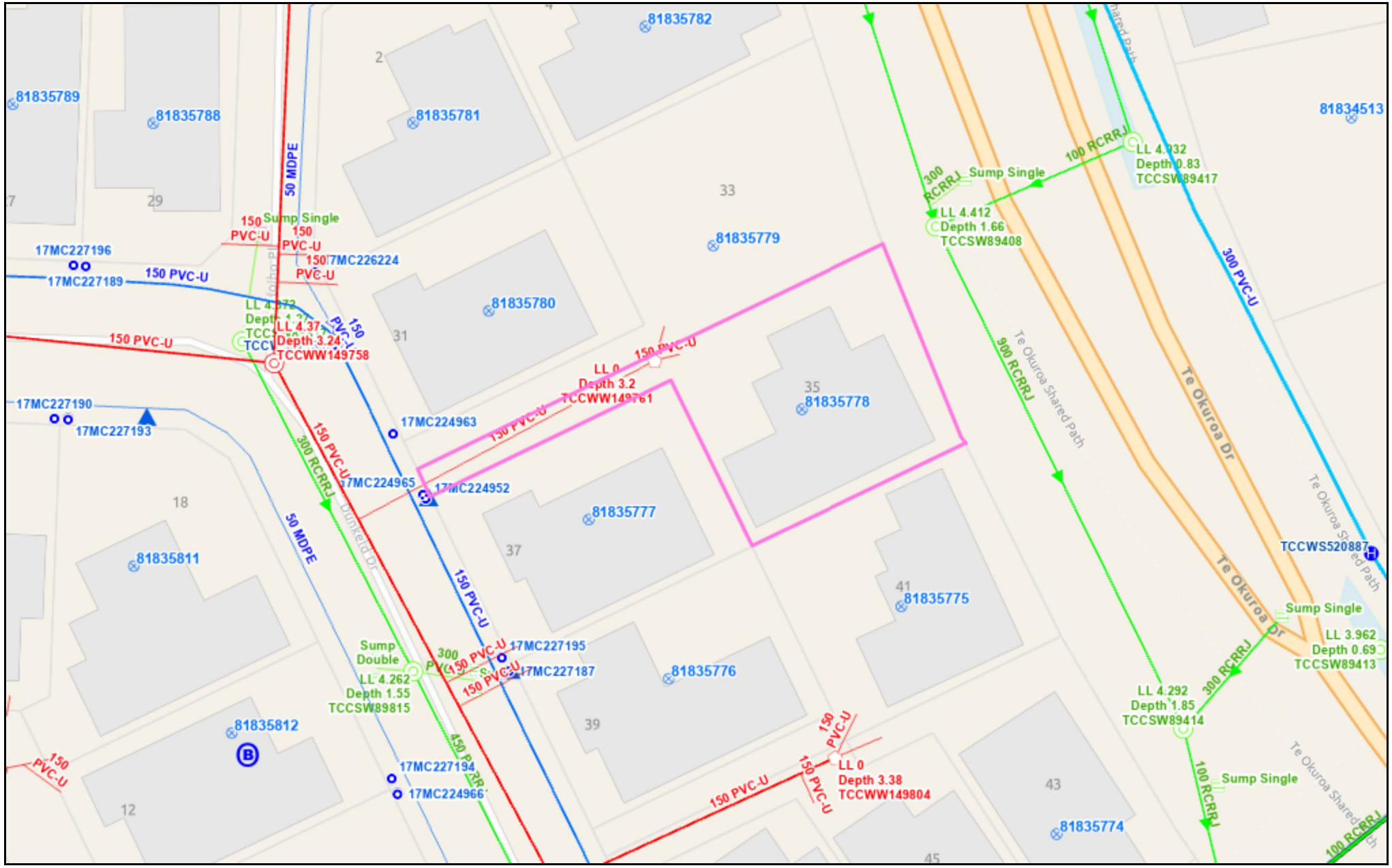
Position held: Senior LIM & Property Files Officer

Date: 20 April 2026

Tauranga City

Services Plan

Tauranga City



Produced by - Tauranga City Council

Printed 20/04/2026

Cadastral Information sourced from LINZ. Crown Copyright Reserved

Services Plan

0 5 10 m

Meters

Scale 1: 500 @A4

N

Information shown on this plan is indicative only. The Council accepts no liability for its accuracy and it is your responsibility to ensure that the data contained herein is appropriate and applicable to the end use intended.

Tauranga City

Services Key

Water

- Water Service Line
- Water Meter
- Rider Main
- Reticulation Main
- Trunk Water Main
- Asbestos Pipe (Abandoned)
- Asbestos Pipe (Operational)
- Hydrant
- Valve
- Water Reservoir
- Backflow - Double Check
- RPZ
- Valve
- Private Water Bore

Stormwater

- Service Line
- Rising Main
- Gravity Main
- Stormwater Drain
- Subsoil Drain
- Stormwater Overland Flow Path
- Culvert
- Inlet
- Outlet
- Stormwater Manhole
- Stormwater Sump
- Stormwater Rodding Eye
- Large Sump
- Storage Pond

Wastewater

- Service Line
- Rising Main
- Gravity Main
- Asbestos Pipe (Abandoned)
- Asbestos Pipe (Operational)
- Node
- Rodding Eye (Inspection Point)
- Manhole
- Valve
- Chamber
- Pump Station

Other

- Abandoned assets and lines
- Private assets and lines
- Geotech Utility Buffer

More symbols may appear on the Services Plan than are shown here. For a full key please contact the Tauranga City Council LIM Office.

Tauranga City

Building Information

Tauranga City

As Built Drainage Plan

Drainage Plan for:

Street Number 35 Street Name Dunkeld Drive

Lot 226 DP 505065

Suburb Papamoa

Owner Kyle & Rachel Berridge

Type of Building New Dwelling

Drainlayer Sam Arundel - The Drainage Department Ltd

Date of Inspection 2/12/2019 Inspector Jamie Pitt.

Drainage Permit No 21709

Note : Plan to be drawn in black ballpoint on graph opposite

Plan to include:

1. The correct position of the drains in relation to the building and boundaries.
2. The position of the street frontage.
3. Depth of drains at connection point.
4. Both foulwater and stormwater drains to be drawn.
5. Clearly define all inspection openings, with accurate measurements from two points.
6. Clearly define all buildings and boundaries.
7. Refer to example drain plan back page.

Privacy Information

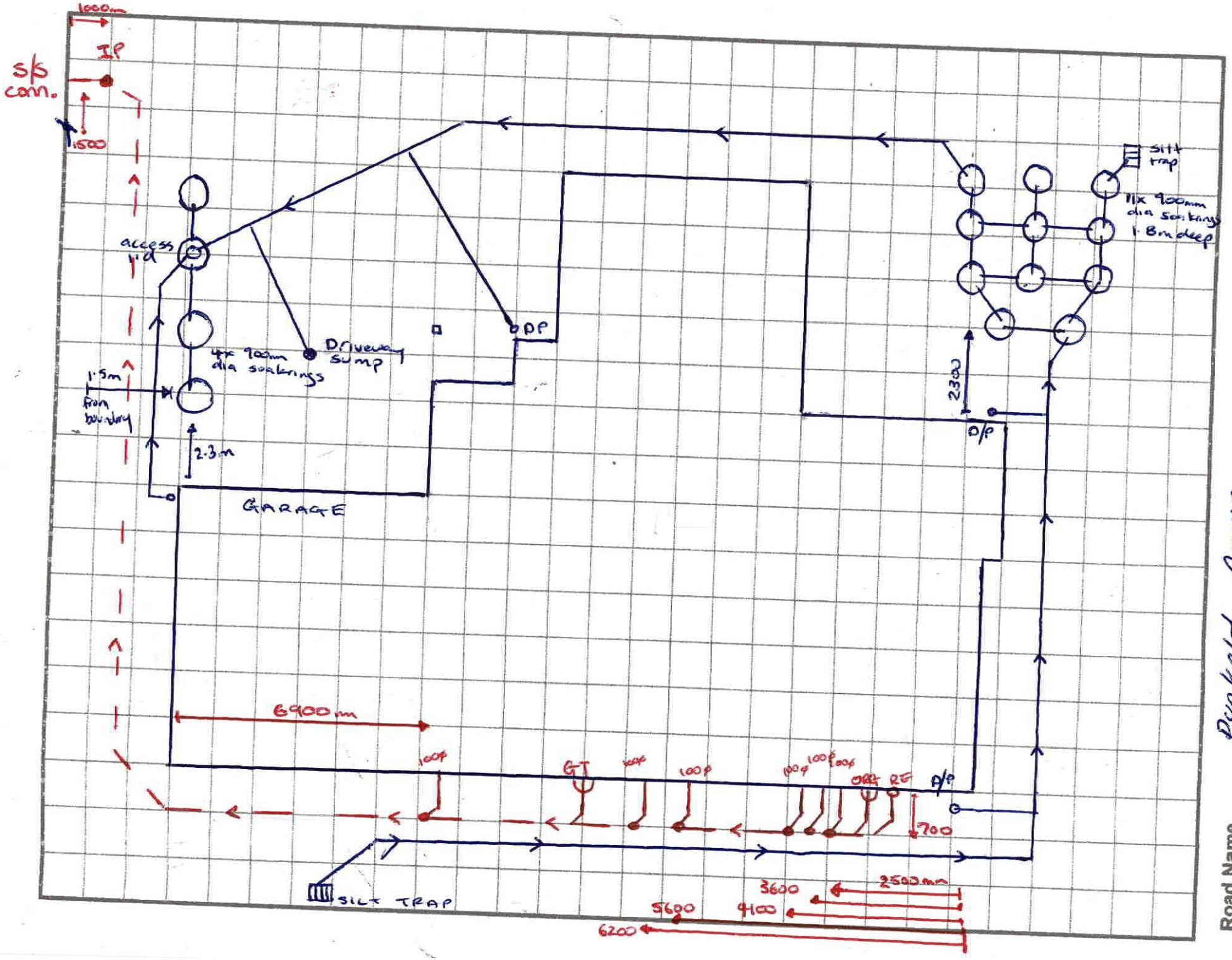
Pursuant to the Privacy Act 1993 the following information is brought to your attention.

This document collects personal information about you and is collected pursuant to Section 33 and/or Section 45 of the Building Act 2004. Pursuant to Section 216 of the Building Act 2004, the information contained in this document will be made available and passed on to the public on request.

The information contained in the document is being collected and held by the Tauranga City Council. You do have the right of access to and correction of this information subject to the provisions of the Privacy Act 1993.

Pursuant to Section 217 of the Building Act 2004 the building owner may request the plans and specifications be marked confidential for the purposes of security. Such a request must be in writing and addressed to:

Group Manager Customer and Environmental Services
Tauranga City Council
Private Bag 12 022, Tauranga 3143


1000mm
I/P
s/p conn.
1500
access lid
4x 900mm dia soakings
Driveway sump
1.5m from boundary
2.3m
GARAGE
D/P
Silt trap
11x 900mm dia soakings 1.8m deep
2300
D/P
6900mm
100ϕ
GT
100ϕ
100ϕ
100ϕ 100ϕ 100ϕ
OPEN RE
D/P
700
SILT TRAP
3600
2500mm
5600
4100
6200
Road Name ..... Dunkeld Drive .....

Planning Information

Tauranga City

TAURANGA CITY COUNCIL

CONSENT NOTICE PURSUANT TO SECTION 44 HOUSING ACCORDS & SPECIAL HOUSING AREAS ACT 2013 (SECTION 221 RESOURCE MANAGEMENT ACT 1991)

TCC Reference: RC25312
Surveyor's Reference: 152870 Terrace Views Stage 2

IN THE MATTER OF Plan DP 508065

AND

IN THE MATTER OF Subdivision Consent pursuant to Sections 34, 36 & 52 of the Housing Accords & Special Housing Areas Act 2013 (HASHAA)

Pursuant to Section 44 of the HASHAA (Section 221 of the Resource Management Act 1991), the Tauranga City Council hereby certifies that by way of resolution passed under delegated authority on 21 November 2016 that the following conditions were imposed on the subdivision consent of Section 3 SO 503280 and Section 11 SO 493592.

That a consent notice be registered on the Certificates of Title of the following allotments advising owners and subsequent owners of the following requirements to be complied with on a continuing basis:

Lots 200 to 251 (inclusive), 253 to 299 (inclusive) and 500 to 509 (inclusive):

i) The design and construction of any building or structures requiring a building consent in accordance with the Building Act 2004 and the associated development of these residential lots shall comply with the recommendations contained in the 'Geotechnical Completion Report – Terrace Views Subdivision: Stage 2 Geotechnical Completion Report' compiled by Aurecon New Zealand Limited, reference 247593-Stage 2-GCR, Revision 2 and dated 12 July 2017 (TCC Ref: TL9803).

Lot 252:

ii) The design and construction of any building or structures requiring a building consent in accordance with the Building Act 2004 and the associated development of this residential lot shall comply with the recommendations contained in the 'Stage 2 Terrace Views Subdivision - Geotechnical Suitability for Building within Lot 252' report compiled by Aurecon New Zealand Limited, reference 247593 - Lot 252 Geo Cert Final.docx, Revision 0 and dated 17 March 2017 (TCC Ref: TL9833).

Lots 293, 294, 297, 298, 501, 502, 505, 506, 508, and 509:

iii) These lots contain Building Line Restrictions as demonstrated on the Title Plan DP 508065 as areas 'AA', 'AB', 'AC', 'AD', 'AE', 'AF', 'AG', 'AH', 'AI' and 'AJ'. There shall be no building foundation or permanent structure requiring building consent erected or earthworks within the building exclusion zone as defined by the Building Line Restriction without first having the design specifically assessed, prepared and certified by a Tauranga City Council Category 1 Soils Engineer.

Lots 200 to 203 (inclusive), 225 to 251 (inclusive), 257 to 262 (inclusive), and 275 to 290 (inclusive):

iv) Stormwater disposal from these lots shall be in accordance with the report prepared by Lysaght Consultants Limited entitled 'RE: Soakage Assessment for Proposed Residential Dwellings in Stages 2A & 2C at Terrace Views, Te Okuroa Drive, Papamoa', referenced as 152870, Revision 1 and dated 12 July 2017 (TCC Ref: TL9805).

Lots 204 to 224 (inclusive), 253 to 256 (inclusive), and 263 to 274 (inclusive):

v) Stormwater disposal from these lots shall be in accordance with the report prepared by Lysaght Consultants Limited entitled 'RE: Soakage Assessment for Proposed Residential Dwellings in Stages 2B at Terrace Views, Te Okuroa Drive, Papamoa', referenced as 152870, Revision 1 and dated 12 July 2017 (TCC Ref: TL9805).

Lots 291 to 299 (inclusive), and 500 to 509 (inclusive):

vi) Stormwater disposal from these lots shall be specifically designed by a Chartered Professional Engineer factoring in the recommendations contained within the report prepared by Aurecon New Zealand Limited entitled 'Re: Terrace Views Subdivision – Stage 2 Soakage Testing and Assessment', referenced as 247593 - Stage 2 Soakage Assessment Report.docx, Revision 0 and dated 6 June 2017 (TCC Ref: TL9804).

Lot 252:

vii) Stormwater disposal from this lot shall be in accordance with the report prepared by Lysaght Consultants Limited entitled 'RE: Soakage Assessment for proposed dwelling on Lot 252, Hills View Drive, Terrace Views, Papamoa', referenced as 173562 and dated 12 April 2017 (TCC Ref: TL9832).

Lots 200 to 299 (inclusive) and 500 to 509 (inclusive):

viii) The development of these allotments shall only proceed in accordance with the 'Residential Land Use Specific Conditions' prescribed within resource consent number RC25312, including any subsequent variations to the conditions of that consent.

Lots 216 to 219 (inclusive), 221, 222, 252, and 282 to 293 (inclusive):

ix) The owner or owners of these allotments are required to meet the full cost of any fencing along the common boundary between the lot and adjoining land vested in Tauranga City Council as local purpose reserve.

DATED at Tauranga this **27th day of July 2017**



……

Authorised Officer
Tauranga City Council

Zariba Holdings Limited
C/- Aurecon New Zealand Limited
PO Box 2292
Tauranga 3140

DECISION ON RESOURCE CONSENT APPLICATION – RC25312 (LAND USE)
Under the Housing Accords and Special Housing Areas Act 2013

Tauranga City Council, being an authorised agency as set out under section 23 of the Housing Accords and Special Housing Areas Act 2013, resolves:

That pursuant to Sections 34 to 38 of the Housing Accords and Special Housing Areas Act 2013, to grant resource consent to the application by Zariba Holdings Limited to undertake a qualifying development comprising the establishment of residential dwellings and associated ancillary buildings, structures and activities within the Te Okuroa Drive/Parton Road and Zariba Special Housing Areas at numbers 1236L, 1482L, 1602L, 1608L, 1612L, 1614L and 1616L Parton Road, Papamoa East, legally described as Lot 3 DP 317472 & Lot 2 DP 429801 (CFR 516264), Lot 1 DP 429801 (CFR 516263), Lot 3 DPS 82613 (CFR SA65B/752), Lot 2 DPS 82613 (CFR SA65B/751), Section 6 SO 481279 (CFR 685335), Lot 1 DP 325745 (CFR 103909) and Lot 2 DP 325745 (CFR 103910).

Reasons for Decision:

1. The proposal, being to develop land for the purpose of establishing residential dwellings and associated ancillary buildings, structures and activities, is consistent with the purpose of the Housing Accords and Special Housing Area Act 2013 (HASHAA) and the sustainable management purpose of Part 2 of the Resource Management Act 1991 (RMA);

2. The proposal is generally consistent with the Tauranga City Plan and the Bay of Plenty Regional Policy Statement, and where it is not consistent, greater weight has been afforded to the overall outcome of the proposal in respect to the purpose of the HASHAA and the acceptable design of the comprehensive residential development including being supported by the necessary level of infrastructure capacity.

3. Adequate infrastructure can be provided to support the Qualifying Development.

Tauranga City Council
91 Willow Street, Private Bag 12022, Tauranga 3143, New Zealand
Phone 07 577 7000 **Fax** 07 577 7193 **Email** info@tauranga.govt.nz **www.tauranga.govt.nz**

That pursuant to section 37 of the Housing Accords and Special Housing Areas Act 2013 and section 108 of the Resource Management Act 1991 the granting of this resource consent is subject to the following conditions:

General

1. *The qualifying development, comprising the establishment of residential dwellings and associated ancillary buildings, structures and activities, shall proceed in general accordance with the plans and information submitted with the application prepared by Aurecon New Zealand Limited, entitled 'Stage 3 - Special Housing Area, Parton Road, Papamoa', referenced as 247593, Revision 0 and dated the 15th of July 2016; and over the land shown on the Layout Plan prepared by Lysaght Consultants Ltd (Rev J), dated 13 June 2016.*

   Compliance with this condition is subject to changes required in order to satisfy the requirements of conditions of this resource consent.

2. *All costs associated with the conditions of this consent shall be met by the Consent Holder.*

3. *Pursuant to section 51 of the HASHAA, this consent lapses five (5) years after the date of commencement unless:*

   (a) The consent is given effect to; or

   (b) The Council extends the period after which the consent lapses.

4. *For the purposes of Condition 3, this Consent has been given effect to on the lodgement and acceptance of the first building consent for a residential dwelling or showhome in accordance with the Building Act 2004.*

5. *The development of each lot with the permanent land use activities provided for under this consent shall not proceed until such time as section 46 of the HASHAA and 224 of the RMA certification has been issued in relation to that allotment.*

6. *Construction noise as a result of giving effect to this consent shall not exceed the limits recommended in, and shall be measured and assessed in accordance with, NZS 6803:1999 Acoustics Construction Noise.*

7. *The use of noise generating tools, motorised equipment, and vehicles that are associated with construction and/or earthworks activity on the subject site shall therefore be restricted to between the following hours to comply with this standard:*

   (a) Monday to Saturday: 7:30 a.m. to 6:00 p.m.; and

   (b) Sundays or Public Holidays: No works.

Definitions

8. *For the purpose of this consent, unless otherwise specified within this consent, any reference to a defined term shall have the same definition as prescribed within Chapter 3 – Definitions of the Tauranga City Plan (operative 1st of December 2014) or any subsequent amendment.*

9. *'Geo-Professional'*

   "Shall have the same meaning as section GEN-4.1 Definitions of the Tauranga City Council Infrastructure Development Code" or any subsequent;

10. *'Residential Allotment(s)'*

    "Shall mean those allotments created for use for residential activities under resource consent RC25312 and shall exclude any allotment created as a Reserve and/or any allotment created to be vested as Road."

11. *'Road'*

    "Shall mean a road that has been or is identified on an approved subdivision resource consent scheme plan to be, vested in Council. This shall exclude rights of way or access lots held in private ownership".

Specific Conditions:

12. *Despite the underlying zoning, the development of 'residential allotments' created under resource consent the corresponding subdivision resource consent RC25312 shall be in accordance with the following on going requirements:*

Activities

13. *The following 'principal activities' are permitted to occur on 'Residential Allotments':*

    (a) 'Independent Dwelling Units';

    (b) 'Secondary Independent Dwelling Units';

    (c) 'Home-Based Businesses'; and

    (d) 'Showhomes'.

14. *No other activity (including business or industrial activities) shall be undertaken on 'Residential Allotments' other than those prescribed within condition 13 of this consent.*

15. *Subject to compliance with the conditions of this consent, the following 'ancillary activities' shall be permitted when carried out in association with a principal activity listed within condition 13 of this consent:*

    (a) 'Buildings' and 'structures' (including demolition and construction);

    (b) Signs' – see conditions 30 to 32; and

    (c) 'Earthworks' - see condition 33.

Development Density

16. *The maximum development density for residential activities on each allotment shall be one (1) independent dwelling unit per 325m² of gross site area.*

    [Note: Secondary Independent Dwelling units shall be permitted in accordance with condition 26.]

Building Bulk & Location Controls

17. *Building Height*

    (a) *Subject to condition 17(b) of this consent, the maximum height of buildings and structures shall be 9.5 metres as measured from 'ground level'.*

    (b) *A 'design feature' or 'building component' may exceed the maximum height by up to a maximum of 2.0 metres provided the external dimensions in any other direction (excluding diagonal measurements) do not exceed 2.0 metres.*

18. *Setbacks*

    (a) *Subject to the permitted intrusions prescribed under condition 18(c) of this consent, all buildings shall be setback a minimum of 3.0 metres from an adjoining road boundary;*

    (b) *Subject to the permitted intrusions prescribed under condition 18(c) of this consent, all buildings shall be setback a minimum of 1.5 metres from an adjoining boundary other than a road boundary;*

    (c) *A 'design feature' or 'building component' may intrude into the above building setback by the following amounts:*

        (i) *Eaves up to 0.6 metres;*

        (ii) *Design feature and/or other building components, whether as a single intrusion or in combination, up to 0.6 metres for a single or cumulative length of no more than 4.0 metres into each setback;*

        (iii) *For the purpose of remediating dwellings with face fixed claddings a maximum intrusion of 80 millimetres, beyond any permitted intrusion, where a dwelling has a face fixed cladding system that needs to be upgraded to a ventilated cavity construction to comply with E2 AS1 of the New Zealand Building Code.*

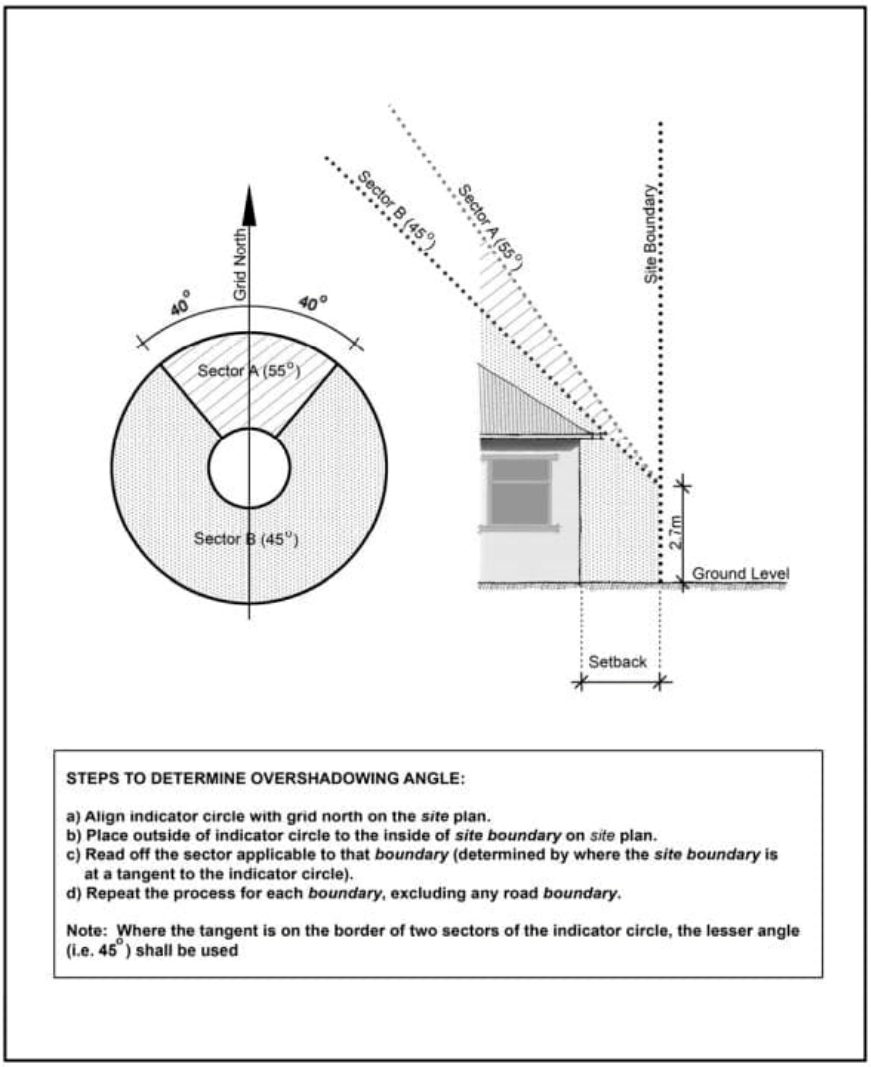
    (d) *All garages or carports designed with 'direct vehicle access' to a road shall be set back at least 4.5 metres from the road boundary. With the exception of the intrusions set out under condition 18(c)(i), there shall be no permitted intrusions into this setback; and*

    (e) *With the exception of road boundaries, a building may be erected closer to a boundary where the written approval of those property owners and occupiers whose properties adjoin the proposed non-compliance has been obtained to a specified lesser distance and this approval is endorsed on all relevant building plans or other plans which show the encroachment.*

        An adjoining property shall include rights of way and properties separated by rights of way adjoining the non-compliance where the building is to be located within 1.5 metres of that property boundary.

19. *Overshadowing*

    (a) *Subject to the permitted intrusions prescribed under condition 19(b) of this consent, all buildings shall be within a building envelope calculated in accordance with the following diagram:*



(b) A 'design feature' or 'building component' may intrude through the overshadowing envelope calculated in accordance with condition 19(a) subject to the following:

(i) The 'design feature' or 'building component' shall not, with the exception of diagonal measurements, exceed an external measurement of 2.0 metres in any direction;

(ii) Gable end roofs may intrude through the overshadowing envelope by no more than one third of the perpendicular height of the gable end; and

(iii) Private (for residential and recreational purposes) radio and telecommunication antennas (being no greater than 2.0m^2 in area) and aerials (being no greater than 80 millimetres in diameter).

(c) Notwithstanding the permitted intrusions prescribed under condition 19(b), a building may also intrude through the overshadowing envelope to any extent where the written approval of those property owners and occupiers whose properties adjoin the proposed non-compliance has been obtained to a specified lesser distance and this approval is endorsed on all relevant building plans or other plans which show the encroachment.

For the purposes of this condition (19(c)), an adjoining property shall include rights of way and properties separated by rights of way adjoining the non-

compliance where the building intrudes the overshadowing envelope applied at that property boundary.

Vehicle Access

20. *The maximum number of 'independent dwelling units' served by private right of ways, private access ways or legal access ways shall be:*

    (a) Up to two (2) 'units with a 2.7 metres minimum legal width with a 2.4 metre minimum seal width;

    (b) Three (3) or Four (4) units with a 3.0 metre minimum legal width with a 2.5 metre minimum seal width;

    (c) Five (5) to twelve (12) units with a 6.0 metre minimum legal width with a 5.0 metre minimum seal width with room for two vehicles to pass.

Outdoor Living Area

21. *All 'independent dwelling units' shall be provided with an outdoor living area as follows:*

    (a) At ground floor level, a minimum of 40 m^2 in area that incorporates an area with minimum dimensions of 4.0 metres by 3.0 metres; OR

    (b) A balcony above first floor level with minimum 6 m^2 in area capable of accommodating a circle with a diameter of 2.0 metres; OR

    (c) Purpose built deck/ terrace (at ground level) with minimum dimensions 4.0 metres (length) x 2.5 metres (depth) with direct door access from a living area.

    (d) Nominated outdoor living areas shall be free from vehicle parking, access and manoeuvring areas.

On-Site Car Parking

22. *Each 'independent dwelling unit' shall be provided with a minimum of two (2) on-site car parking spaces.*

23. *Each 'secondary independent dwelling unit' shall be provided with a minimum of one (1) on-site car parking spaces.*

24. *Each car parking space shall have minimum dimensions of 5.4 metres (length) by 2.5 metres (width).*

25. *The on-site car parking spaces required under Conditions 22 and 23 may be stacked and/or incorporated into a garage or carport.*

Secondary Independent Dwelling Units

26. *Secondary independent dwelling units may be provided subject to compliance with the following:*

    (a) The minimum site size required to accommodate both a principal independent dwelling unit and a secondary independent dwelling unit is 500 m^2;

(b) *Development on the site is restricted to one principal independent dwelling unit and its secondary independent dwelling unit and their accessory buildings;*

(c) *A secondary independent dwelling unit shall be either:*

(i) *Encompassed within the bulk of the principal independent dwelling unit, or*

(ii) *Encompassed as a second floor to a garage servicing the principal independent dwelling unit.*

(d) *A secondary independent dwelling unit must be capable of functioning as a separate household unit and be physically partitioned from the principal independent dwelling unit or garage by fire separation;*

(e) *A secondary independent dwelling unit shall be limited to a maximum of two (2) bedrooms (or two (2) rooms other than the main living area capable of being used as bedrooms) in addition to other rooms within the unit (living, kitchen, laundry, bathroom and storage rooms); and*

(f) *A secondary independent dwelling unit must comply with the Bulk and Location Controls conditions of this consent.*

Home-Based Business

27. *The maximum development intensity for a home-based business or combination of home-based business activities on a single site shall be:*

(a) *Every home-based business or combination of home-based business activities on a single site may employ not more than two (2) other persons Full Time Equivalent (FTE)) additional to the members of the household who permanently reside on the site and who own and operate the business from that site;*

(b) *The activity shall be carried out either within a dwelling, an accessory building, or in an outdoor activity area clearly designed and constructed for the purpose of the business or businesses, or a combination of these areas.*

(c) *The maximum total gross area used for the home-based business or combination of home-based businesses, including retail sales space, shall be 50m²;*

(d) *The activity, including any aspect of the activity undertaken in an outdoor activity area, shall not encroach on the setback or streetscape requirements of the site as defined by condition 18 of this Consent;*

(e) *Retail sales from a home-based business or businesses shall be limited to only those goods and materials produced by the home-based business or used in the direct operation and management of that business or those businesses on the site. Retail sales shall take place from within a building or structure on the same site and the area occupied for retail sales shall be a constituent part of the gross area of the activity; and*

(f) *In addition to the on-site car parking required for the principal activity occurring on the site, one additional visitor car parking space shall be provided.*

Showhomes

28. *Any 'Showhome' established on a 'residential allotment' shall comply with all of the conditions of this consent as if it were an Independent Dwelling Unit'.*

Heavy Machinery

29. *No 'heavy machinery' shall be parked, stored or displayed on a site. This excludes one private motor home vehicle per site and heavy machinery visiting and using a site to pick up or deliver goods or materials, or during construction.*

Signs

30. *Signage on 'residential allotments' shall only be associated with home based businesses or showhome activities.*

31. *Freestanding signs or signs attached to a fence, or wall associated with a home-based business shall have a combined area no greater than 1.0m^2 per site.*

32. *Freestanding signs or signs attached to a fence or wall shall have a combined area of no greater than 2.0m^2 per site.*

Earthworks

33. *With the exception of earthworks for domestic gardening and those bulk earthworks approved as part of the corresponding subdivision consent RC25312, earthworks shall be subject to the following:*

    (a) Where earthworks on a site expose more than 100m^2, a combination of erosion and sediment control measures that are consistent with Tauranga City Plan Appendix 4N: Erosion and Sediment Control Measures shall be used; and

    (b) Where any single cut on a site is 1.5 metres in height or higher (either as a single cut or combination of cuts) and where the angle of cut is 45 degrees or greater, the cut(s) shall be retained either before construction of any building foundations or no later than three (3) months after that cut being created, whichever is the lesser.

Site Access and Vehicle Crossings

34. *The location of vehicle access points from an intersection shall be in accordance with the following diagram and accompanying table as if the site was located within a Residential Zone:*



ROAD SPEED LIMIT 70KM/H AND OVER DISTANCE (m) TO ACCESS X				
Road Classification	**Residential & Rural Residential Zones**	**Rural Zones**	**Commercial, Open Space and Education Centre Zones**	**Industrial Zones/ Special Use Zone - Baypark**
Primary Arterial	15	50	50	50
Secondary Arterial	9	50	50	50
Collector	9	30	30	30
Local	9	30	9	9

ROAD SPEED LIMIT 60KM/H AND UNDER DISTANCE (m) TO ACCESS X				
Road Classification	**Residential & Rural Residential Zones**	**Rural Zones**	**Commercial, Open Space and Education Centre Zones**	**Industrial Zones/ Special Use Zone - Baypark**
Primary Arterial	15	30	15	15
Secondary Arterial	9	30	9	9
Collector	9	30	9	9
Local	9	30	9	9

35. *Notwithstanding Condition 34 of this consent, with reference to the approved Master Plans referenced in Table One of condition 1, there shall be no vehicle access onto Te Okuroa Drive from the 'Residential Allotments'; Access for Lots 232, 233 (Stage 2) and Lots 313 and 314 (Stage 3A) shall only be to local roads and not directly to the Collector Road known as 'Zariba Access Road'.*

36. *All allotments within Stages 2 and 3A with access to the Collector Road known as 'Zariba Access Road' shall provide on-site manoeuvring so at all vehicles can enter and exit the site without reversing onto the road. Such manoeuvring shall be able to be executed in no more than a three-point turn.*

<u>Noise – Reverse Sensitivity</u>

37. *Subject to the exceptions provided by condition 38, all 'residential allotments' located within 100 metres of the boundary of State Highway 2 (Tauranga City Plan Designation NZTA 16), being Lots 201, 202, 205, 206, 209, 210, 253 to 255, 265 to 270, 272 to 277, 288 to 290, 420 to 422, 435 to 454, 458 to 464, 500 to 509 and 527 to 546. shall be subject to the following conditions:*

    (a) Any new dwelling shall meet an internal road-traffic design sound level of 40dB LAeq(24h) inside all habitable rooms with ventilating windows open;

(b) *Any addition, extension or alteration to an existing dwelling (excluding garaging) which exceeds 25 per cent of the existing gross floor area shall be designed and constructed to achieve a maximum internal road-traffic design sound level of 40dB LAeq(24h) inside all habitable rooms being added to, altered or extended with ventilating windows open; and*

(c) *Either an acoustics design report from a suitably qualified and experienced acoustics expert shall be provided to the Council at the time building consent is sought demonstrating compliance with condition 36(a) or 36(b) of this consent, whichever is applicable; OR*

(d) *New dwellings or additions, extensions or alterations to an existing dwelling which exceed 25 per cent of the existing gross floor area shall comply with the following:*

  (i) *The windows of all habitable rooms shall be constructed with glazing that includes a laminated pane that is at least 6.38 millimetres thick and covers the glazed area; and*

  (ii) *A ventilation system shall be installed comprising the following components and specifications:*

    a. *Consist of an air conditioning unit(s) provided that the noise level generated by the unit(s) must not exceed 40dB LAeg(30s) in the largest habitable room (excluding bedrooms) and 35dB LAeg(30s) in all other habitable rooms; when measured 1.0 metre away from any grille or diffuser; OR*

    b. *A system capable of providing at least 15 air changes per hour in the largest habitable room (excluding bedrooms) and at least five (5) air changes per hour in all other habitable rooms; and the noise level generated by the system must not exceed 40dB LAeg(30s) in the largest habitable room (excluding bedrooms) and 35dB LAeg(30s) in all other habitable rooms, when measured 1.0 metre away from any grille or diffuser; and*

    c. *The internal air pressure must be no more than 10 Pa above ambient air pressure due to the mechanical ventilation; and*

    d. *Where a high air flow rate setting is provided, the system must be controllable by the occupants to be able to alter the ventilation rate with at least three equal progressive stages up to the high setting.*

38. *Condition 37 of this consent does not apply where one of the following conditions are met:*

(a) *The nearest façade of the dwelling is at least 50 metres from the State Highway 2 road boundary <u>and</u> there is a solid building, fence, wall or landform that blocks the line of sight from all parts of all windows and doors to habitable spaces to any part of the State Highway 2 road surface; OR*

(b) *It can be demonstrated by way of prediction or measurement by a suitably qualified and experienced acoustics expert that the road-traffic noise level from State Highway 2 is less than 55 dB LAeg(24h) on all facades of any addition, extension or alteration, or new dwelling.*

Connectivity for 1236L Parton Road

39. *In the event that the Consent Holder does not proceed with Option 3 (being the corresponding subdivision resource consent RC25312), the Consent Holder shall make an allotment available for purchase by the owner/s of number 1236L Parton Road (Lot 3 DP 317472 and Lot 2 DP 429801) for the purpose of providing vehicle access and service connections for these allotments via the road network proposed under the corresponding subdivision resource consent RC25312. Any allotment made available for purchase in accordance with this condition shall be offered at a reasonable market rate, as determined by a registered property valuer(s).*

    This condition shall lapse if before the date of repeal under section 3(1) of the Housing Accords and Special Housing Areas Act 2013, an application for resource consent has not been lodged for a Qualifying Development on 1236L Parton Road under section 14 of the Housing Accords and Special Housing Areas Act 2013.

40. *All costs associated with compliance with the conditions of this consent shall be met by the Consent Holder.*

Recommended and Assessed by:



Shanan Miles
Development Planner

Delegated Authorisation by:



Brad Bellamy
Team Leader: Environmental Planning

Date: 21 November 2016

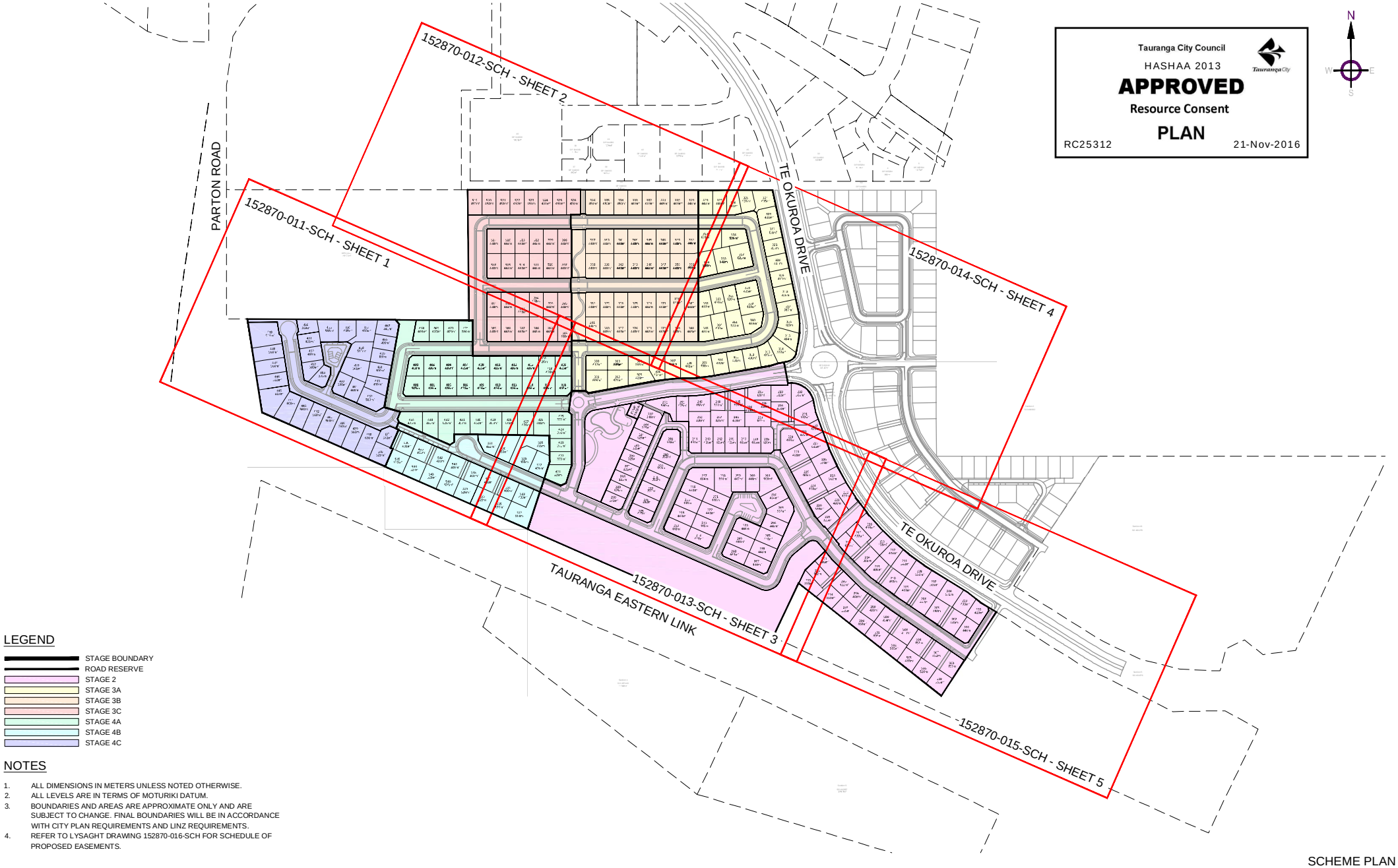
Advice Notes:

1. *Under section 81 of the HASHAA you have a right of objection to the authorised agency in respect of any additional fees and charges required in respect of this decision. In accordance with section 82 of the HASHAA (see section 357C of the RMA) notice of any such objection must be in writing to the Council within 15 working days of receiving this decision and/or the date on which the invoice is received. Any notice given under section 82 should describe the reasons for the objection.*

2. *Where any building or drainage works are required to satisfy conditions of this consent, all consents required under the Building Act 2004 must be obtained prior to the works being carried out.*

3. *The consent holder is responsible for ensuring that all contractors carrying out works under this consent are made aware of the relevant consent conditions, plans and associated documents.*

4. *The consent holder is advised that non-compliance with consent conditions may result in enforcement action against the consent holder and/or their contractors.*



LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
- STAGE 3C
- STAGE 4A
- STAGE 4B
- STAGE 4C

NOTES

1. ALL DIMENSIONS IN METERS UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN TERMS OF MOTURIKI DATUM.
3. BOUNDARIES AND AREAS ARE APPROXIMATE ONLY AND ARE SUBJECT TO CHANGE. FINAL BOUNDARIES WILL BE IN ACCORDANCE WITH CITY PLAN REQUIREMENTS AND LINZ REQUIREMENTS.
4. REFER TO LYSAGHT DRAWING 152870-016-SCH FOR SCHEDULE OF PROPOSED EASEMENTS.

SCHEME PLAN

No.	Date	Revision Details	By	Ver.	App.
J	13/06/16	SHEET LAYOUT AND SCHEME BOUNDARIES UPDATED	JC		

Drawn	JC	Signed	Date 30/10/15
Designed		Signed	Date
Verified		Signed	Date
Approved		Signed	Date

LYSAGHT

SURVEYING, ENGINEERING & LAND DEVELOPMENT
19 Totara St, Mount Maunganui 3116 Ph 07 578 8798 www.lysaght.net.nz

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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
OVERALL LAYOUT PLAN

Project No. 152870

Scale (A3) 1:4000

Drawing No. 152870-010-SCH

Rev. J

X:\Projects 1\15 Jobs\152870 Zariba Holdings, Parton Rd, Development\CAD\Drawings\152870-010_016-SCH Rev J.dwg

Zariba Holdings Limited
C/- Aurecon New Zealand Limited
PO Box 2292
Tauranga 3140

DECISION ON RESOURCE CONSENT APPLICATION – RC25312 (SUBDIVISION)
Under the Housing Accords and Special Housing Areas Act 2013

Tauranga City Council, being an authorised agency as set out under section 23 of the Housing Accords and Special Housing Areas Act 2013, resolves:

That pursuant to Sections 34 to 38 of the Housing Accords and Special Housing Areas Act 2013, to grant resource consent to the application by Zariba Holdings Limited to undertake a qualifying development comprising the establishment of residential dwellings and associated ancillary buildings, structures and activities within the Te Okuroa Drive/Parton Road and Zariba Special Housing Areas at numbers 1236L, 1482L, 1602L, 1608L, 1612L, 1614L and 1616L Parton Road, Papamoa East, legally described as Lot 3 DP 317472 & Lot 2 DP 429801 (CFR 516264), Lot 1 DP 429801 (CFR 516263), Lot 3 DPS 82613 (CFR SA65B/752), Lot 2 DPS 82613 (CFR SA65B/751), Section 6 SO 481279 (CFR 685335), Lot 1 DP 325745 (CFR 103909) and Lot 2 DP 325745 (CFR 103910).

Reasons for Decision:

1. The proposal, being to develop land for the purpose of establishing residential dwellings and associated ancillary buildings, structures and activities, is consistent with the purpose of the Housing Accords and Special Housing Area Act 2013 (HASHAA) and the sustainable management purpose of Part 2 of the Resource Management Act 1991 (RMA);

2. The proposal is generally consistent with the Tauranga City Plan and the Bay of Plenty Regional Policy Statement, and where it is not consistent, greater weight has been afforded to the overall outcome of the proposal in respect to the purpose of the HASHAA and the acceptable design of the comprehensive residential development including being supported by the necessary level of infrastructure capacity.

3. Adequate infrastructure can be provided to support the Qualifying Development.

Tauranga City Council
91 Willow Street, Private Bag 12022, Tauranga 3143, New Zealand
Phone 07 577 7000 **Fax** 07 577 7193 **Email** info@tauranga.govt.nz **www.tauranga.govt.nz**

That pursuant to sections 37 and 38 of the Housing Accords and Special Housing Areas Act 2013 and sections 108 and 220 of the Resource Management Act 1991 the granting of this resource consent is subject to the following conditions:

General

1. *The qualifying development, comprising the creation of freehold allotments and associated works, shall proceed in general accordance with the plans and information submitted with the application prepared by Aurecon New Zealand Limited, entitled 'Application for Resource Consents for Special Housing Area, Te Okuroa Drive, Papamoa – Stage 2 Area', referenced as 247593, dated the 18th of March 2016 and that previously provided in support of resource consents RC24953/RC25954 and RC25070 as set out in Table 1 below:*

Table 1: Application Plans and Technical Reports

Reference No.	Title	Author	Date
247593, Revision 0	*Application for Resource Consent*	*Aurecon New Zealand Limited*	*15/07/2016*
152870, Revision 0	*Zariba Properties Ltd – Resource Consent Servicing Report Stage 2, 3B, 3C & 4B – Te Okuroa Drive, Tauranga*	*Lysaght Consultants Ltd*	*21/06/2016*
247593	*Geotechnical Report and Earthworks Methodology*	*Aurecon New Zealand Limited*	*15/03/2016*
247593	*Preliminary assessment on geotechnical suitability for residential subdivision of Osmond Block – Terrace Views Subdivision, Parton Road Papamoa*	*Aurecon New Zealand Limited*	*15/06/2016*
247593	*Geotechnical suitability for residential subdivision of Samson and Wheeldon Blocks – Terrace Views Subdivision, Parton Road Papamoa*	*Aurecon New Zealand Limited*	*15/06/2016*
152870-2110-EW, Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Proposed Contour Plan – Sheet 1*	*Lysaght Consultants Ltd*	*21/06/2016*
152870-2111-EW, Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Proposed Contour Plan – Sheet 2*	*Lysaght Consultants Ltd*	*21/06/2016*
152870-2130-EW, Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Boundary Interface Cross Sections*	*Lysaght Consultants Ltd*	*21/06/2016*
152870-2140-EW, Revision B	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Erosion and Sediment Control Plan Sheet 1*	*Lysaght Consultants Ltd*	*26/08/2016*
152870-2141-EW, Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Erosion and Sediment Control Plan Sheet 2*	*Lysaght Consultants Ltd*	*21/06/2016*
152870-BDY-001, Revision A	*Boundary Assessment – Overall Plan*	*Lysaght Consultants Ltd*	*27/05/2016*
152870-BDY-002, Revision A	*Boundary Assessment – Pond Detail and Bund Long Section*	*Lysaght Consultants Ltd*	*27/05/2016*

152870-BDY-003, Revision A	*Boundary Assessment – Boundary Sections – Sheet 1 of 4*	*Lysaght Consultants Ltd*	*27/05/2016*
152870-BDY-004, Revision A	*Boundary Assessment – Boundary Sections – Sheet 2 of 4*	*Lysaght Consultants Ltd*	*27/05/2016*
152870-BDY-005, Revision A	*Boundary Assessment – Boundary Sections – Sheet 3 of 4*	*Lysaght Consultants Ltd*	*27/05/2016*
152870-BDY-006, Revision A	*Boundary Assessment – Boundary Sections – Sheet 4 of 4*	*Lysaght Consultants Ltd*	*27/05/2016*
233481-003 Revision 0	*Methodology for Carrying Out Bulk Earthworks at Zariba Holdings Limited, 144 Parton Road, Papamoa, Tauranga*	*Aurecon New Zealand Limited*	*22/03/2013*
233481 Revision 0	*Pond H Catchment Papamoa – Proposed Modifications to Catchment Building Platform Levels and Stormwater Pond Design*	*Aurecon New Zealand Limited*	*22/03/2013*
220166-001 Revision 1	*Geotechnical Suitability of Land for Development – Papamoa East Block, Parton Road – Zariba Holdings Ltd*	*Aurecon New Zealand Limited*	*06/09/2011*
247593	*Parton Road Residential Subdivision – Geotechnical Review of Landform Design and Suitability for Residential Subdivision*	*Aurecon New Zealand Limited*	*29/01/2016*
Option One - Existing Consented Areas, Zariba and Samson Blocks			
Revision B	*Terrace Views Resource Consent July 2016: Stage 1 & 2 HASHA Consents with Zariba & Samson Blocks* *(Option 2)*	*Boffa Miskell Limited*	*28/07/2016*
152870-010-SCH Revision L	*Proposed Subdivision of Lot 1 DP 429801 – Overall Layout Plan*	*Lysaght Consultants Limited*	*07/09/2016*
152870-011-SCH Revision H	*Proposed Subdivision of Lot 1 DP 429801 – Sheet 1 of 5*	*Lysaght Consultants Limited*	*07/09/2016*
152870-012-SCH Revision I	*Proposed Subdivision of Lot 1 DP 429801 – Sheet 2 of 5*	*Lysaght Consultants Limited*	*13/06/2016*
152870-013-SCH Revision H	*Proposed Subdivision of Lot 1 DP 429801 – Sheet 3 of 5*	*Lysaght Consultants Limited*	*07/09/2016*
152870-014-SCH Revision H	*Proposed Subdivision of Lot 1 DP 429801 – Sheet 4 of 5*	*Lysaght Consultants Limited*	*13/06/2016*
152870-015-SCH Revision F	*Proposed Subdivision of Lot 1 DP 429801 – Sheet 5 of 5*	*Lysaght Consultants Limited*	*13/06/2016*
152870-016-SCH Revision F	*Proposed Subdivision of Lot 1 DP 429801 – Schedule of Easements*	*Lysaght Consultants Limited*	*07/09/2016*
Option Two - Existing Consented Areas, Zariba, Samson and Osmond Blocks			
Revision B	*Terrace Views Resource Consent July 2016: Stage 1 & 2 HASHA Consents with Zariba, Samson & Osmond Blocks* *(Option 3)*	*Boffa Miskell Limited*	*28/07/2016*
152870-010-SCH Revision J	*Proposed Subdivision of Lot 1 DP 429801 – Overall Layout Plan*	*Lysaght Consultants Limited*	*13/06/2016*
152870-011-SCH Revision F	*Proposed Subdivision of Lot 1 DP*	*Lysaght Consultants Limited*	*13/06/2016*

	429801 – Sheet 1 of 5		
152870-012-SCH Revision I	*Proposed Subdivision of Lot 1 DP 429801 – Sheet 2 of 5*	*Lysaght Consultants Limited*	*13/06/2016*
152870-013-SCH Revision F	*Proposed Subdivision of Lot 1 DP 429801 – Sheet 3 of 5*	*Lysaght Consultants Limited*	*13/06/2016*
152870-014-SCH Revision H	*Proposed Subdivision of Lot 1 DP 429801 – Sheet 4 of 5*	*Lysaght Consultants Limited*	*13/06/2016*
152870-015-SCH Revision F	*Proposed Subdivision of Lot 1 DP 429801 – Sheet 5 of 5*	*Lysaght Consultants Limited*	*13/06/2016*
152870-016-SCH Revision D	*Proposed Subdivision of Lot 1 DP 429801 – Schedule of Easements*	*Lysaght Consultants Limited*	*15/06/2016*
152870-2300-SW Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Stormwater Plan – Sheet 1*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2300-SW Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Stormwater Plan – Sheet 2*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2400-WW Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Wastewater Plan – Sheet 1*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2401-WW Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Wastewater Plan – Sheet 2*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2500-WS Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Water Reticulation Plan – Sheet 1*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2501-WS Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Water Reticulation Plan – Sheet 2*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2300-SW Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Stormwater Plan – Sheet 1*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2300-SW Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Stormwater Plan – Sheet 2*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2400-WW Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Wastewater Plan – Sheet 1*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2401-WW Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Wastewater Plan – Sheet 2*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2500-WS Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Water Reticulation Plan – Sheet 1*	*Lysaght Consultants Limited*	*21/06/2016*
152870-2501-WS Revision A	*Resource Consent – Terrace Views Stages 2, 3 & 4 – Water Reticulation Plan – Sheet 2*	*Lysaght Consultants Limited*	*21/06/2016*

Compliance with this condition is subject to changes required in order to satisfy the requirements of conditions of this resource consent.

2. *All costs associated with the conditions of this consent shall be met by the Consent Holder.*

3. *Pursuant to section 51 of the HASHAA, this consent lapses five (5) years after the date of commencement unless:*

   a) *The consent is given effect to; or*

   b) *The Council extends the period after which the consent lapses.*

4. *Construction noise as a result of giving effect to this consent shall not exceed the limits recommended in, and shall be measured and assessed in accordance with, NZS 6803:1999 Acoustics Construction Noise.*

5. *The use of noise generating tools, motorised equipment, and vehicles that are associated with giving effect to this consent on the subject site shall be restricted to between the following hours to comply with condition 4 of this consent:*

   a) *Monday to Saturday: 7:30 a.m. to 6:00 p.m.; and*

   b) *Sundays or Public Holidays: No works.*

Definitions

6. *For the purpose of this consent, unless otherwise specified within this consent, any reference to a defined term shall have the same definition as prescribed within Chapter 3 – Definitions of the Tauranga City Plan (operative 1st of December 2014) or any subsequent amendment.*

7. *'Geo-Professional'*

   "Shall have the same meaning as section GEN-4.1 Definitions of the Tauranga City Council Infrastructure Development Code" or any subsequent;

8. *'Residential Allotment(s)'*

   "Shall mean those allotments created for use for residential activities and shall exclude any allotment created as a Reserve and/or any allotment created to be vested as Road."

9. *'Road'*

   "Shall mean a road that has been or is identified on an approved subdivision resource consent scheme plan to be, vested in Council. This shall exclude rights of way or access lots held in private ownership''.

Specific Conditions:

10. *The Consent Holder shall submit to Council survey plans for approval under section 45 of the HASHAA and section 223 of the RMA within 7 years of the grant of this consent that generally conform with the subdivision scheme plans referred to in Table 1 of Condition 1 and attached to this consent as approved plans.*

11. *Any separate survey plans submitted to Council for approval in accordance with condition 10 of this consent for the purpose of giving effect to this consent in stages is appropriate subject to all relevant conditions of this consent applicable*

to allotments shown on that survey plan being complied and subject to the following:

(a) ***Option One***

(i) Stage 2 service connections shall be provided to the boundary with number 1236L Parton Road (Lot 2 DP 429801 and Lot 3 DP 317472) or in a vested Council reserve or road that adjoins the boundary with number 1236L Parton Road (Lot 2 DP 429801 and Lot 3 DP 317472) of for the purpose of providing service connections for number 1236L Parton Road; and

(ii) Stage 3A the road reserve to vest and service connections shall be provided to the boundary with number 1616L Parton Road (Lot 2 DP 325745) for the purpose of providing vehicle access and service connections for number 1616L Parton Road; and

(iii) Stage 3C the road reserve to vest shall be provided to the boundary with number R176 Parton Road (Lot 1 DPS 14276 BLK IV Te Tumu SD) for the purpose of providing vehicle access for number R176 Parton Road; and

(iv) Stage 4A the road reserve to vest and service connections shall be provided to the boundary with number R176 Parton Road (Lot 1 DPS 14276 BLK IV Te Tumu SD) for the purpose of providing vehicle access and service connections for number R176 Parton Road.

(b) ***Option Two***

(i) Stage 3C the road reserve to vest shall be provided to the boundary with number R176 Parton Road (Lot 1 DPS 14276 BLK IV Te Tumu SD) for the purpose of providing vehicle access for number R176 Parton Road; and

(ii) Stage 4A the road reserve to vest and service connections shall be provided to the boundary with number R176 Parton Road (Lot 1 DPS 14276 BLK IV Te Tumu SD) for the purpose of providing vehicle access and service connections for number R176 Parton Road.

12. *Any separate survey plans submitted to Council for approval in accordance with condition 10 of this consent may, subject to the prior written confirmation from the Chief Executive of the Tauranga City Council (or delegate), incorporate allotments approved under separate resource consents granted for adjoining allotments subject to compliance with the consent conditions of applicable resource consents. [See Advice Note 6]*

13. *Subject to Condition 15 of this consent, all matters and works relating to the servicing and accessing of the subdivision, shall be designed, supervised, constructed and certified in accordance with all requirements of the Council's' Infrastructure Development Code except where those requirements are in accordance with the plans within Table 1 of Condition 1 or amended by way of engineering plans submitted and approved in accordance with the requirements of Condition 16 of this consent.*

14. *Street trees may be provided at a rate lower than one tree per lot with road frontage prescribed by DS-2.8 of the Tauranga City Council Infrastructure Development Code. [See Advice Note 7]*

15. *Prior to the commencement of any works (exclusive of site clearance or earthworks), the consent holder shall submit complete engineering plans to the Team Leader: Development Engineering of Tauranga City Council for approval. The plans shall include the following:*

    (a) The information and plans required by the Infrastructure Development Code QA3;

    (b) All flood risk and areas of ponding in rainfall events which exceed the design capacity of the stormwater reticulation system up to the 100 year (one percent AEP) rainfall event;

    (c) Details of the construction of the roads to vest including vehicle tracking curves, proposed temporary and permanent traffic management measures and street planting;

    (d) Details of street lighting layout including columns and fittings;

    (e) Details of the layout and construction for all proposed right of ways and access lots (including Lot 3018 – one-way system between Lots 3016 and 3017; and Lot 3019);

    (f) Details of the sewer extension that is required to service the development and any upstream catchment;

    (g) Details of any culvert required under proposed roads to vest;

    (h) Details of the water reticulation and fire-fighting system,

    (i) Details of proposed landscaping to be planted within road zones and pathways within Lots 3010, 3011, 3012, 3013, 3014, 3015, 3016 and 3017;

    (j) Details of stormwater drainage including overland flowpaths;

    (k) Details of the Recreation Reserve to vest Lot 2005;

    (l) Details of the Local Purpose Stormwater Reserves to vest Lots 2001, 2002 and 2003,

    (m) Details of design and construction of the noise mitigation bund/fence within Lot 2003. In this regard, the design shall incorporate allowance for an overland flow path through or around the bund/fence in overdesign events limiting maximum top water levels to RL4.80 metres;

    (n) Details of the works to establish a suitable building platform on each allotment (as required by condition 19 and any retaining structures to be constructed for that purpose; and

    (o) Locations of easements in gross required for vested infrastructure within private property.

16. *Unless otherwise approved under condition 15 of this consent, Lots 2001, 2002 and 2003 (Local Purpose Reserve: Stormwater) shall be constructed in general accordance with the following Lysaght drawings:*

    - *152870-360-SW, revision A and dated 9 November;*
    - *152870-063-EW, revision A and dated 9 November 2015;*
    - *152870-064-EW, revision A and dated 9 November 2015;*
    - *152870-065-EW, revision A and dated 9 November 2015.*

    And shall, as a minimum include:

(a) *Stormwater storage volume of 10,108m^3 within Lot 2003;*

(b) *Provision of all-weather access for maintenance machinery and vehicles incorporating turning areas for an eight (8) metre truck and loading and storage areas;*

(c) *Provision of pedestrian and cycle access in accordance with sub-class 2C of the Tauranga City Council 'Track and Walkway Development and Maintenance Manual Classification 2 standards' (as attached to this consent);*

(d) *Provision of fencing to restrict unauthorised vehicle entry;*

(e) *Provision of low maintenance revegetation and wetland species planting to all areas steeper than 1 vertical:5 horizontal; and*

(f) *Provision of a 36-month Landscape Maintenance Plan which includes scheduled maintenance requirements and addresses Health and Safety aspects in order to carry out maintenance in a safe manner.*

17. *All residential lots shall each be provided with a separate underground connection to the sanitary sewer, water and electricity reticulation systems in accordance with the Tauranga City Council's Infrastructure Development Code.*

18. *The Consent Holder shall supply to the Tauranga City Council a set of 'as built' plans of all engineering and landscaping works in accordance with the Tauranga City Council's Infrastructure Development Code.*

19. *The Consent Holder shall undertake works to ensure that all residential lots have a minimum building platform level that of RL4.8 metres Moturiki Datum* ***and*** *that is 500 millimetres above the maximum ponding level of a 100 year (one percent AEP) rainfall event as calculated by a Chartered Professional Engineer, whichever is the greater. Compliance with this condition shall be certified, in writing, by a licensed Cadastral Surveyor.*

20. *All earthworks design, testing and construction shall be undertaken in accordance with the Tauranga City Council's Infrastructure Development Code and the specific requirements of the Consent Holder's appointed 'Geo-Professional'.*

21. *The Consent Holder shall provide to the Team Leader: Development Engineering of Tauranga City Council a "Geotechnical Completion Report" compiled by a Category 1 Geo-Professional. This report shall:*

    (a) *Comply with the Council's Infrastructure Development Code QA4 requirements;*

    (b) *Determine the position of all designated building platforms and building restriction lines where applicable;*

    (c) *Provide recommendations for the ongoing development of the lots, including but not limited to, maximum cut/fill heights, management of steep slopes, management of stormwater, maintenance requirements and minimum separation distances;*

    (d) *Provide specific requirements for onsite disposal of stormwater to ground;*

    (e) *Confirm earthworks and/or building platforms have been constructed to comply with the New Zealand Building Code requirements and Condition 19 of this consent;*

(f) *Confirm the minimum building platform heights for each lot required to comply with Condition 19 of this consent;*

(g) *Provide specific foundation solutions which mitigate the effects of liquefaction and/or lateral spread;*

(h) *Provide certification that any required structures have been completed to required specification and where necessary, Code Compliance Certificates obtained;*

(i) *Certify that any residual settlement or differential settlement that may still occur shall not exceed the manufacturer's recommendations with respect to the installed underground pipe networks to be vested in Council or exceed accepted design techniques with respect to road settlement or long term deflection, or exceed the settlement limitations as detailed in the New Zealand Building Code; and*

(j) *Comment on the removal or amendment of existing land feature/s displayed on Council's GIS.*

Upon receipt of the Geotechnical Completion Report, any requirements to be complied with on an ongoing basis, including (but not limited to) those in relation to minimum building platform heights shall be recorded in a consent notice prepared pursuant to section 44 of the HASHAA and section 221 of the RMA.

22. *All building line restrictions or designated building platforms shall be clearly identified and dimensioned on the survey plan(s) submitted in accordance with Condition 10 of this consent.*

23. *All easements required for underground services and rights of way serving lots within the subdivision shall be duly granted or reserved.*

24. *The Consent Holder shall register an easement in gross in favour of Tauranga City Council over any stormwater overland flowpath located on private property, including those resulting from overload of the roading primary stormwater system in an extreme rainfall event.*

    Any overland flowpath easement shall be shown on the survey plan submitted in accordance with Condition 10 of this consent and shall be recorded as the "Right to Drain Water" and be registered on the survey plan under a "Memorandum of Easements in Gross".

25. *The Consent Holder shall vest in the Tauranga City Council Lots 3010, 3011, 3012, 3013, 3014, 3015 and 3017 shown on the approved subdivision scheme plan as "Roads to Vest".*

    (a) *All roads to vest shall be shown on the survey plan submitted in accordance with Condition 10 of this consent;*

    (b) *Roads to vest shall be free from any and all encumbrances, land covenants or other restrictions and shall extend to the boundaries of land adjoining the subject site as shown on the subdivision scheme plans referenced in condition 1.*

26. *Prior to, or in conjunction with an application for certification pursuant to section 46 of the HASHAA and section 224(c) of the RMA, the Consent Holder shall*

confirm that the roads to vest in Tauranga City Council have been constructed in accordance with the plans approved under condition 16 of the Consent.

27. *Pursuant to pursuant to section 44 of the HASHAA and section 221 of the RMA, a Consent Notice shall be registered on the Certificates of Title for each 'residential allotment' advising the owners and subsequent owners thereof, of requirements to be complied with on a continuing basis:*

    "The development of this allotment shall only proceed in accordance with the 'Residential Land Use Specific Conditions' prescribed within resource consent number RC25312, including any subsequent variations to the conditions of that consent."

28. *Waste water pump station PS16 shall be fully complete and operational prior to certification pursuant to section 46 of the HASHAA and section 224(c) of the RMA.*

29. *Prior to, or in conjunction with an application for certification pursuant to section 46 of the HASHAA and section 224(c) of the RMA the consent holder shall provide certification from a Chartered Professional Engineer that the required stormwater mitigation volumes and peak flow restrictions for the respective stage have been achieved in accordance with BOPRC Consent Number 65120 and TCC Consent Numbers RC24853 and RC24854. [See Advice Note 10]*

30. *Prior to, or in conjunction with an application for certification pursuant to section 46 of the HASHAA and section 224(c) of the RMA the Consent Holder shall provide certification that planting has taken place in accordance with the planting plan submitted in accordance with Condition 16 of this consent.*

31. *The consent holder shall maintain all landscaping within roads to vest for a period of 12 months after completion of planting.*

32. *The Consent Holder shall construct a shared accessway shown as Areas 'KK' and 'LL' on the approved subdivision scheme plan in accordance with the Tauranga City Council Infrastructure Development Code.*

33. *Pursuant to section 44 of the HASHAA and Section 221 of the Resource Management Act 1991, a consent notice shall be registered on the Certificate of Title for all allotments that share a common boundary with any reserve(s). The consent notice shall advise the owners and subsequent owners of the following:*

    "The owners of this lot are required to meet the full cost of any fencing along the common boundary between the lot and adjoining land vested in Tauranga City Council as local purpose reserve".

34. *Upon application for certification pursuant to section 45 of the HASHAA and Section 223 of the RMA, the Consent Holder shall confirm in writing to Council which property boundaries require a fencing consent notice to be registered on its title in accordance with Condition 33.*

35. *Prior to the approval of any survey plan in accordance with condition 10 of this consent, the Consent Holder must submit to the Team Leader: Revenue of the*

Tauranga City Council (or delegate) three (3) alternative street names for each proposed new road in the subdivision. Street names must be provided in accordance with Tauranga City Council's 'Naming of Streets, Reserves and Community Facilities Policy' and include all information required under this policy including evidence of the significance of the proposed names [See Advice Note 9].

Recommended and Assessed by:



Shanan Miles
Development Planner

Delegated Authorisation by:



Brad Bellamy
Team Leader: Environmental Planning

Date: 21 November 2016

Advice Notes:

1. *Under section 81 of the HASHAA you have a right of objection to the authorised agency in respect of any additional fees and charges required in respect of this decision. In accordance with section 82 of the HASHAA (see section 357C of the RMA) notice of any such objection must be in writing to the Council within 15 working days of receiving this decision and/or the date on which the invoice is received. Any notice given under section 82 should describe the reasons for the objection.*

2. *Where any building or drainage works are required to satisfy conditions of this consent, all consents required under the Building Act 2004 must be obtained prior to the works being carried out.*

3. *It is acknowledged that the Site contains recorded archaeological site number U14/2873 and may also contain other, unidentified, archaeological features. The Consent Holder is advised that all works on the Site are subject to the conditions of Authority Number 2016/599 issued by Heritage New Zealand and also the requirements of the Heritage New Zealand Pouhere Taonga Act 2014 generally.*

4. *The consent holder is responsible for ensuring that all contractors carrying out works under this consent are made aware of the relevant consent conditions, plans and associated documents.*

5. *It is acknowledged that the development proposal has been advanced on the basis of the 'Masterplan' referenced in Table 1 in condition 1 of this consent. Subject to the specific requirements of the conditions of this consent, including a minimum residential allotment yield (15 dwellings per hectare of nett developable area) and minimum allotment size, amendments to this 'Masterplan' are anticipated and provided for through the provision of survey plan(s) for approval under condition 10.*

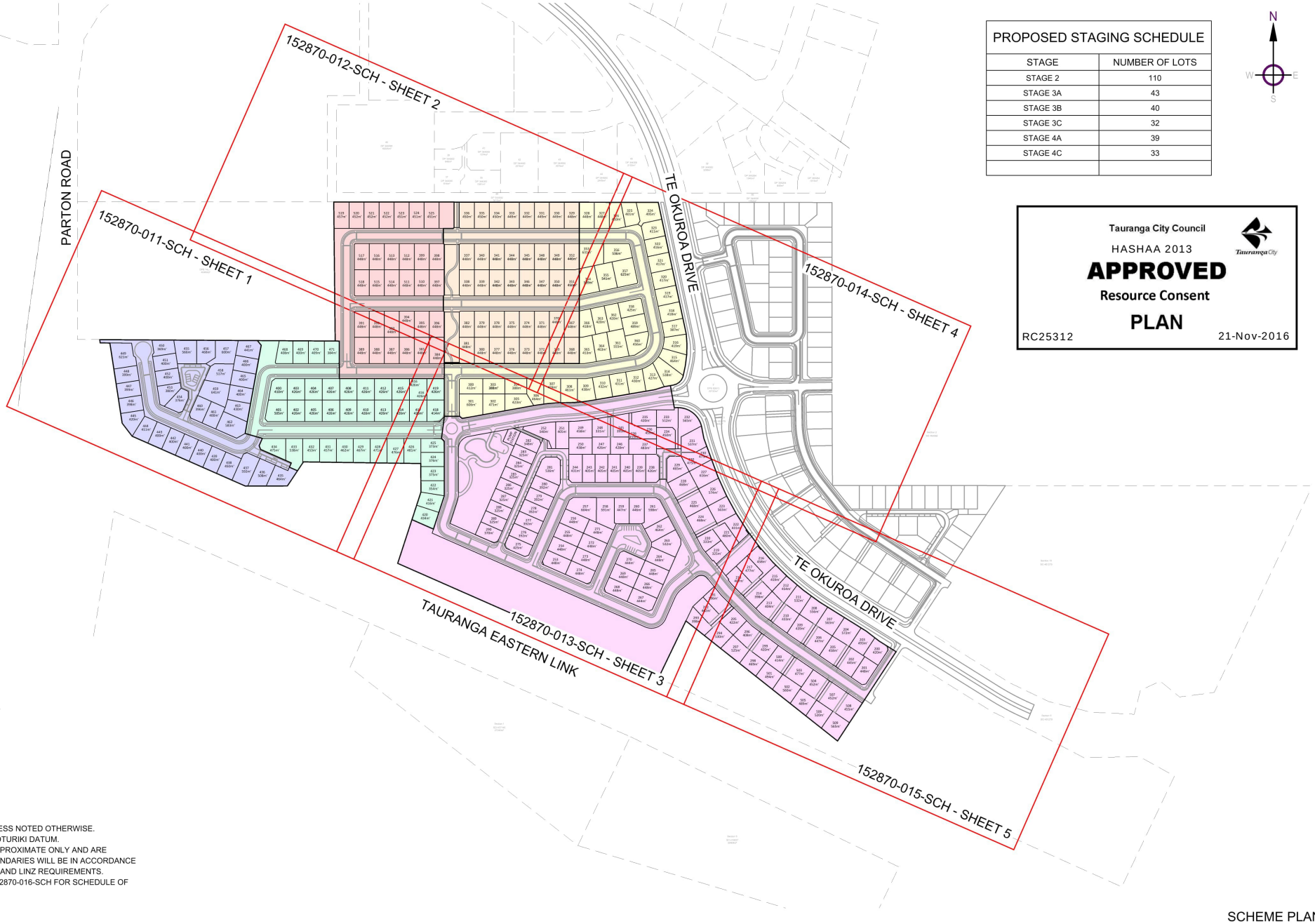
6. *It is acknowledged that the Consent Holder currently holds resource consent under the HASHAA for subdivision and land use proposals for the adjoining property to the south of the Site (i.e. number 1428L Parton Road) under separate resource consents (RC2453 and RC24854). These resource consents include residential allotments and roads to vest that are interconnected with this resource consent. Condition 13 has been included in recognition of these interconnections and that combined survey plans across one or more consents are potentially both logical and efficient.*

7. *The Scheme Plan includes allotments with relatively narrow frontages where it is likely to be impractical to provide trees at a rate of one per allotment with road frontage as required by clause f) i) of Appendix 12A – Performance Standard, Transport Network. Condition 15 has been included to provide for reduced rates to be considered through the Development Plan Approval process.*

8. *The consent holder is advised that non-compliance with consent conditions may result in enforcement action against the consent holder and/or their contractors.*

9. *A copy of Tauranga City Council's 'Naming of Streets, Reserves and Community Facilities Policy' can be found online using the following link: http://www.tauranga.govt.nz/documents-reports/bylaws-policies/policies.aspx#s.*

10. *Condition 29 allows for adequate storage volumes within the stormwater detention ponds and swales forming part of resource consents RC24853 and RC24854 to be progressively created to service the catchment/developed area within the Site without needing to have final construction fully complete.*



PROPOSED STAGING SCHEDULE	
STAGE	NUMBER OF LOTS
STAGE 2	110
STAGE 3A	43
STAGE 3B	40
STAGE 3C	32
STAGE 4A	39
STAGE 4C	33

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Tauranga City Council
HASHAA 2013
APPROVED
Resource Consent
PLAN
RC25312 21-Nov-2016

LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
- STAGE 3C
- STAGE 4A
- STAGE 4C

NOTES

1. ALL DIMENSIONS IN METERS UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN TERMS OF MOTURIKI DATUM.
3. BOUNDARIES AND AREAS ARE APPROXIMATE ONLY AND ARE SUBJECT TO CHANGE. FINAL BOUNDARIES WILL BE IN ACCORDANCE WITH CITY PLAN REQUIREMENTS AND LINZ REQUIREMENTS.
4. REFER TO LYSAGHT DRAWING 152870-016-SCH FOR SCHEDULE OF PROPOSED EASEMENTS.

SCHEME PLAN

No.	Date	Revision Details	By	Ver.	App.
L	07/09/16	OPTION WITHOUT OSMAND BLOCK	JC		
J	13/06/16	SHEET LAYOUT AND SCHEME BOUNDARIES UPDATED	JC		

Drawn	Signed	Date
JC		30/10/15
Designed	Signed	Date
Verified	Signed	Date
Approved	Signed	Date

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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
OVERALL LAYOUT PLAN

Project No.	152870
Scale (A3)	1:4000
Drawing No.	152870-010-SCH
Rev.	L

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LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
- STAGE 3C
- STAGE 4A
- STAGE 4C

NOTES

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4. REFER TO LYSAGHT DRAWING 152870-016-SCH FOR SCHEDULE OF PROPOSED EASEMENTS.

AMALGAMATION CONDITIONS

1. THAT LOT 3018 HEREON BE HELD AS TO TWO UNDIVIDED HALF SHARES BY THE OWNERS OF LOTS 435 & 436 HEREON AS TENANTS IN COMMON IN THE SAID SHARES AND THE INDIVIDUAL COMPUTER REGISTERS BE ISSUED IN ACCORDANCE HEREWITH.

Tauranga City Council
HASHAA 2013
APPROVED
Resource Consent
PLAN
RC25312 21-Nov-2016

1 DPS 14276 40469m²

JOINLINE - 152870-012-SCH

391 448m² 392 448m² 393 448m² 384 448m²
385 448m² 386 448m² 387 448m² 388 448m² 389 448m²
ROAD TO VEST 3014 7737m²
471 384m² 470 409m² 469 400m² 468 408m²
ROAD TO VEST 3015 6452m²
416 426m² 415 426m² 412 426m² 411 426m² 408 426m² 407 426m² 404 426m² 403 426m² 400 410m²
414 426m² 413 426m² 410 426m² 409 426m² 406 426m² 405 426m² 402 426m² 401 505m²
ROAD TO VEST 3015 6452m²
428 471m² 429 467m² 430 462m² 431 457m² 432 453m² 433 538m² 434 475m²
467 441m² 466 400m² 465 400m² 464 400m² 463 430m² 462 583m² 461 400m² 460 396m² 459 641m² 458 517m² 457 600m² 456 468m² 455 566m² 454 376m² 453 380m² 452 400m² 451 400m² 450 369m² 449 621m² 448 399m² 447 399m² 446 398m² 445 420m²
ROAD TO VEST 3017 4894m²
444 411m² 443 400m² 442 400m² 441 400m² 440 400m² 439 400m² 438 450m² 437 592m² 436 508m² 435 464m²

JOINLINE - 152870-013-SCH

PARTON ROAD

TAURANGA EASTERN LINK

SCHEME PLAN

No.	Date	Revision Details	By	Ver.	App.
H	07/09/16	OPTION WITHOUT OSMAND BLOCK	JC		
F	13/06/16	SHEET LAYOUT AND SCHEME BOUNDARIES UPDATED	JC		
E	16/02/16	MINOR AMENDMENTS	JC		
D	18/10/15	MINOR AMENDMENTS	JC		
C	17/12/15	SCHEME LAYOUT REVISED	JC		
B	06/11/15	STAGING LABELS ADDED	JC		
A	30/10/15	SCHEME PLAN	JC		

Drawn JC Signed Date 30/10/15
Designed Signed Date
Verified Signed Date
Approved Signed Date

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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
LAYOUT PLAN
SHEET 1 OF 5

Project No. 152870
Scale (A3) 1:1000
Drawing No. 152870-011-SCH
Rev. H

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LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
- STAGE 3C
- STAGE 4A
- STAGE 4C

NOTES

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4. REFER TO LYSAGHT DRAWING 152870-016-SCH FOR SCHEDULE OF PROPOSED EASEMENTS.

Tauranga City Council

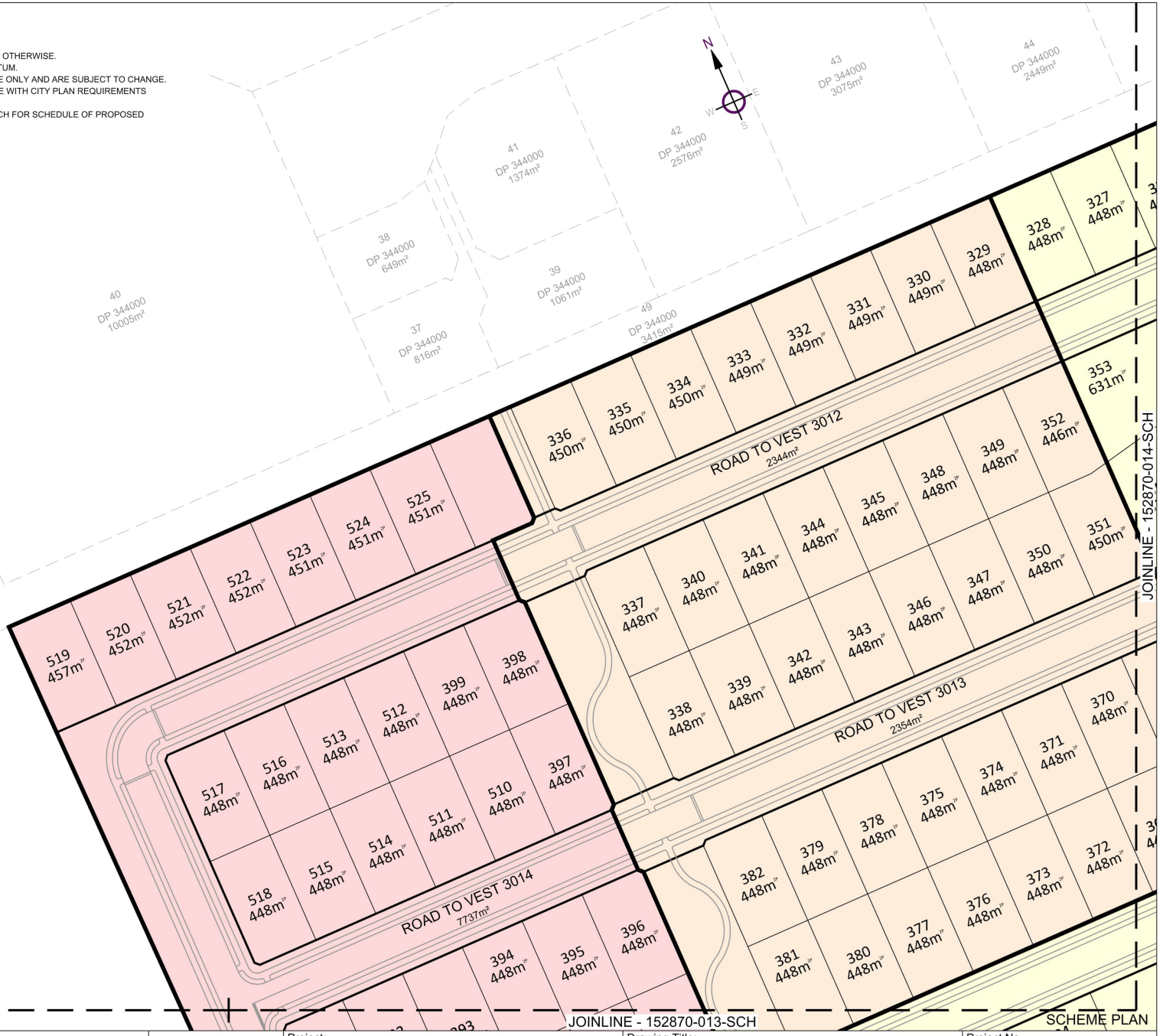
HASHAA 2013

APPROVED

Resource Consent

PLAN

RC25312 21-Nov-2016



No.	Date	Revision Details	By	Ver.	App.
I	13/06/16	SHEET LAYOUT AND SCHEME BOUNDARIES UPDATED	JC		
H	02/03/16	MINOR AMENDMENTS	JC		
G	18/02/16	MINOR AMENDMENTS TO BOUNDARIES AND NOTES	JC		
F	16/02/16	MINOR AMENDMENTS	JC		
E	18/12/15	MINOR AMENDMENTS	JC		
D	17/12/15	SCHEME LAYOUT REVISED	JC		
C	08/11/15	STAGING LABELS ADDED	JC		
B	05/11/15	MINOR AMENDMENTS	JC		
A	30/10/15	SCHEME PLAN	JC		

Drawn	JC	30/10/15
Designed	Signed	Date
Verified	Signed	Date
Approved	Signed	Date

LYSAGHT

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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
LAYOUT PLAN
SHEET 2 OF 5

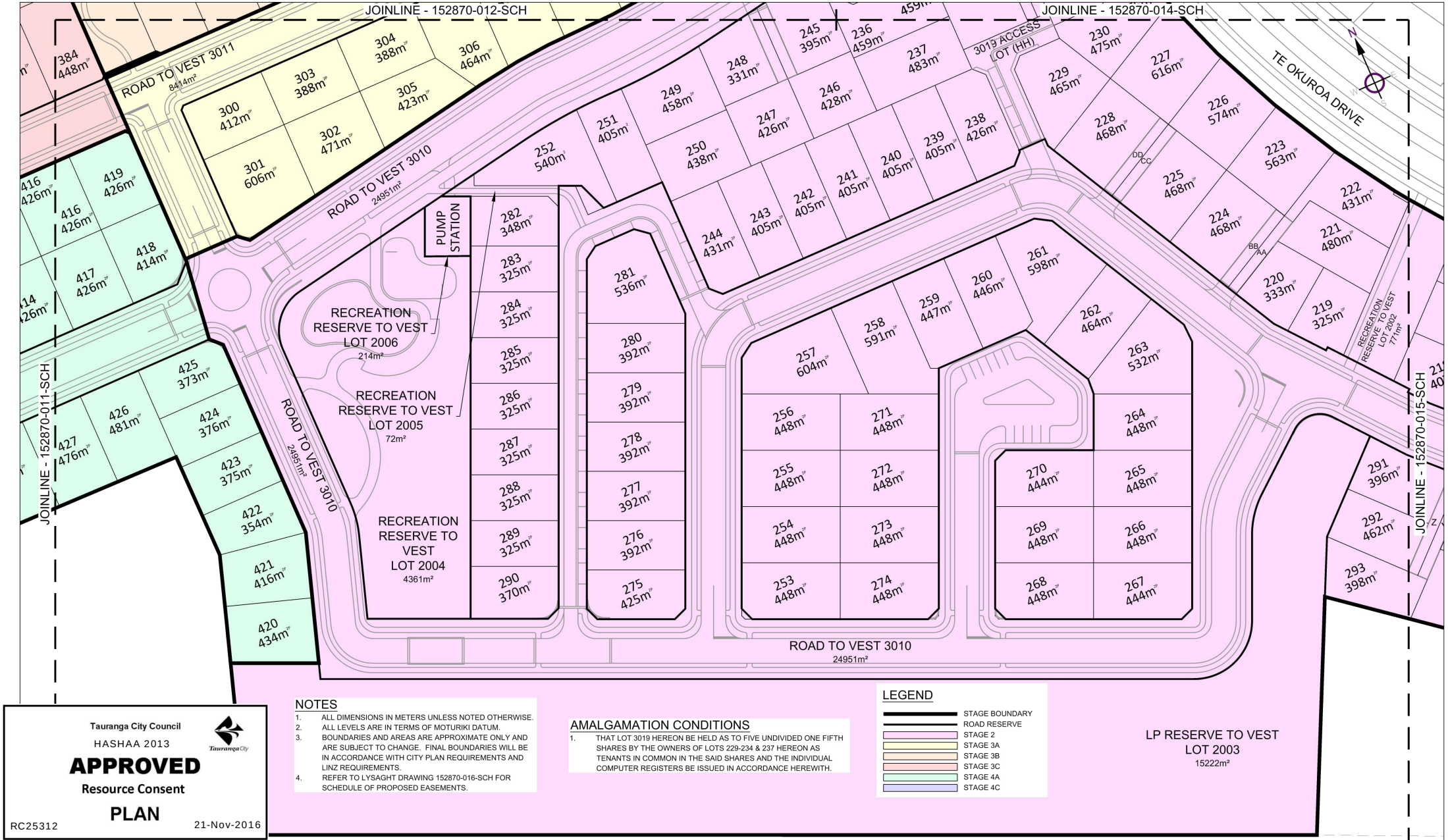
Project No. 152870

Scale (A3) 1:1000

Drawing No. 152870-012-SCH

Rev. I

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Tauranga City Council

HASHAA 2013

APPROVED

Resource Consent

PLAN

RC25312 21-Nov-2016

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4. REFER TO LYSAGHT DRAWING 152870-016-SCH FOR SCHEDULE OF PROPOSED EASEMENTS.

AMALGAMATION CONDITIONS

1. THAT LOT 3019 HEREON BE HELD AS TO FIVE UNDIVIDED ONE FIFTH SHARES BY THE OWNERS OF LOTS 229-234 & 237 HEREON AS TENANTS IN COMMON IN THE SAID SHARES AND THE INDIVIDUAL COMPUTER REGISTERS BE ISSUED IN ACCORDANCE HEREWITH.

LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
- STAGE 3C
- STAGE 4A
- STAGE 4C

SCHEME PLAN

No.	Date	Revision Details	By	Ver.	App.
H	07/09/16	OPTION WITHOUT OSMAND BLOCK	JC		
F	13/06/16	SHEET LAYOUT AND SCHEME BOUNDARIES UPDATED	JC		
E	18/02/16	MINOR AMENDMENTS TO BOUNDARIES AND NOTES	JC		
D	18/12/15	MINOR AMENDMENTS	JC		
C	17/12/15	SCHEME LAYOUT REVISED	JC		
B	06/11/15	STAGING LABELS ADDED	JC		
A	30/10/15	SCHEME PLAN	JC		

Drawn	JC	30/10/15
Designed		
Verified		
Approved		

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SURVEYING, ENGINEERING & LAND DEVELOPMENT

19 Totara St, Mount Maunganui 3116 Ph 07 578 8798 www.lysaght.net.nz

Project:

TERRACE VIEWS

PROPOSED RESIDENTIAL SUBDIVISION

TE OKUROA DRIVE

PAPAMOA

Drawing Title:

PROPOSED SUBDIVISION OF LOT 1 DP 429801

LAYOUT PLAN

SHEET 3 OF 5

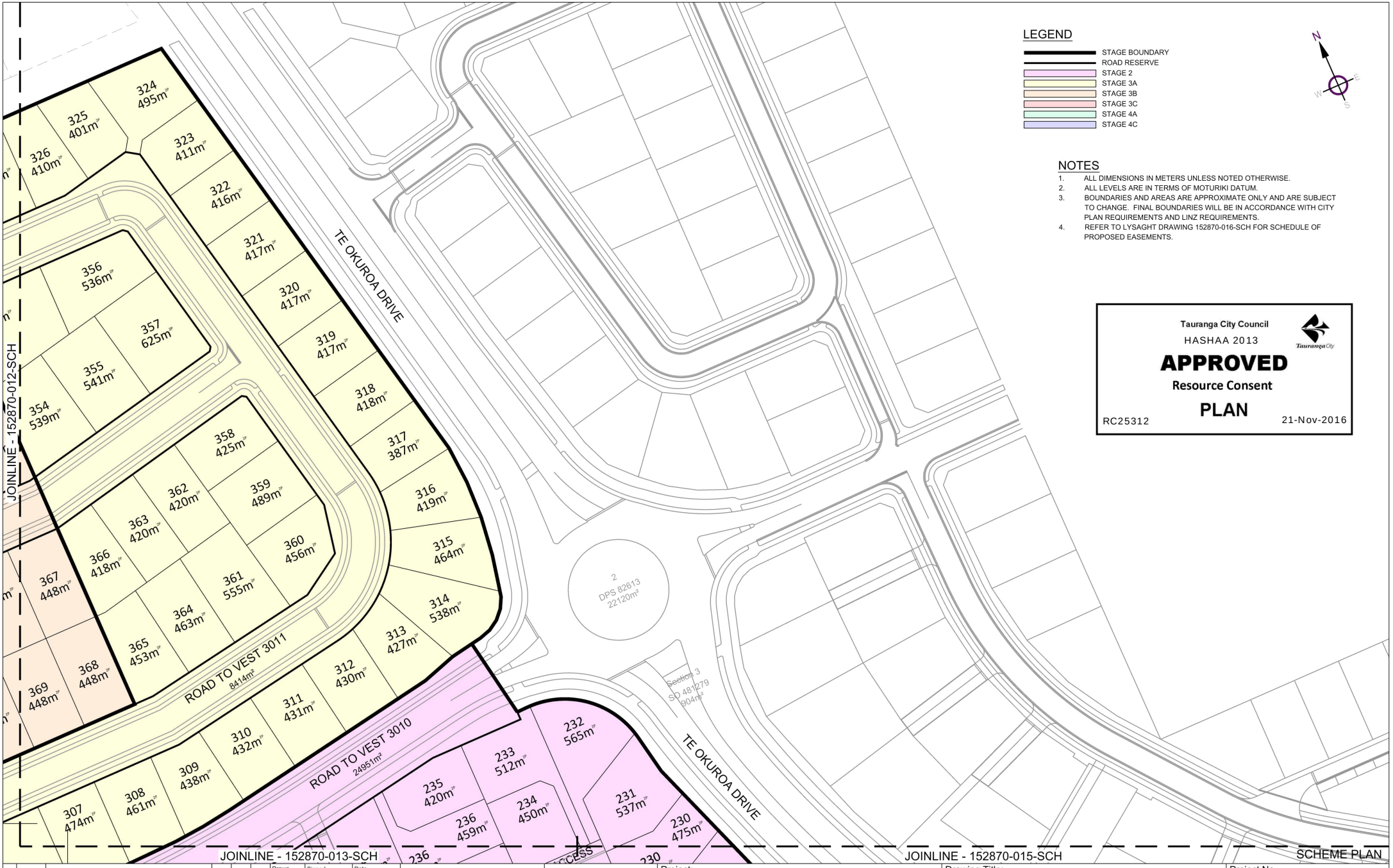
Project No. 152870

Scale (A3) 1:1000

Drawing No. 152870-013-SCH

Rev. H

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No.	Date	Revision Details	By	Ver.	App.
H	13/06/16	SHEET LAYOUT AND SCHEME BOUNDARIES UPDATED	JC		
G	02/03/16	MINOR AMENDMENTS	JC		
F	18/02/16	MINOR AMENDMENTS TO BOUNDARIES AND NOTES	JC		
E	18/12/15	MINOR AMENDMENTS	JC		
D	17/12/15	SCHEME LAYOUT REVISED	JC		
C	08/11/15	STAGING LABELS ADDED	JC		
B	05/11/15	MINOR AMENDMENTS	JC		
A	30/10/15	SCHEME PLAN	JC		

Drawn	JC	30/10/15
Designed	Signed	Date
Verified	Signed	Date
Approved	Signed	Date

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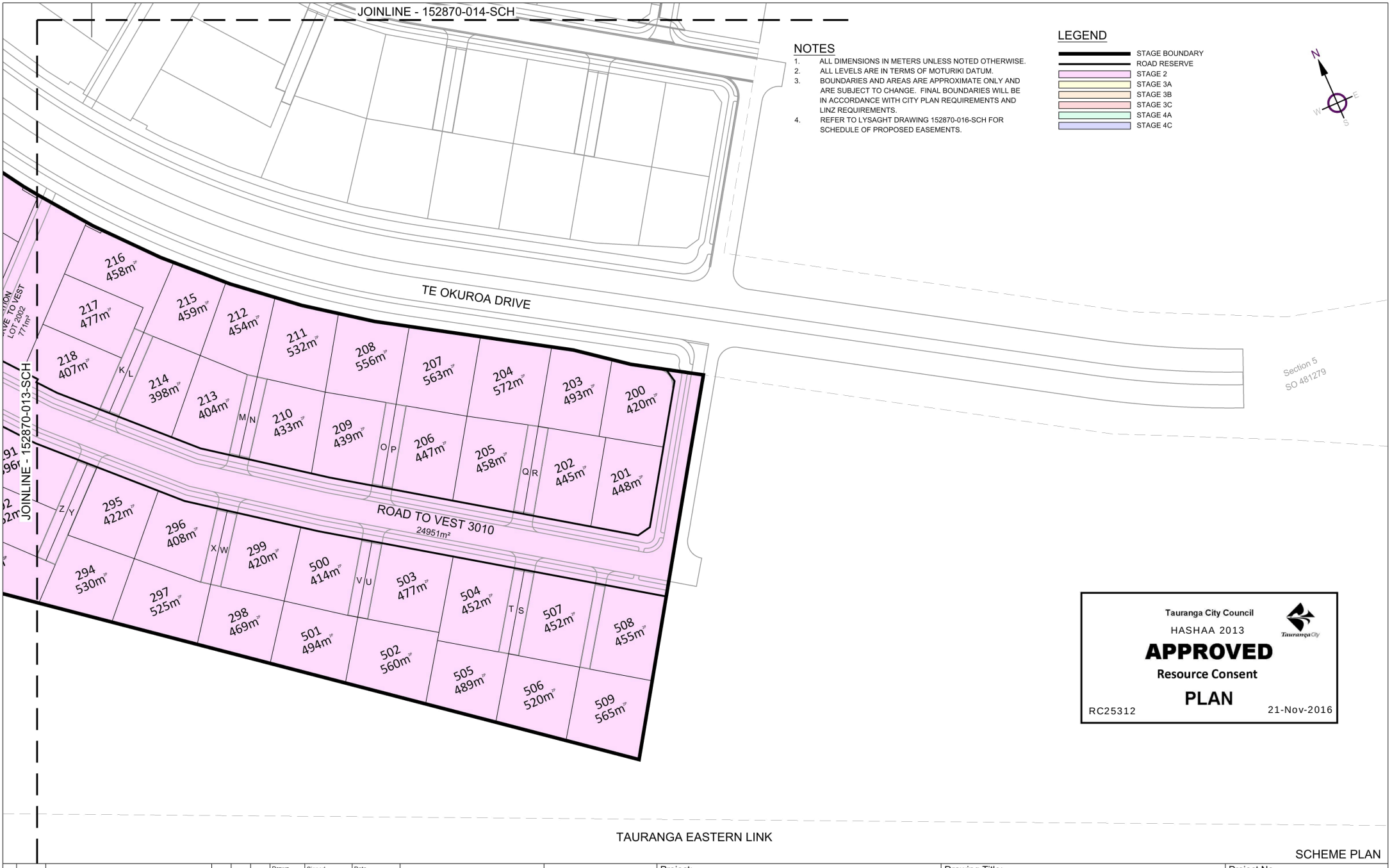
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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
LAYOUT PLAN
SHEET 4 OF 5

Project No. 152870
Scale (A3) 1:1000
Drawing No. 152870-014-SCH
Rev. H

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NOTES

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4. REFER TO LYSAGHT DRAWING 152870-016-SCH FOR SCHEDULE OF PROPOSED EASEMENTS.

LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
- STAGE 3C
- STAGE 4A
- STAGE 4C

N E S W

Tauranga City Council
HASHAA 2013
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PLAN
RC25312 21-Nov-2016

SCHEME PLAN

No.	Date	Revision Details	By	Ver.	App.
F	13/06/16	SHEET LAYOUT AND SCHEME BOUNDARIES UPDATED	JC		
E	18/02/16	MINOR AMENDMENTS TO BOUNDARIES AND NOTES	JC		
D	18/12/15	MINOR AMENDMENTS	JC		
C	17/12/15	SCHEME LAYOUT REVISED	JC		
B	06/11/15	STAGING LABELS ADDED	JC		
A	30/10/15	SCHEME PLAN	JC		

Drawn	JC	Signed
Designed		Signed
Verified		Signed
Approved		Signed

Date: 30/10/15

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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
LAYOUT PLAN
SHEET 5 OF 5

Project No. 152870
Scale (A3) 1:1000
Drawing No. 152870-015-SCH
Rev. F

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SCHEDULE OF PROPOSED EASEMENTS

PURPOSE	SHOWN	DOM	SERV
RIGHT OF WAY, RIGHT TO CONVEY ELECTRICITY, TELECOMMUNICATIONS AND COMPUTER MEDIA, RIGHT TO CONVEY WATER, GAS, RIGHT TO DRAIN WATER, SEWAGE	K	LOTS 215, 217 HEREON	LOT 216 HEREON
	L	LOTS 216, 217 HEREON	LOT 215 HEREON
	M	LOT 211 HEREON	LOT 212 HEREON
	N	LOT 212 HEREON	LOT 211 HEREON
	O	LOT 207 HEREON	LOT 208 HEREON
	P	LOT 208 HEREON	LOT 207 HEREON
	Q	LOT 203 HEREON	LOT 204 HEREON
	R	LOT 204 HEREON	LOT 203 HEREON
	S	LOT 505 HEREON	LOT 506 HEREON
	T	LOT 506 HEREON	LOT 505 HEREON
	U	LOT 501 HEREON	LOT 502 HEREON
	V	LOT 502 HEREON	LOT 501 HEREON
	W	LOT 297 HEREON	LOT 298 HEREON
	X	LOT 298 HEREON	LOT 297 HEREON
	Y	LOTS 292, 293 HEREON	LOT 294 HEREON
	Z	LOTS 292, 294 HEREON	LOT 293 HEREON
	AA	LOTS 221, 223 HEREON	LOT 222 HEREON
	BB	LOTS 221, 222 HEREON	LOT 223 HEREON
	CC	LOT 227 HEREON	LOT 226 HEREON
	DD	LOT 226 HEREON	LOT 227 HEREON
	HH	LOT 230, 232, 233, 234, 237 HEREON	LOT 231 HEREON
	KK	LOT 545 HEREON	LOT 546 HEREON
	LL	LOT 546 HEREON	LOT 545 HEREON

Tauranga City Council

HASHAA 2013

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PLAN

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SCHEME PLAN

No.	Date	Revision Details	By	Ver.	App.
F	07/09/16	OPTION WITHOUT OSMAND BLOCK	JC		
D	15/06/16	SCHEDULE OF EASEMEMNTS TABLE REVISED	JC		
C	18/12/15	MINOR AMENDMENTS	JC		
B	17/12/15	SCHEDULE OF EASEMENTS TABLE REVISED	JC		
A	30/10/15	SCHEME PLAN	JC		

Drawn	Signed	Date
JC		30/10/15
Designed	Signed	Date
Verified	Signed	Date
Approved	Signed	Date

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Project:

TERRACE VIEWS

PROPOSED RESIDENTIAL SUBDIVISION

TE OKUROA DRIVE

PAPAMOA

Drawing Title:

PROPOSED SUBDIVISION OF LOT 1 DP 429801

SCHEDULE OF EASEMENTS

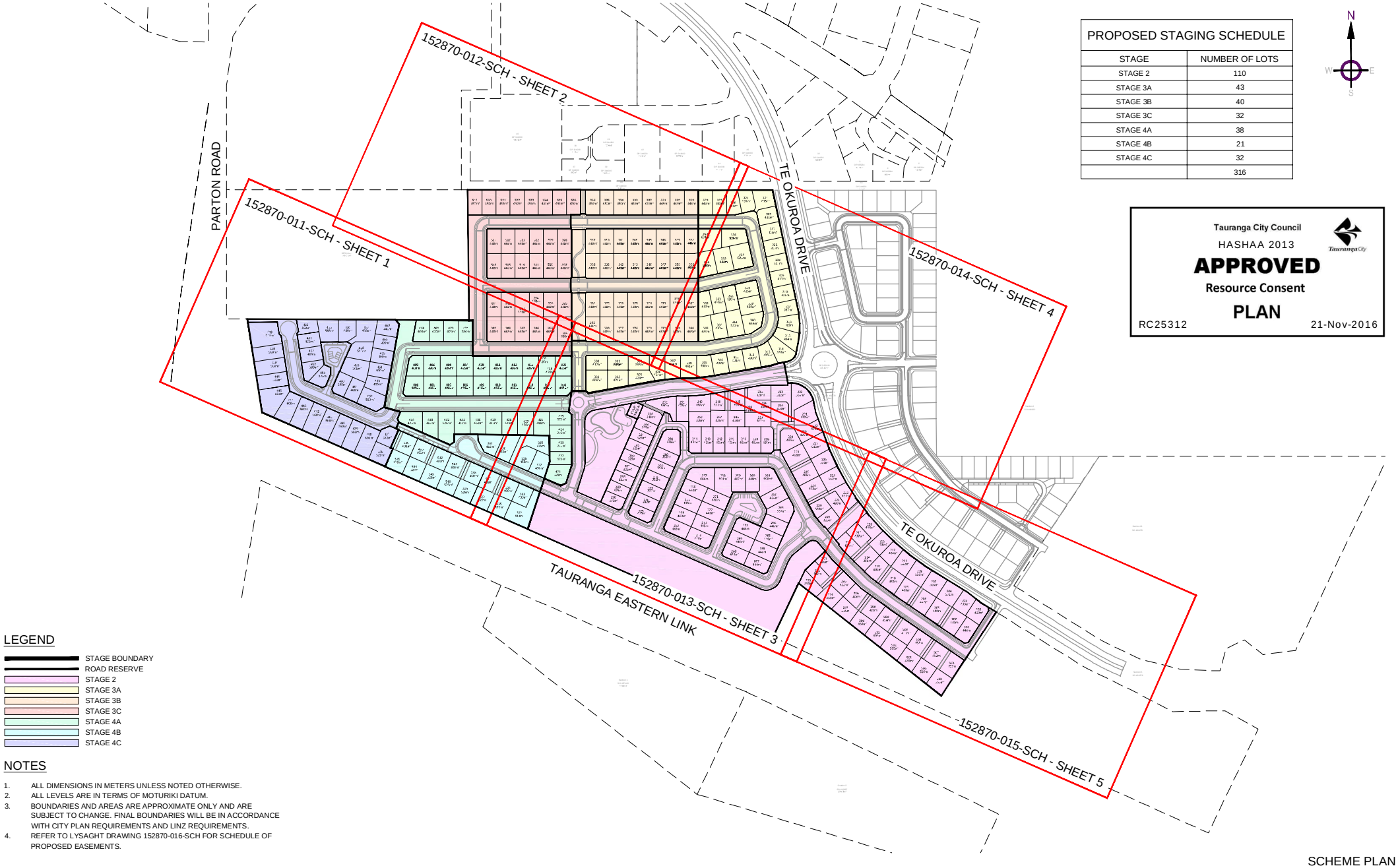
Project No. 152870

Scale (A3) NOT TO SCALE

Drawing No. 152870-016-SCH

Rev. F

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PROPOSED STAGING SCHEDULE	
STAGE	NUMBER OF LOTS
STAGE 2	110
STAGE 3A	43
STAGE 3B	40
STAGE 3C	32
STAGE 4A	38
STAGE 4B	21
STAGE 4C	32
	316

N

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PLAN
RC25312 21-Nov-2016

LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
- STAGE 3C
- STAGE 4A
- STAGE 4B
- STAGE 4C

NOTES

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4. REFER TO LYSAGHT DRAWING 152870-016-SCH FOR SCHEDULE OF PROPOSED EASEMENTS.

SCHEME PLAN

No.	Date	Revision Details	By	Ver.	App.
J	13/06/16	SHEET LAYOUT AND SCHEME BOUNDARIES UPDATED	JC		

Drawn	JC	Signed	Date 30/10/15
Designed		Signed	Date
Verified		Signed	Date
Approved		Signed	Date

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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
OVERALL LAYOUT PLAN

Project No. 152870
Scale (A3) 1:4000
Drawing No. 152870-010-SCH
Rev. J

X:\Projects 1\15 Jobs\152870 Zariba Holdings, Parton Rd, Development\CAD\Drawings\152870-010_016-SCH Rev J.dwg

LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
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- STAGE 4B
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Tauranga City Council
HASHAA 2013
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1 DPS 14276 40469m²

JOINLINE - 152870-012-SCH

391 448m² 392 448m² 393 448m² 384 448m²
385 448m² 386 448m² 387 448m² 388 448m² 389 448m²

ROAD TO VEST 3014 7737m²

468 408m² 469 400m² 470 409m² 471 384m²
416 426m² 415 426m² 412 426m² 411 426m² 408 426m² 407 426m² 404 426m² 403 426m² 400 410m²
414 426m² 413 426m² 410 426m² 409 426m² 406 426m² 405 426m² 402 426m² 401 505m²

ROAD TO VEST 3015 6452m²

JOINLINE - 152870-013-SCH

428 471m² 429 467m² 430 462m² 431 457m² 432 626m² 433 495m² 434 475m²
531 483m² 530 553m²

ROAD TO VEST 3016 2654m²

467 441m² 466 400m² 465 400m² 464 400m² 463 430m² 462 583m²
457 600m² 458 517m² 459 641m² 460 396m² 461 400m²
456 468m² 455 566m² 454 376m² 453 380m² 452 400m² 451 400m² 450 369m² 449 913m² 448 560m² 447 560m² 446 560m² 445 817m²

ROAD TO VEST 3017 4894m²

444 600m² 443 560m² 442 560m² 441 560m² 440 560m² 439 560m² 438 630m²
437 372m² 546 529m²
KK LL 436 401m² 435 401m² MM NN 542 400m² 541 403m² OO PP 538 400m² 537 403m² QQ RR
545 527m² 544 527m² 543 529m² 540 529m² 539 529m² 536 529m²

PARTON ROAD

TAURANGA EASTERN LINK

SCHEME PLAN

No.	Date	Revision Details	By	Ver.	App.
F	13/06/16	SHEET LAYOUT AND SCHEME BOUNDARIES UPDATED	JC		
E	16/02/16	MINOR AMENDMENTS	JC		
D	18/10/15	MINOR AMENDMENTS	JC		
C	17/12/15	SCHEME LAYOUT REVISED	JC		
B	06/11/15	STAGING LABELS ADDED	JC		
A	30/10/15	SCHEME PLAN	JC		

			Date
Drawn	JC	Signed	30/10/15
Designed		Signed	Date
Verified		Signed	Date
Approved		Signed	Date

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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
LAYOUT PLAN
SHEET 1 OF 5

Project No. 152870
Scale (A3) 1:1000
Drawing No. 152870-011-SCH
Rev. F

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LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
- STAGE 3C
- STAGE 4A
- STAGE 4B
- STAGE 4C

NOTES

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Tauranga City Council

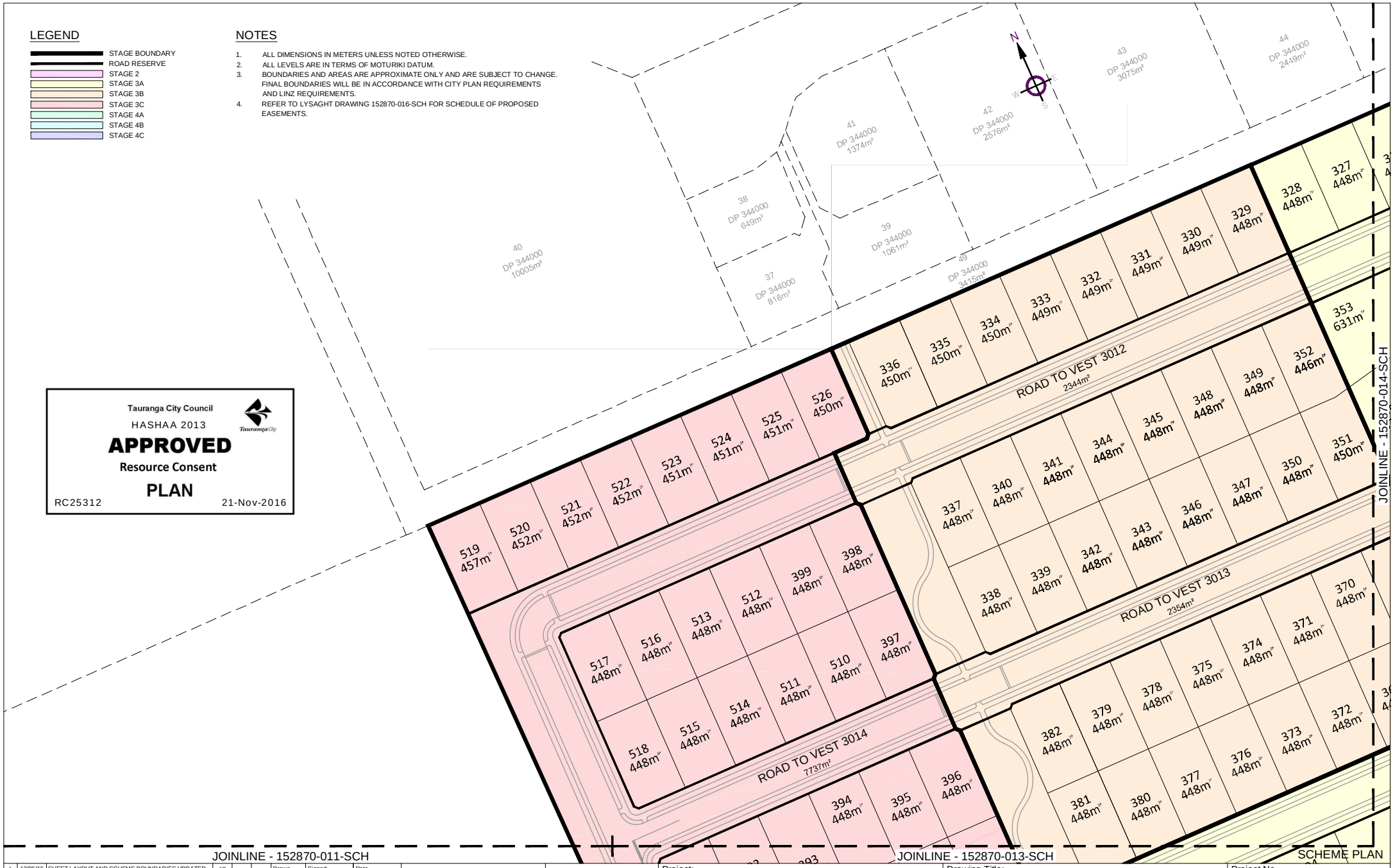
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No.	Date	Revision Details	By	Ver.	App.
I	13/06/16	SHEET LAYOUT AND SCHEME BOUNDARIES UPDATED	JC		
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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
LAYOUT PLAN
SHEET 2 OF 5

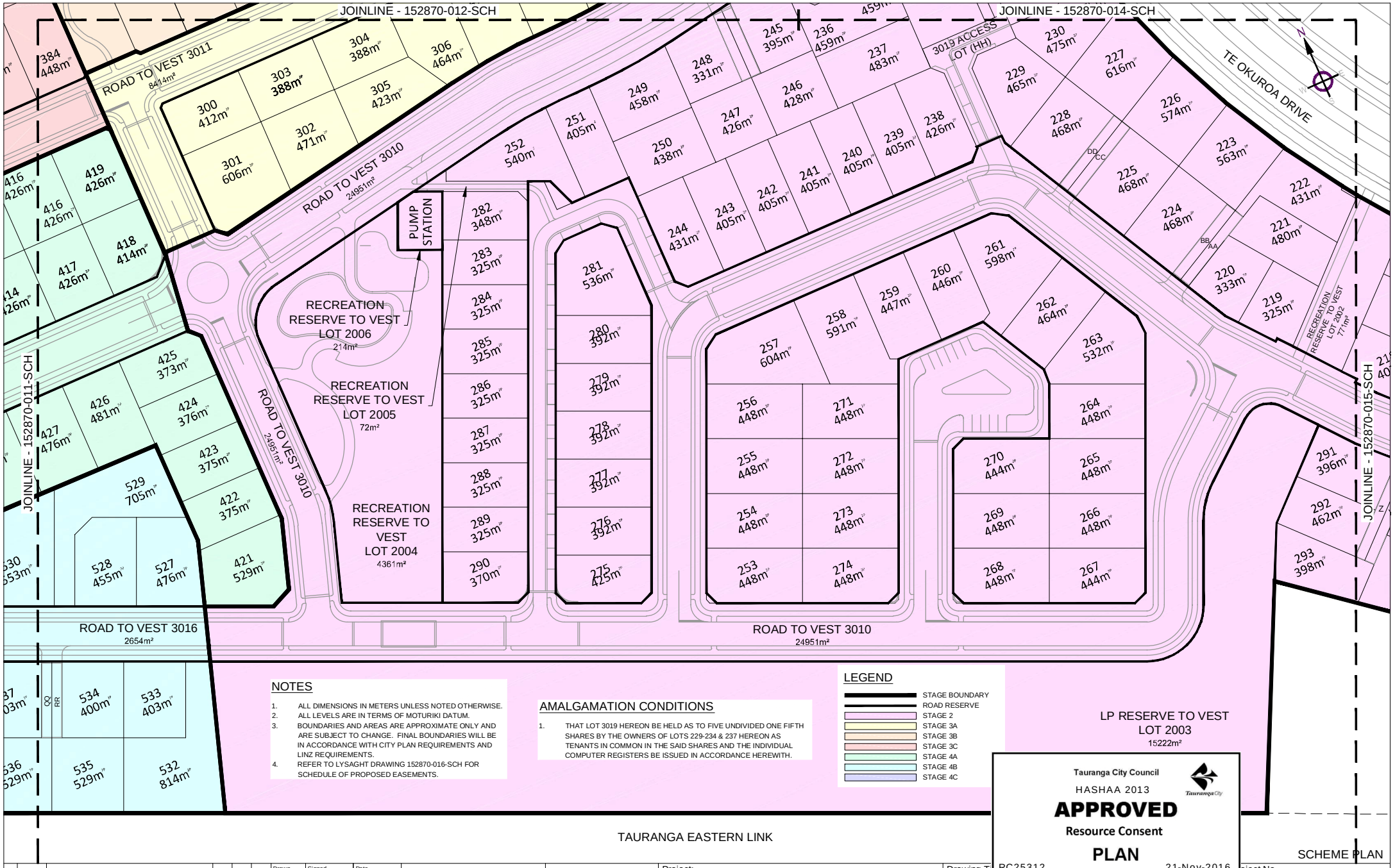
Project No. 152870

Scale (A3) 1:1000

Drawing No. 152870-012-SCH

Rev. I

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LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
- STAGE 3C
- STAGE 4A
- STAGE 4B
- STAGE 4C

Tauranga City Council
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SCHEME PLAN

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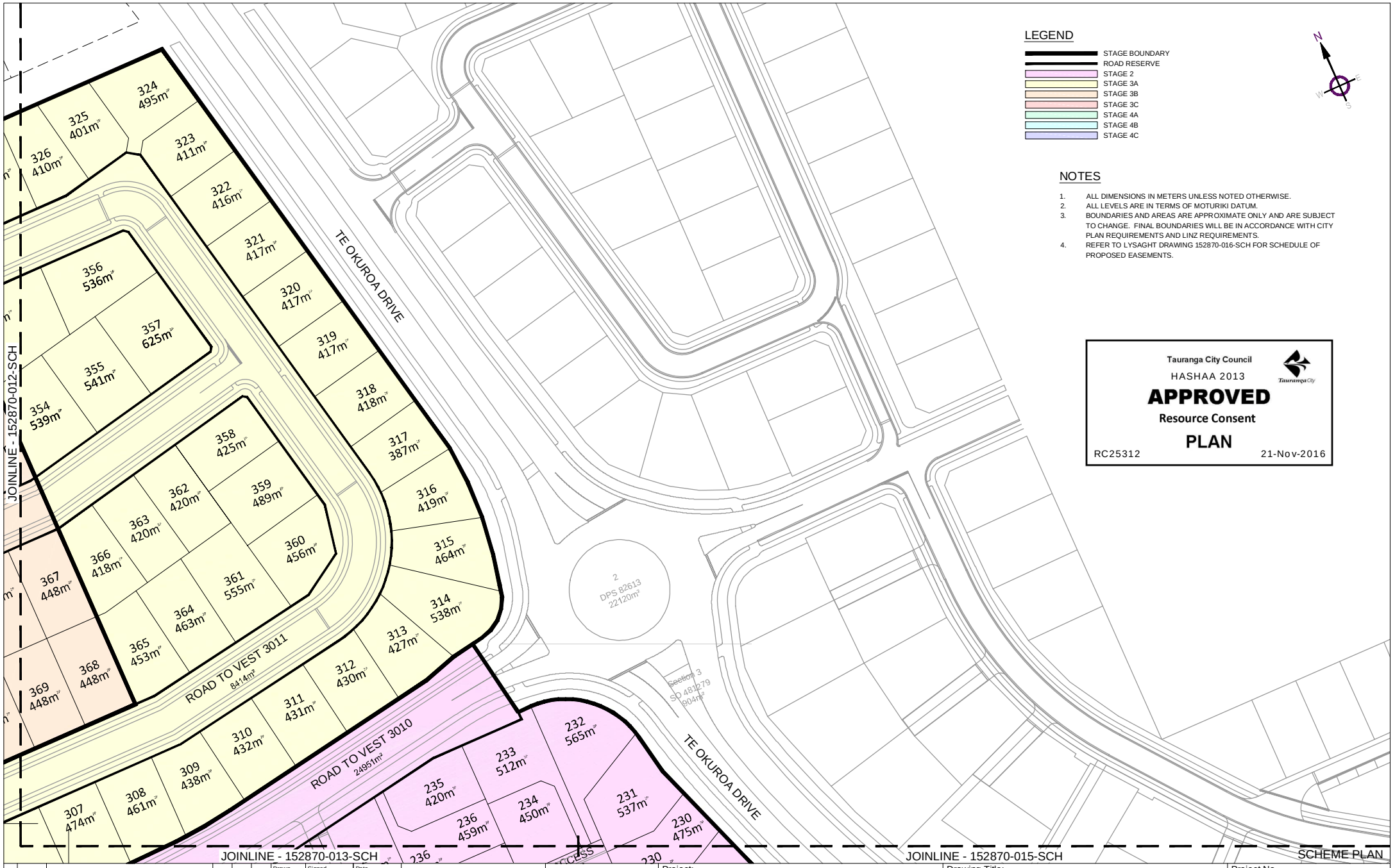
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19 Totara St, Mount Maunganui 3116 Ph 07 578 8798 www.lysaght.net.nz

Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
LAYOUT PLAN
SHEET 3 OF 5

Project No. 152870
Scale (A3) 1:1000
Drawing No. 152870-013-SCH
Rev. F

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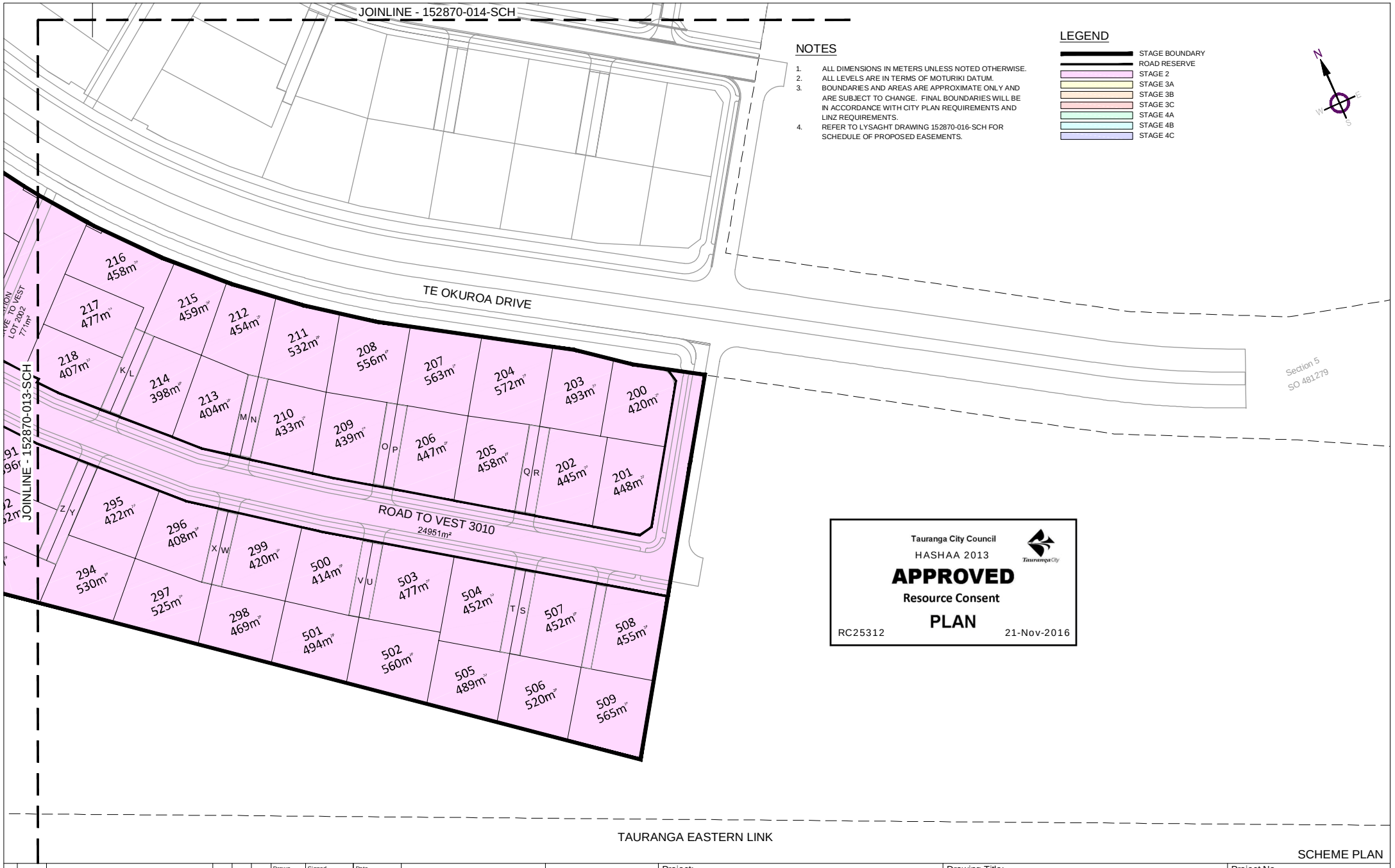
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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
LAYOUT PLAN
SHEET 4 OF 5

Project No. 152870
Scale (A3) 1:1000
Drawing No. 152870-014-SCH
Rev. H

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LEGEND

- STAGE BOUNDARY
- ROAD RESERVE
- STAGE 2
- STAGE 3A
- STAGE 3B
- STAGE 3C
- STAGE 4A
- STAGE 4B
- STAGE 4C

Tauranga City Council
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SCHEME PLAN

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Drawn	JC	30/10/15
Designed		
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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
PROPOSED SUBDIVISION OF LOT 1 DP 429801
LAYOUT PLAN
SHEET 5 OF 5

Project No. 152870
Scale (A3) 1:1000
Drawing No. 152870-015-SCH
Rev. F

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SCHEDULE OF PROPOSED EASEMENTS			
PURPOSE	SHOWN	DOM	SERV
RIGHT OF WAY, RIGHT TO CONVEY ELECTRICITY, TELECOMMUNICATIONS AND COMPUTER MEDIA, RIGHT TO CONVEY WATER, GAS, RIGHT TO DRAIN WATER, SEWAGE	K	LOTS 215, 217 HEREON	LOT 216 HEREON
	L	LOTS 216, 217 HEREON	LOT 215 HEREON
	M	LOT 211 HEREON	LOT 212 HEREON
	N	LOT 212 HEREON	LOT 211 HEREON
	O	LOT 207 HEREON	LOT 208 HEREON
	P	LOT 208 HEREON	LOT 207 HEREON
	Q	LOT 203 HEREON	LOT 204 HEREON
	R	LOT 204 HEREON	LOT 203 HEREON
	S	LOT 505 HEREON	LOT 506 HEREON
	T	LOT 506 HEREON	LOT 505 HEREON
	U	LOT 501 HEREON	LOT 502 HEREON
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	NN	LOT 544 HEREON	LOT 543 HEREON
	OO	LOT 539 HEREON	LOT 540 HEREON

SCHEDULE OF PROPOSED EASEMENTS			
PURPOSE	SHOWN	DOM	SERV
RIGHT OF WAY, RIGHT TO CONVEY ELECTRICITY, TELECOMMUNICATIONS AND COMPUTER MEDIA, RIGHT TO CONVEY WATER, GAS, RIGHT TO DRAIN WATER, SEWAGE	PP	LOT 540 HEREON	LOT 539 HEREON
	QQ	LOT 535 HEREON	LOT 536 HEREON
	RR	LOT 536 HEREON	LOT 535 HEREON

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RC25312 21-Nov-2016

SCHEME PLAN

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D	15/06/16	SCHEDULE OF EASEMEMNTS TABLE REVISED	JC		
C	18/12/15	MINOR AMENDMENTS	JC		
B	17/12/15	SCHEDULE OF EASEMENTS TABLE REVISED	JC		
A	30/10/15	SCHEME PLAN	JC		

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Drawing Title:

PROPOSED SUBDIVISION OF LOT 1 DP 429801
SCHEDULE OF EASEMENTS

Project No. 152870

Scale (A3) NOT TO SCALE

Drawing No. 152870-016-SCH

Rev. D

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LEGEND

SUBDIVISION APPROVAL EXTENTS

CHANGE TO EXISTING CONSENT AREA EXTENTS

NOTES

1. CONTOURS SHOWN ARE PROPOSED FINISHED GROUND CONTOURS AT 0.20m INTERVALS TO MOTURIKI DATUM.



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Drawing Title:

RESOURCE CONSENT

TERRACE VIEWS STAGES 2, 3 & 4

PROPOSED CONTOUR PLAN

SHEET 1

Project No. 152870

Scale (A3) 1:2000

Drawing No. 152870-2110-EW

Rev. A

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TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
RESOURCE CONSENT
TERRACE VIEWS STAGES 2, 3 & 4
PROPOSED CONTOUR PLAN
SHEET 2

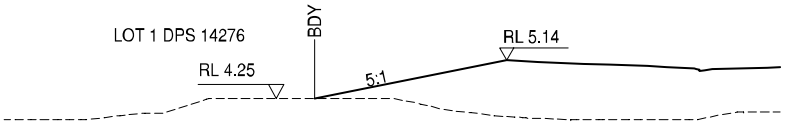
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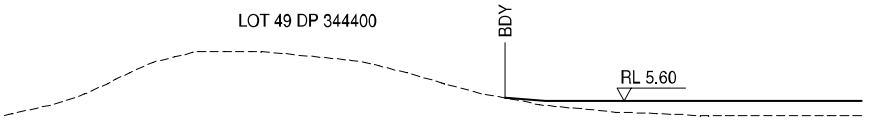
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Rev. A

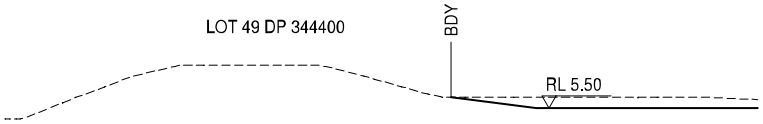
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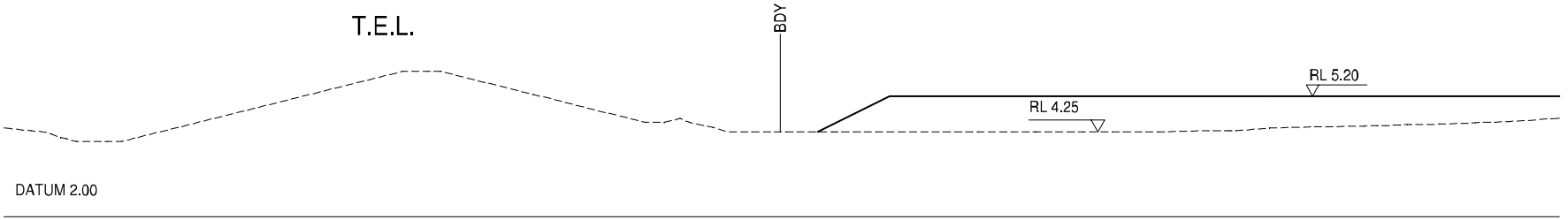


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C SECTION
2130 SCALE 1:125

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D SECTION
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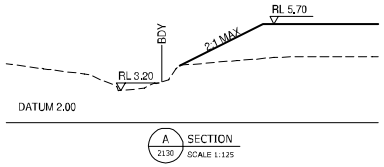
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PAPAMOA

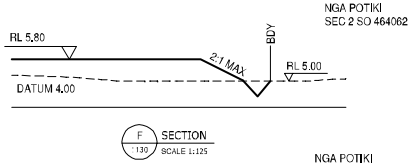
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RESOURCE CONSENT
TERRACE VIEWS STAGES 2, 3 & 4
BOUNDARY INTERFACE CROSS SECTIONS

Project No. 152870
Scale (A3) 1:125
Drawing No. 152870-2130-EW
Rev. A

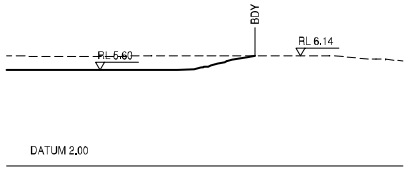
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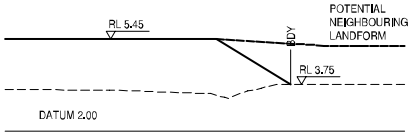
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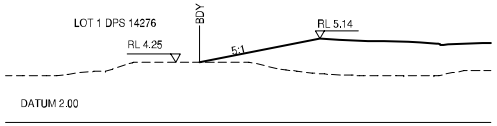
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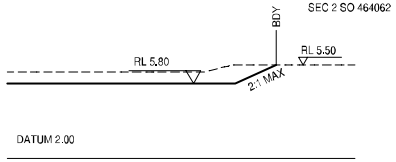
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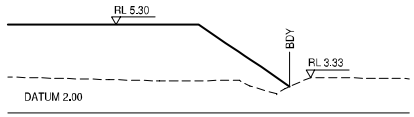
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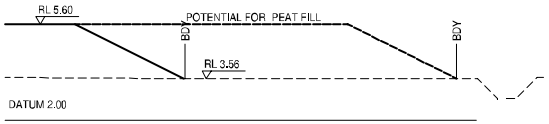
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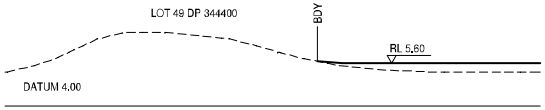
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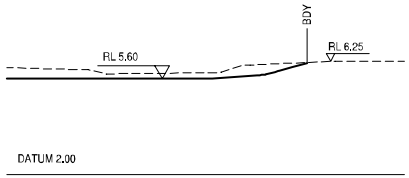
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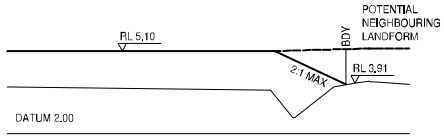
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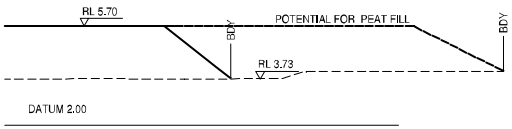
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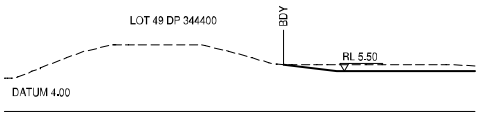
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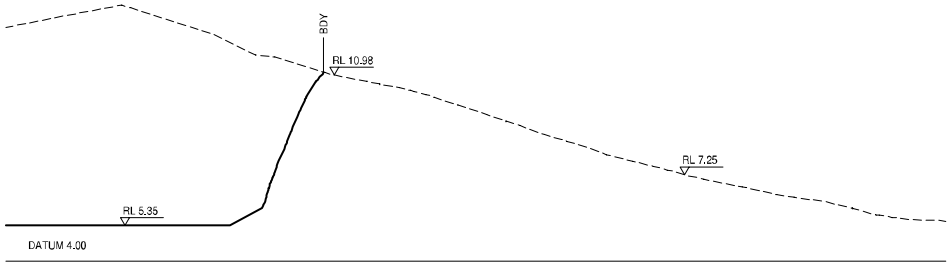
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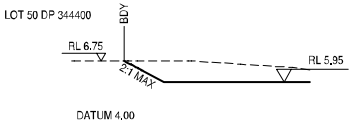
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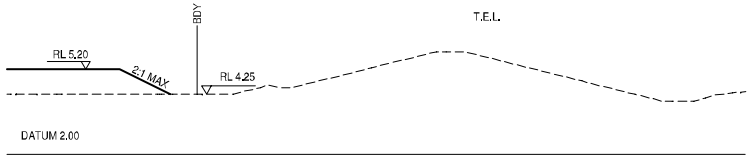
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H SECTION 1130 SCALE 1:125



E SECTION 1130 SCALE 1:125



N SECTION 2130 SCALE 1:125

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PAPAMOA

Drawing Title:
BOUNDARY ASSESSMENT
BOUNDARY SECTIONS
SHEET 2 OF 4

Project No. 152870
Scale (A3) AS SHOWN
Drawing No. 152870-BDY-004
Rev. A

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Land Development

Tauranga City

General Description of Landform within Tauranga District

The landform and geology within Tauranga District have some features which demand particular attention.

(a) Minimum Building Platform Levels

Significant areas of Tauranga District are at risk of flooding through sea level rise, tidal surges within the harbour, storm-wave runup on the ocean coastline and the flooding of streams, sewer drains, ponding areas and overland flow paths in extreme climatic conditions. Council has some "broadbrush" information on many possibly flood prone areas. More detailed investigations by appropriately qualified people may be required to be submitted in support of Resource and Building consents. Building Platforms should be constructed with adequate freeboard above flood levels. Council has adopted a minimum floor level policy. This level is available from Council on request from Council's Development Engineer. However due to the dynamic nature of the environment and the ongoing investigative work these levels may be reviewed at any time. For the purposes of this clause, a "building platform" is defined as the area of ground within a line 1.0m outside the perimeter of the building proper.

(b) Low-lying Land

There are many areas of low-lying land (often adjacent to the harbour) which comprise soft or very soft foundation conditions. These conditions are characterised by normally consolidated fine grained alluvial sediments (silts and clays) which have been deposited in marine or estuarine environments. In many areas they have been subject to random and non-engineered fillings. The materials are prone to settlement caused by consolidation under even minor loadings. These areas require particular care and appropriate geotechnical investigation and advice prior to development concepts being prepared. Whilst most of the Mount Maunganui/Papamoa area has an underlying sand formation, pockets of peat and "black sand" occur which exhibit poor foundation support qualities. These should be removed from building platforms and roading subgrades.

(c) Sloping Ground

The foundation conditions of the low-lying areas in the District have been described in (b) above. The near surface geology of the higher ground within the District comprises a series of weathered fine grained rhyothic ashes known locally as the Older Ashes. The Older Ashes consist of the Pahoia Tuffs overlain by the Hamilton Ash (the top of which is known locally as the "chocolate" layer).

Overlying the Older Ashes is a series of coarse friable silts, sands and pumice lapilli which tends to mantle the topography formed within the Older Ashes and are known locally as the Younger Ashes.

On some sloping ground, particularly the present and relic slips adjacent to the harbour, the ashes often have marginal stability and there are numerous examples of past and recent instability. Deep seated failures are generally confined to the steep banks which are or have in their history been subjected to active toe erosion. Development must be set back from the top of such steep banks, with the setback distance being determined by appropriate geotechnical investigations carried out by a Person who has pre-qualified with Council as a Specialist Geotechnical Advisor.

The majority of other failures on modest to steeply sloping ground are shallow failures (involving the top 1m to 3m of soil), but are nonetheless of serious consequence to any building development. Such failures are usually initiated by extreme climatic conditions. Any sloping ground greater than 15-degree gradient should be subject to appropriate geotechnical investigations to determine whether the ground is adequately stable for development.

aurecon

Terrace Views Subdivision
Parton Road, Tauranga

Stage 2 Geotechnical Completion Report

Zariba Properties Limited

12 July 2017

Revision: 2

Reference: 247593-210

Bringing ideas to life

TERRACE VIEWS
PAPAMOA

Document control record

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File path		P:\Projects\247593 - Zariba HASHA Parton Road Papamoa\009 - Geotechnical\Geotechnical Completion Reports\Stage 2\GCR Stage 2 Rev\Text\247593-0000-REP-CC-0001 (Stage 2 -GCR_Rev 2)_Final.docx				
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1	19 June 2017	First issue	A Fang	B O'Loughlin	B O'Loughlin	A Collier
2	12 July 2017	Second issue with updated final landforms	A Fang	B O'Loughlin	B O'Loughlin	A Collier
Current revision		**2**				

Approval			
Author signature		Approver signature	
Name	Anderson Fang	Name	Aaron Collier
Title	Senior Geotechnical Engineer	Title	Project Director

Contents

1 Introduction 3
2 Site location and description 3
3 Proposed subdivision development 4
4 Geotechnical considerations 4
4.1 Pre-development geotechnical assessment 4
4.2 Site earthworks 5
4.3 Earthworks subgrade inspection and compliance testing 6
4.4 Post fill settlement monitoring 17
4.5 Ground conditions 17
4.6 Liquefaction 18
5 Requirements for building development 18
5.1 General 18
5.2 Lot by lot investigations 19
5.3 Suitability of lots for building 19
5.4 Specific requirements for building 19
5.5 General recommendations for building 21
5.6 Advisory notes 22
6 Natural hazard completion report 23
7 Limitations 24
8 References 24

Appendices

Appendix A

Statement of professional opinion and lot summary sheets

Appendix B

Drawings

Appendix C

Fill compliance testing

Appendix D

Lot-by-lot hand auger logs

Tables

Table 1: Testing schedule for engineered sand fill 7
Table 2: Summary of nuclear densometer testing (conducted by Opus) 7
Table 3: Summary of nuclear densometer testing for Stage 2B (conducted by Higgins) 15
Table 4: Natural hazards 23

1 Introduction

Zariba Properties Limited (Zariba), the developer of the Terrace Views Subdivision has commissioned Aurecon New Zealand Ltd (Aurecon) to prepare a Geotechnical Completion Report (GCR) for Stage 2 of the development. Terrace Views Subdivision is a multistage residential subdivision planned to be developed in four stages. This report is limited to Stage 2 (the 'Site') which comprises a total of 109 residential lots split over two sub-stages (Stages 2A and 2B).

The Terrace Views Subdivision was originally investigated by Aurecon in 2011 as part of an initial geotechnical assessment to support subdivision for the then proposed commercial and light industrial development. Since preparing the 2011 report, the proposed development was changed to residential development under a Special Housing Accord resource consent application. To support resource consent application for residential subdivision of the Site, additional geotechnical investigations and reporting was prepared by Aurecon. Following this, Aurecon have provided geotechnical investigation, design and construction observations for our client.

The following reports were prepared by Aurecon which are relevant to the Site:

- Geotechnical Suitability of Land for Development Papamoa East Block, Parton Road Papamoa. Reference 220166-001, Revision 1, dated 29 August 2011.
- Geotechnical review of landform design and suitability for residential subdivision, Reference 247593-Geotechnical Review Parton Road Subdivision, Revision 1, dated 29th January 2016
- Geotechnical review of fill edge stability, reference 247593_Geotechnical Edge Assessment, Revision 0, dated 9 May 2016.

The reader is referred to the above reports for background to the geotechnical investigations carried out at the Site, interpretation and assessment of Site soil conditions and requirements for development.

This Geotechnical Completion Report (GCR) relates only to the residential Lots 200 to 251(inclusive), Lots 253 to 299 (inclusive) and Lots 500 to 509 (inclusive) within Stage 2 of the subdivision and presents discussion on:

- Earthworks and compliance testing
- Geotechnical investigations of each individual residential lot to determine suitability for building
- Specific requirements for building development on each residential lot

Data is provided within the attached Appendices that support the comments, conclusions and recommendations given in this report. A statement of professional opinion as to the suitability of land for building is provided in Appendix A. This report forms part of the s224 application to Tauranga City Council.

Note as required by Zariba a separate Geotechnical Completion Report for Lot 252 was issued by Aurecon on 17 March 2017 (refer to 247593–Lot 252 Geo Cert Final, Revision 0 dated 17 March 2017). Lot 252 is therefore excluded from this report.

2 Site location and description

The Terrace Views Subdivision is located at 162 Parton Road, Papamoa and measures an area of 10 hectares. The land is defined by the legal property boundary for Lot 1 and 2 of DP 429801, Lot 1 and 2 of DP 325745, Lot 1, 2 and 3 of DP 82613 as well as land to the north east formally owned by Tauranga City Council. The property is roughly triangular in shape and is located between Parton Road and Tauranga Eastern Link.

Stage 2 is located within the southern portion of the Terrace Views Subdivision west of the Te Okuroa Drive extension. Stage 2 is bordered by Te Okuroa Drive to the east and north, and by Nga Potiki and NZTA land to the south and east. The overall Terrace Views Subdivision layout and Stage 2 location is shown on the subdivision masterplan titled Resource Consent June 2016 Revision C included in Appendix B.

3 Proposed subdivision development

Stage 2 of the development is divided into sub-stages, 2A and 2B. Collectively these sub-stages comprise a total of 109 residential lots. The sub-stages were primarily established to support construction phasing but have been retained for this report to support our discussion of earthworks.

Each of the 109 residential lots developed within Stage 2 will be shallow founded at the designed platform level. It is our understanding that the proposed residential buildings will be one or two storey residential structures designed in accordance with the requirements of NZS 3604:2011 *Timber Framed Buildings*. All lots will be serviced with wastewater and town water supply at each lot boundary. Stormwater from residential lots will be disposed of via on-site ground soakage within each lot. Stormwater from the internal road network will be reticulated and discharged into a swale drain which flows to a wetland storm water pond on the southern boundary of the subdivision.

4 Geotechnical considerations

4.1 Pre-development geotechnical assessment

The geotechnical requirements for development of the Site are outlined in the "Suitability for Subdivision" report dated 29 January 2016. The key geotechnical requirements and conclusions from this report are summarised as follows:

4.1.1 Peat

Where exposed in the natural foundation subgrade, Aurecon advised the undercut and removal of peat and replacement with engineered fill.

"The peat undercut and replacement is expected to largely remove the risk of settlement (both primary and secondary creep consolidation) affecting the development. As discussed in our previous reports, settlement of the underlying loose sands and firm sandy silt layers may occur as a result of replacing the peat with denser engineered fill in combination with raising site levels with engineered fill."

4.1.2 Settlement

"The magnitude of settlement due to fill placement is likely to vary based on a number of factors including the fill thickness, groundwater levels and nature of the underlying sediments below the peat."

"Considering the sandy nature of the underlying soils, fill induced settlements are expected to occur rapidly during construction. Settlement monitoring is proposed as part of the earthworks contract. The settlement data will be reviewed by a TCC Category 1 Soils Engineer to confirm timing for building development."

4.1.3 Ground water level

"Groundwater was encountered within the test pits excavated within peat areas. Groundwater was generally encountered approximately 1.0m below ground level (~+2.7mRL)."

4.1.4 Liquefaction

"For elevated areas of the site, liquefaction may occur below the groundwater table which following earthworks is expected to be around 2.4 – 3.5m below finished ground levels. Given the assumed thickness of the non-liquefiable crust (ranging between 2.4 and 5m), the likely effects of liquefaction for surface foundations are anticipated to meet the requirements of the NZ Building Code which states that buildings must remain serviceable following a SLS event with only minor repair. During a ULS event buildings must retain their structural integrity such that they can be safely evacuated, however the resulting damage may require significant repair and/or rebuild. With this in mind, raft foundations for future residential buildings are recommended for the purpose of residential building construction."

4.1.5 Foundations

"We understand that the subdivision will comprise residential buildings that include materials composition and dimensional characteristics as defined by NZS 3604:2011. Given that the site is located within an area of moderate liquefaction potential we recommend the specification of engineer designed or proprietary raft foundations for each residential building."

"It is our expectation that following earthworks cuts and filling, all structures can be shallow founded in accordance with the provisions of the Standard. Each building structure shall be supported on a shallow founded engineer designed or proprietary raft foundation (i.e. TC2 Rib-Raft or equivalent)".

"Final foundation recommendations and bearing capacities shall be confirmed as part of the geotechnical completion report for each stage of development following lot by lot testing and certification of the fill."

4.1.6 Stormwater and effluent disposal

"Stormwater from roads will be collected and disposed of into the proposed subdivision stormwater swales and ponds. It is proposed to dispose of storm water from individual lots via in-ground soakage."
"We recommend soakage percolation testing is carried out following filling to confirm the viability of onsite soakage systems and to provide parameters for design".

4.1.7 Stage 2B southern edge stability assessment

Aurecon provided a variety of options to ensure the stability of the fill edge along the southern boundary of Stage 2. These recommendations are covered in detail in the aforementioned edge stability assessment report.

A 2.0m high timber pole retaining wall was selected to be constructed along the southern boundary of Stage 2B area. The retaining wall was to be designed and certified by Aurecon, and included the requirement for undercut and replacement of peat beyond the southern boundary of the property.

Edge stabilisation for the remaining portion of the southern boundary of Stage 2 (Stage 2A area) comprised an engineered battered slope forming the northern edge of the storm water wetland pond.

4.2 Site earthworks

The earthworks covering the Site have been undertaken between June 2016 and May 2017 by Andrew Young Contractors, as a sub-contractor to Higgins. Pre-development, final development and cut to fill drawings are included in Appendix B.

To achieve the design landform, earthworks comprised general cutting and filling with large areas of the Site requiring excavation of peat and replacement with site-won sand cut from elevated parts of the Site. Pumice sand fill imported from Paengaroa Sands quarry was placed in localised areas of Stage 2, including the southeast corner of the Stage 2B within Lots 291 to 299 and Lots 500 to 509.

The earthworks equipment comprised mainly excavators to carry out localised undercuts, and Caterpillar 627G motor scrapers to cut, transport and compact the fill. Following completion of the design subgrade level, topsoil and grass seed was placed over the lots to finished lot levels.

A summary of the earthworks carried out over Stage 2 is provided as follows:

- Stage 2A comprised predominantly low lying areas of the site below +4.0mRL. The surface peat deposits were undercut and filled up to ~+3.0mRL by site-won dune sand. The exported pumice sand was then placed on the dune sand up to the final subgrade level. Typically, 2.0m thick peat deposit were undercut across the area of Stage 2A.
- 0m to 3.5m cut earthworks was carried out across half of Stage 2B. The cut dune sand was moved to Stage 2A and used as fill material. An elevated ridge at the western part of Stage 2A was cut down by 3.5m to the design platform level. Minor fill (<1.0m high) earthworks was undertaken at the north western corner of Stage 2A.
- A historical TEL stockpile was identified in the southern part of Stage 2A which was subsequently undercut to the final subgrade level within the footprints of Lots 275, 276, 253, 274, and 265 to 269. Engineered site-won sand fill was placed to replace areas of locally undercut peat and top soil identified below the stockpile, to form the final subgrade level.
- Stage 2B comprised a combination of elevated land underlain by dunes to the north, and low lying underlain by peat to the south. Where encountered within Stage 2B, the peat was undercut and replaced with up to 2.0m of engineered site won dune sand along the southern part of Stage 2B. Around 1.5m of imported pumice sand from Paengaroa Sands quarry was placed over the engineered dune sand to bring the site up to finished levels. The filled building platform was subsequently retained with a 2.0m high engineer designed timber pole retaining wall.
- Undercut and replacement of the peat within Stage 2B extended approximately 4m beyond the southern boundary of Stage 2B to support the subsequent foundations for a timber pole retaining wall built along this part of the site.
- A wetland pond was built along the southern boundary of Stage 2A. The wetland pond was constructed largely by peat removal. The northern pond edge was constructed with engineered sand fill, whilst the southern pond edge comprises a combination of in-situ peat and peat bund constructed to provide both water retention and noise mitigation. The outlets of wetland pond were connected to the existing reinforced concrete culverts beneath the Tauranga East Link by sheet pile walls with steel box inserts. The positioning of the bunds and the use of sheet piling and inserts was governed by the requirement to mitigate settlement effects to NZTA.

4.3 Earthworks subgrade inspection and compliance testing

4.3.1 Subgrade observations

Aurecon carried out regular geotechnical subgrade inspections following topsoil stripping and following peat undercut. Instruction to commence earthworks filling was only provided following certification of the subgrade by Aurecon.

4.3.2 Earthworks compliance testing specification

Fill compliance testing was undertaken during earthworks construction. Compliance testing was carried out in accordance with the contract earthworks specification. The specification provided requirements for subgrade inspection, laboratory and field density testing, and compaction criteria. The specification required all engineered fill to be tested in accordance with NZS4431 as required under the Tauranga City Council Infrastructure Development Code. All laboratory testing was specified to be carried out by an independent IANZ accredited laboratory.

The following testing schedule was specified for Stage 2.

Table 1: Testing schedule for engineered sand fill

Soil Classification & Specific Gravity	Standard Compaction Test	In-situ Density Test (NDM)	DCP Tests Cohesionless Soils (sands / gravels)
4 specific gravity tests per soil type (all soils). 4 PSD grading curves per representative soil type (granular soils)	Four compaction tests per representative soil type. NZS 4402, Test 4.1.1. Minimum of 5 points shall be determined. Lab shear vanes for each point (for cohesive soils only). Material description to NZGS guidelines	Minimum of 1 NDM test per 500 m^3 of filling placed evenly distributed over the extent filling. Testing at every 750 mm lift (or part thereof). 1x oven corrected moisture content per NDM test	1 test per in-situ density test. Scala tests to be to depth of not less than 0.9m.

As the source fill material tested comprised predominantly sand, percentage compaction was used to determine fill compliance. Due to a lack of site-won sand for the earthworks, Paengaroa pumice sand was selected as the other source of fill material. Target maximum dry density was selected from the laboratory Standard Compaction testing undertaken as part of the earthworks.

The acceptance criteria for the fill and pumice sand compaction was:

- DCP: Minimum 5 blows per 100mm
- NDM: Minimum 95% Maximum Dry Density

4.3.3 Results of testing

The total volume of fill is approximately 123,000m^3 based on the as-built cut-fill plan provided by Higgins. Nuclear densometer testing (NDM) was undertaken at 335 locations within Stage 2 with each NDM accompanied by one DCP test. A summary of the results of testing are presented in Tables 2 to 4. Test locations are shown on the Cut Fill drawing in Appendix B, and the laboratory reports are included in Appendix C. Most compliance tests were carried out by Opus and at their IANZ accredited Tauranga laboratory. Part of compliance tests within the southern area of Stage 2B were conducted by qualified technicians appointed by Higgins and all the test results were certified by their IANZ accredited Higgins Contractors Auckland Laboratory.

Table 2: Summary of nuclear densometer testing (conducted by Opus)

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
46	Site-won Sand	1.62	13.4	1.58	102
47	Site-won Sand	1.64	13.6	1.58	104
48	Site-won Sand	1.64	15.1	1.58	104
49	Site-won Sand	1.67	8.3	1.58	106
50	Site-won Sand	1.66	10.2	1.58	115
51	Site-won Sand	1.79	12.4	1.58	113
52	Site-won Sand	1.73	12.4	1.58	109

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
53	Site-won Sand	1.66	10.5	1.58	105
54	Site-won Sand	1.71	9.6	1.58	108
55	Site-won Sand	1.60	13.8	1.58	101
56	Site-won Sand	1.60	14.8	1.58	101
57	Site-won Sand	1.69	14.4	1.58	107
58	Site-won Sand	1.67	14.1	1.58	106
59	Site-won Sand	1.66	12.1	1.58	105
60	Site-won Sand	1.70	9.3	1.58	108
61	Site-won Sand	1.63	15.9	1.58	103
62	Site-won Sand	1.68	11.1	1.58	106
63	Site-won Sand	1.65	12.8	1.58	105
64	Site-won Sand	1.71	10.6	1.58	108
65	Site-won Sand	1.73	10.0	1.58	109
66	Site-won Sand	1.69	12.4	1.58	107
67	Site-won Sand	1.69	12.7	1.58	107
68	Site-won Sand	1.67	13.2	1.58	106
69	Site-won Sand	1.67	13.0	1.58	106
70	Site-won Sand	1.67	13.2	1.58	105
71	Site-won Sand	1.69	12.2	1.58	107
72	Site-won Sand	1.69	13.4	1.58	107
73	Site-won Sand	1.68	13.6	1.58	106
74	Site-won Sand	1.69	15.1	1.58	107
75	Site-won Sand	1.65	9.8	1.58	105
76	Site-won Sand	1.67	9.7	1.58	106
77	Site-won Sand	1.64	13.1	1.58	104
78	Site-won Sand	1.69	13.3	1.58	107
89	Site-won Sand	1.74	9.5	1.58	110
80	Site-won Sand	1.67	15.6	1.58	106
81	Site-won Sand	1.70	14.2	1.58	108
82	Site-won Sand	1.69	15.6	1.58	107
83	Site-won Sand	1.71	15.4	1.58	109
84C	Site-won Sand	1.71	14.5	1.58	108
85C	Site-won Sand	1.61	13.0	1.58	102
86C	Site-won Sand	1.60	13.9	1.58	101
87C	Site-won Sand	1.69	12.0	1.58	107
88CD	Site-won Sand	1.72	14.4	1.58	109

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
89CD	Site-won Sand	1.76	12.9	1.58	111
90CD	Site-won Sand	1.76	13.0	1.58	111
92CD	Site-won Sand	1.71	14.9	1.58	108
93CD	Site-won Sand	1.71	14.9	1.58	108
94CD	Site-won Sand	1.69	14.7	1.58	107
88B	Site-won Sand	1.60	10.7	1.63	98
90B	Site-won Sand	1.62	13.9	1.63	99
91B	Site-won Sand	1.77	12.5	1.63	109
92B	Site-won Sand	1.63	15.2	1.63	100
94B	Site-won Sand	1.64	14.0	1.63	101
95CD	Site-won Sand	1.75	8.7	1.58	111
96CD	Site-won Sand	1.65	13.2	1.58	104
97CD	Site-won Sand	1.78	12.7	1.58	113
98CD	Site-won Sand	1.70	13.4	1.58	107
99CD	Site-won Sand	1.77	11.4	1.58	112
100CD	Site-won Sand	1.66	11.6	1.58	105
101CD	Site-won Sand	1.73	11.1	1.58	109
102CD	Site-won Sand	1.73	12.2	1.58	110
103CD	Site-won Sand	1.74	14.5	1.58	110
104CD	Site-won Sand	1.69	13.7	1.58	107
105CD	Site-won Sand	1.80	11.8	1.58	114
106CD	Site-won Sand	1.69	10.5	1.58	107
107CD	Site-won Sand	1.64	15.7	1.58	104
108CD	Site-won Sand	1.64	17.1	1.58	104
109CD	Site-won Sand	1.69	14.9	1.58	107
110CD	Site-won Sand	1.75	11.4	1.58	111
111CD	Site-won Sand	1.74	12.3	1.58	110
112A	Site-won Sand	1.72	13.9	1.58	106
112B	Site-won Sand	1.68	12.3	1.58	103
113A	Site-won Sand	1.68	15.5	1.58	103
113B	Site-won Sand	1.74	13.0	1.58	107
112C	Site-won Sand	1.72	12.9	1.58	109
113C	Site-won Sand	1.73	12.8	1.58	109
46B	Site-won Sand	1.72	11.7	1.63	106
48B	Site-won Sand	1.69	10.8	1.63	104
66B	Site-won Sand	1.56	11.9	1.63	96

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
68B	Site-won Sand	1.64	10.5	1.63	101
46CD	Site-won Sand	1.61	11.0	1.58	102
47CD	Site-won Sand	1.59	12.1	1.58	101
48CD	Site-won Sand	1.62	11.6	1.58	102
66CD	Site-won Sand	1.61	14.8	1.58	102
67CD	Site-won Sand	1.66	11.6	1.58	105
68CD	Site-won Sand	1.59	10.5	1.58	101
79CD	Site-won Sand	1.50	11.3	1.58	95
62B	Site-won Sand	1.68	7.7	1.63	103
64B	Site-won Sand	1.67	4.9	1.63	102
70B	Site-won Sand	1.66	9.6	1.63	102
72B	Site-won Sand	1.66	11.4	1.63	102
76B	Site-won Sand	1.63	11.0	1.63	100
78B	Site-won Sand	1.70	13.2	1.63	104
82B	Site-won Sand	1.70	10.2	1.63	104
62C	Site-won Sand	1.64	16.9	1.58	104
63C	Site-won Sand	1.65	7.9	1.58	104
64C	Site-won Sand	1.67	12.0	1.58	106
65C	Site-won Sand	1.79	9.7	1.58	113
70C	Site-won Sand	1.66	11.9	1.58	105
71C	Site-won Sand	1.74	8.5	1.58	110
72C	Site-won Sand	1.61	10.4	1.58	102
76C	Site-won Sand	1.67	8.8	1.58	106
77C	Site-won Sand	1.76	10.3	1.58	111
78C	Site-won Sand	1.67	11.0	1.58	105
82C	Site-won Sand	1.65	10.4	1.58	105
86A	Site-won Sand	1.74	11.4	1.63	107
86B	Site-won Sand	1.76	11.2	1.63	108
88A	Site-won Sand	1.73	9.8	1.63	106
90A	Site-won Sand	1.78	9.2	1.63	109
92A	Site-won Sand	1.72	8.4	1.63	105
94A	Site-won Sand	1.75	8.3	1.63	108
96A	Site-won Sand	1.78	11.4	1.63	109
98A	Site-won Sand	1.80	7.9	1.63	111
100A	Site-won Sand	1.79	7.9	1.63	110
104A	Site-won Sand	1.76	6.8	1.63	108

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
106A	Site-won Sand	1.78	9.6	1.63	109
108A	Site-won Sand	1.77	11.0	1.63	109
110A	Site-won Sand	1.71	12.0	1.63	105
112A	Site-won Sand	1.73	11.6	1.63	106
112B	Site-won Sand	1.75	7.7	1.63	107
114A	Site-won Sand	1.74	10.4	1.63	107
114B	Site-won Sand	1.83	11.3	1.63	112
116A	Site-won Sand	1.73	9.5	1.63	106
118A	Site-won Sand	1.80	4.8	1.63	111
118B	Site-won Sand	1.66	11.2	1.63	102
120A	Site-won Sand	1.75	9.2	1.63	108
120B	Site-won Sand	1.72	10.5	1.63	105
122A	Site-won Sand	1.71	9.6	1.63	105
124A	Site-won Sand	1.73	9.7	1.63	106
126A	Site-won Sand	1.66	8.9	1.63	102
126B	Site-won Sand	1.70	12.2	1.63	104
128A	Site-won Sand	1.61	10.8	1.63	99
113CD	Site-won Sand	1.66	10.8	1.58	105
114CD	Site-won Sand	1.75	10.6	1.58	111
115CD	Site-won Sand	1.66	10.3	1.58	105
117CD	Site-won Sand	1.65	10.6	1.58	104
118CD	Site-won Sand	1.69	14.6	1.58	107
120CD	Site-won Sand	1.67	11.3	1.58	106
119CD	Site-won Sand	1.67	7.9	1.58	106
121CD	Site-won Sand	1.68	6.8	1.58	106
123CD	Site-won Sand	1.68	10.7	1.58	107
125CD	Site-won Sand	1.58	8.0	1.58	100
127CD	Site-won Sand	1.71	9.3	1.58	108
129CD	Site-won Sand	1.66	8.4	1.58	105
130CD	Site-won Sand	1.65	11.3	1.58	105
131CD	Site-won Sand	1.68	7.6	1.58	106
132CD	Site-won Sand	1.65	7.2	1.58	105
133CD	Site-won Sand	1.66	10.5	1.58	105
134CD	Site-won Sand	1.77	6.2	1.58	112
135CD	Site-won Sand	1.69	8.3	1.58	107
136CD	Site-won Sand	1.69	7.3	1.58	107

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
137CD	Site-won Sand	1.65	10.5	1.58	104
138CD	Site-won Sand	1.69	7.7	1.58	107
139CD	Site-won Sand	1.69	8.4	1.58	107
140CD	Site-won Sand	1.74	7.8	1.58	110
141CD	Site-won Sand	1.70	9.1	1.58	107
142CD	Site-won Sand	1.72	9.0	1.58	109
143CD	Site-won Sand	1.70	7.1	1.58	108
144CD	Site-won Sand	1.73	7.8	1.58	109
145CD	Site-won Sand	1.71	7.6	1.58	108
146CD	Site-won Sand	1.64	7.0	1.58	104
147CD	Site-won Sand	1.70	5.7	1.58	107
148CD	Site-won Sand	1.75	6.1	1.58	111
54B	Site-won Sand	1.70	7.3	1.63	104
54C	Site-won Sand	1.60	11.9	1.63	98
149B	Site-won Sand	1.67	6.9	1.63	103
149C	Site-won Sand	1.75	11.9	1.63	107
150B	Site-won Sand	1.81	7.3	1.63	111
150C	Site-won Sand	1.64	8.2	1.63	100
151B	Site-won Sand	1.67	7.0	1.63	103
151C	Site-won Sand	1.62	6.0	1.63	99
152B	Site-won Sand	1.71	6.6	1.63	105
152C	Site-won Sand	1.57	7.1	1.63	96
153B	Site-won Sand	1.78	5.8	1.63	109
153C	Site-won Sand	1.55	8.4	1.63	95
154B	Site-won Sand	1.65	7.0	1.63	101
154C	Site-won Sand	1.70	5.4	1.63	104
155B	Site-won Sand	174	6.3	1.63	107
155C	Site-won Sand	1.73	6.9	1.63	106
156A	Site-won Sand	1.63	8.7	1.63	100
156B	Site-won Sand	1.62	6.1	1.63	99
157A	Site-won Sand	1.60	9.7	1.63	98
157B	Site-won Sand	1.68	6.8	1.63	103
158A	Site-won Sand	1.60	8.5	1.63	98
158B	Site-won Sand	1.68	10.4	1.63	103
159A	Site-won Sand	1.67	7.7	1.63	102
159B	Site-won Sand	1.68	9.8	1.63	103

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
160A	Site-won Sand	1.65	9.1	1.63	101
160B	Site-won Sand	1.68	6.6	1.63	103
161A	Site-won Sand	1.64	8.4	1.63	101
161B	Site-won Sand	1.63	7.1	1.63	100
162A	Site-won Sand	1.61	8.1	1.63	99
162B	Site-won Sand	1.72	7.2	1.63	106
163A	Site-won Sand	1.59	9.8	1.63	97
163B	Site-won Sand	1.69	9.0	1.63	103
164A	Site-won Sand	1.66	10.1	1.63	102
164B	Site-won Sand	1.53	15.9	1.63	94
165A	Site-won Sand	1.65	9.1	1.63	101
165B	Site-won Sand	1.73	8.9	1.63	106
166A	Site-won Sand	1.57	10.3	1.63	96
166B	Site-won Sand	1.70	8.7	1.63	104
167A	Site-won Sand	1.69	8.4	1.63	104
167B	Site-won Sand	1.69	9.7	1.63	103
176A	Site-won Sand	1.58	11.3	1.63	97
177A	Site-won Sand	1.73	9.4	1.63	106
178A	Site-won Sand	1.70	10.0	1.63	104
180A	Site-won Sand	1.73	12.0	1.63	106
183A	Site-won Sand	1.65	10.5	1.63	101
184A	Site-won Sand	1.78	8.8	1.63	109
52B	Site-won Sand	1.68	5.3	1.63	103
56B	Site-won Sand	1.72	11.7	1.63	106
57B	Site-won Sand	1.56	10.6	1.63	96
58B	Site-won Sand	1.68	11.5	1.63	103
60B	Site-won Sand	1.60	6.9	1.63	98
102A	Site-won Sand	1.76	7.4	1.63	108
122B	Site-won Sand	1.61	15.5	1.63	99
123B	Site-won Sand	1.75	8.6	1.63	107
124B	Site-won Sand	1.69	8.2	1.63	103
52C*	Site-won Sand	1.51	10.7	1.58	96
56C	Site-won Sand	1.72	8.6	1.58	109
60C	Site-won Sand	1.63	6.7	1.58	103
61C	Site-won Sand	1.50	12.8	1.58	95
75C	Site-won Sand	1.60	8.8	1.58	102

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
122C	Site-won Sand	1.55	5.8	1.58	98
80A	Site-won Sand	1.66	13.8	1.63	102
80B	Site-won Sand	1.78	10.0	1.63	109
88B	Site-won Sand	1.70	9.1	1.63	104
90B	Site-won Sand	1.55	9.2	1.63	95
92B	Site-won Sand	1.79	10.5	1.63	110
150A	Site-won Sand	1.67	10.0	1.63	103
152A	Site-won Sand	1.66	7.3	1.63	102
154A	Site-won Sand	1.64	8.4	1.63	101
174A	Site-won Sand	1.85	6.3	1.63	114
79C	Site-won Sand	1.64	10.0	1.58	104
91C	Site-won Sand	1.61	9.1	1.58	102
176-1	Pumice Sand	1.19	31.0	1.26	94
176-2 (Retest)	Pumice Sand	1.22	18.5	1.26	97
178	Pumice Sand	1.22	25.7	1.26	97
184	Pumice Sand	1.43	14.2	1.26	114
186	Pumice Sand	1.28	21.9	1.26	101
187C	Site-won Sand	1.62	18.0	1.58	102
188C	Site-won Sand	1.73	14.1	1.58	110
189C	Site-won Sand	1.78	13.6	1.58	112
191C	Site-won Sand	1.71	14.7	1.58	108
192C	Site-won Sand	1.73	9.1	1.58	110
193	Site-won Sand	1.58	8.3	1.58	100
194C*	Site-won Sand	1.54	6.3	1.58	98
196C	Site-won Sand	1.63	6.4	1.58	103
198C*	Site-won Sand	1.56	5.0	1.58	99
200C*	Site-won Sand	1.57	5.2	1.58	99
133*	Pumice Sand	1.27	19.8	1.26	101
134*	Pumice Sand	1.38	5.8	1.26	109
135*	Pumice Sand	1.32	15.5	1.26	105
136*	Pumice Sand	1.29	17.3	1.26	103
137*	Pumice Sand	1.26	16.0	1.26	100
138*	Pumice Sand	1.27	22.5	1.26	101
141*	Pumice Sand	1.23	19.1	1.26	97
142*	Pumice Sand	1.28	20.3	1.26	102
143*	Pumice Sand	1.35	16.4	1.26	107

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
144*	Pumice Sand	1.34	17.2	1.26	107
145*	Pumice Sand	1.32	16.1	1.26	105
146*	Pumice Sand	1.31	17.6	1.26	104
147*	Pumice Sand	1.33	11.9	1.26	106
148*	Pumice Sand	1.20	21.5	1.26	96
187*	Pumice Sand	1.34	12.8	1.26	107
188*	Pumice Sand	1.28	13.0	1.26	102
189*	Pumice Sand	1.30	16.7	1.26	103
190*	Pumice Sand	1.24	17.4	1.26	99
191*	Pumice Sand	1.29	17.8	1.26	102
192*	Pumice Sand	1.32	14.1	1.26	105
193*	Pumice Sand	1.33	12.9	1.26	106
194*	Pumice Sand	1.23	16.1	1.26	98
195*	Pumice Sand	1.28	16.9	1.26	102
196*	Pumice Sand	1.34	14.3	1.26	106
197*	Pumice Sand	1.36	12.9	1.26	108
198*	Pumice Sand	1.25	21.4	1.26	99
199*	Pumice Sand	1.25	18.0	1.26	99
200*	Pumice Sand	1.21	16.6	1.26	96
134*	Pumice Sand	1.34	11.5	1.26	106
136	Pumice Sand	1.57	9.4	1.26	124
138*	Pumice Sand	1.29	9.8	1.26	103
140*	Pumice Sand	1.30	12.3	1.26	104
142*	Pumice Sand	1.34	11.6	1.26	106
144*	Pumice Sand	1.39	9.3	1.26	111
146*	Pumice Sand	1.28	15.4	1.26	102
148*	Pumice Sand	1.26	12.9	1.26	100

1) Dry density measured in the field by Nuclear Density Meter (NDM) and adjusted following laboratory measurement of water content.

2) Ratio of oven adjusted dry density to maximum dry density expressed as a percentage.

Table 3: Summary of nuclear densometer testing for Stage 2B (conducted by Higgins)

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
H1	Site-won Sand	1.588	15.9	1.58	100.5
H2	Site-won Sand	1.555	20.8	1.58	98.4

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
I1	Site-won Sand	1.657	16.1	1.58	104.9
I2	Site-won Sand	1.548	21.2	1.58	98.0
J1	Site-won Sand	1.618	13.5	1.58	102.4
J2	Site-won Sand	1.595	14.2	1.58	100.9
K1	Site-won Sand	1.565	14.6	1.58	99.1
K2	Site-won Sand	1.584	14.1	1.58	100.2
N1	Site-won Sand	1.627	13.6	1.58	103.0
N2	Site-won Sand	1.575	15.1	1.58	99.7
A1	Pumice sand	1.435	12.1	1.26	113.9
B1	Pumice sand	1.392	14.0	1.26	110.5
B2	Pumice sand	1.423	13.7	1.26	112.9
C1	Pumice sand	1.468	11.7	1.26	116.5
C2	Pumice sand	1.456	11.8	1.26	115.6
D1	Pumice sand	1.450	13.3	1.26	115.1
D2	Pumice sand	1.461	12.1	1.26	116.0
E1	Pumice sand	1.438	12.3	1.26	114.1
E2	Pumice sand	1.541	12.0	1.26	122.3
M1 (top of fill)	Pumice sand	1.359	17.6	1.26	107.8
M2 (top of fill)	Pumice sand	1.382	18.0	1.26	109.7
L1 (top of fill)	Pumice sand	1.649	17.2	1.26	130.9
L2 (top of fill)	Pumice sand	1.649	15.4	1.26	130.9
K1 (top of fill)	Pumice sand	1.392	15.6	1.26	110.5
K2 (top of fill)	Pumice sand	1.402	19.6	1.26	111.3
J1 (top of fill)	Pumice sand	1.437	16.2	1.26	114.1
J2 (top of fill)	Pumice sand	1.357	20.6	1.26	107.7
I1 (top of fill)	Pumice sand	1.416	16.9	1.26	112.4
I2 (top of fill)	Pumice sand	1.349	17.2	1.26	107.1
H1 (top of fill)	Pumice sand	1.399	15.4	1.26	111.1
H2 (top of fill)	Pumice sand	1.416	18.5	1.26	112.4
G1 (top of fill)	Pumice sand	1.508	12.2	1.26	119.7
G2 (top of fill)	Pumice sand	1.450	15.9	1.26	115.0
F1 (top of fill)	Pumice sand	1.459	12.1	1.26	115.8
F2 (top of fill)	Pumice sand	1.527	14.2	1.26	121.2
Lot504	Pumice sand	1.276	25.9	1.26	101.2
Lot503	Pumice sand	1.578	15.0	1.26	125.3
Lot296	Pumice sand	1.399	18.4	1.26	111.0

Test Number	Material	Oven adjusted dry density[1] (t/m^3)	Oven corrected moisture content (%)	Target Maximum dry density[2] (t/m^3)	Compaction[2] (%)
Lot295	Pumice sand	1.301	21.1	1.26	103.3
M1 (750mm lift)	Pumice sand	1.336	20.9	1.26	106.0
L1 (750mm lift)	Pumice sand	1.344	18.0	1.26	106.7
K1 (750mm lift)	Pumice sand	1.354	18.8	1.26	107.5
K2 (750mm lift)	Pumice sand	1.245	17.3	1.26	98.8
J1 (750mm lift)	Pumice sand	1.379	16.3	1.26	109.5
J2 (750mm lift)	Pumice sand	1.318	17.4	1.26	104.6
I1 (750mm lift)	Pumice sand	1.324	19.0	1.26	105.0
I2 (750mm lift)	Pumice sand	1.519	12.9	1.26	120.6
H1 (750mm lift)	Pumice sand	1.408	16.8	1.26	111.8
H2 (750mm lift)	Pumice sand	1.312	16.9	1.26	104.1

1) Dry density measured in the field by Nuclear Density Meter (NDM) and adjusted following laboratory measurement of water content.

2) Ratio of oven adjusted dry density to maximum dry density expressed as a percentage.

Based on the reported results we confirm that all of the compliance testing (NDM and DCP) met or exceeded the minimum acceptance criteria for the fill compaction. The density of testing also exceeded the earthworks specification requirements.

4.4 Post fill settlement monitoring

The settlements due to fill placement have been monitored through the filling and after the completion of fill earthworks. Aurecon have reviewed monitored data and we confirm the filled ground is suitable for building development.

4.5 Ground conditions

The geological model for the site was developed from cone penetration tests (CPT) and test pitting carried out during the investigations for the Suitability for Subdivision reports dated 29 January 2016.

The majority of Stage 2A and the southern boundary of Stage 2B was located within low-lying ground (below+4.0mRL) underlain by a variable thickness of surface peat. Within the area of Stage 2A, the peat ranged between 1.2m to 2.0m thick and it tended to be thicker towards the south with the maximum thickness of 2.0m near the southern boundary. Along the southern boundary of Stage 2B adjacent to NZTA property, the peat was of more uniform thickness, ranging between 1.7m to 2.0m.

The predevelopment CPT results indicated the surface peat is underlain by sand deposits which are typically 13-15m thick but locally up to 19m thick in the elevated dune areas. The elevated dune sands can be broadly separated into an upper 4-5m thick layer of loose to medium dense sand, underlain by medium dense to dense sands. The dune sands are underlain by a variable sequence of alluvial deposits comprising interbedded firm to stiff sandy silts and loose to medium dense sands, and dense sands down to the maximum investigation depth (20m below the ground surface). The groundwater was measured to be approximately +2.8mRL. Finished platform ground levels for the subject lots range between +4.9mRL to +5.5mRL, inferring a groundwater level of around 2.1 to 2.7m below ground level across Stage 2.

Bulk earthworks and movement of the motor scrapers across all areas of the Site are expected to have resulted in the densification of the upper 2 to 3m of the site surface, as evidenced by the subsequent lot by lot verification testing.

4.6 Liquefaction

A liquefaction assessment using parameters derived from NZS1170.5 was carried out based on the method of Tokimatsu and Seed was included in the Suitability for Subdivision report dated 29 August 2011. The analysis indicates that during a ULS earthquake event, up to 200mm of settlement was predicted. Updated liquefaction assessment guidelines are now available using the methods outlined in MBIE's Earthquake geotechnical engineering practice Module 3 guidelines: Identification, assessment and mitigation of liquefaction hazards[1]. Given the protracted date since the initial liquefaction assessment was carried out, we have re-evaluated the liquefaction potential of the site using the original CPT data and the Module 3 guidelines. The method of Boulanger and Idriss (2014) was used in our re-analysis of the Site's liquefaction potential.

The results of this additional analysis generally agree with the earlier liquefaction analysis findings, with minor (<10mm) to no settlement predicted in a SLS design event, moderate (50mm to 120mm) liquefaction induced settlement was predicted to occur following an intermediate level 1/150 year earthquake event, and more significant settlement in a ULS design event (up to 225mm). In accordance with Table 5.1 of the MBIE Module 3 guideline, the site effects from excess pore water pressure and liquefaction under intermediate case is assessed to be L1 to L2 (Mild to Moderate), and under ULS to be L3 (High).

Foundation recommendations with regards to liquefaction mitigation are discussed in Section 5.4.1.

5 Requirements for building development

5.1 General

109 residential lots have been considered within Stage 2, which comprise Lots 200 to 251 (inclusive), Lots 253 to 299 and Lots 500 to 509 (inclusive).

This section of the report deals with:

a) The suitability of the created residential lots for building complying with the characteristics of NZS 3604:2011: Timber Framed Buildings

b) Specific requirements for residential construction on the lots

c) General recommendations for the building development on the lots

d) Advisory notes to owners and lot developers

The specific requirements should be read in conjunction with the general recommendations for building and the advisory notes contained in this section of the report.

[1] New Zealand Geotechnical Society (NZGS) and Ministry of Business Innovation & Employment (MBIE) guidelines for Earthquake Geotechnical Practice in New Zealand; Module 3: Identification, assessment and mitigation of liquefaction hazards, Revision 0, May 2016.

5.2 Lot by lot investigations

5.2.1 Testing

Each residential lot has been individually investigated by one hand auger borehole that extended to 2.0m below the finished ground surface. In addition, two dynamic cone penetrometer (DCP) tests were conducted within each lot to a maximum depth of 1.9m or prior refusal (>20 blows per 50mm) for the purpose of verifying compaction compliance and foundation requirements. The locations of the hand auger/DCP tests are shown on Drawing 247593-0210-DRG-G-0114 and Drawing 247593-0210-DRG-G-0115, Appendix B. Descriptive logs of the hand auger boreholes and DCP tests are included in Appendix D.

5.2.2 Topsoil depth

Hand auger testing indicates that the depth of topsoil generally ranges from 0mm to 400mm below ground level in the specific locations investigated. Please note that the topsoil placement was not wholly completed at the time of undertaking our investigations and therefore topsoil depth may vary from that identified in hand auger testing. It is therefore advisable for future lot owners/builders to undertake their own investigations of topsoil thickness prior to planning and design for future house construction.

Refer to Section 5.6.1 for further recommendations regarding topsoil thickness. Compacted sand fill, and natural dune sands were encountered below the topsoil in all locations investigated.

5.2.3 Test results

The DCP test results indicated considerable variability in the density of the sands with values of between 3 and 30 blows per 100mm over the areas and depths investigated. DCP test results indicated generally dense sands in the upper 2m, with between 5-12 blows per 100mm typically recorded in cut down natural ground areas and greater than 10 blows per 100mm in engineered fill areas.

5.3 Suitability of lots for building

Based on the post earthworks verification testing, all of the subject lots within Stage 2 are considered suitable on which to construct residential dwellings that comply with the characteristics defined by NZS3604:2011: Timber framed buildings. There are specific requirements that relate to the lots as given in Section 5.4, and summarised in the lot summary sheets included in Appendix A. The suitability of lots for building is contingent on the specific requirements being included in the planning, design and construction of dwellings and any other structure requiring a building consent under the Building Act 2004.

5.4 Specific requirements for building

The following paragraphs outline the specific requirements for building on the subject lots within Stage 2 of the subdivision. The reader is also referred to the General Recommendations (Section 5.5) and the Advisory Notes (Section 5.6) when assessing the implications of these requirements.

5.4.1 Building foundations - Lots 200 to 251 (inclusive), Lots 253 to 299 (inclusive) and Lots 500 to 509 (inclusive)

MBIE Guidelines 'TC2' building foundations

The subject lots are founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction induced settlements predicted to occur within these lots, it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011.

In accordance with Table 5.1 within Module 3 of the MBIE guidelines the site effects from excess pore water pressure and liquefaction is assessed to be 'L3 - High' under ULS conditions. The ULS liquefaction induced settlements are predicted to range up to 225mm.

In accordance with Module 4 of the MBIE guidelines[2], for cases where the predicted effects are deemed to be intolerable (L3 or higher), it is considered necessary to consider options for either ground improvement or the use of robust raft foundations, or deep foundations. We consider that the most practicable solution for this site is to specify robust raft foundations.

We have assessed the type of raft foundation system using the general guidance provided in the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes[3]. In consideration of the predicted liquefaction settlement and thickness of the non-liquefiable crust, we classify the site as Technical Category 2 (TC2) in accordance with this guideline.

Specific engineered design of a MBIE 'TC2' foundation is required for all residential buildings constructed on the subject lots with Stage 2. Section 5.5.1 provides further discussions of TC2 foundation options/types.

Foundation bearing capacity

An ultimate rupture bearing capacity of 300kPa may be used for the design of foundations for all lots within Stage 2 with the exception of Lots 222, 282, 295, 296, 503 and 509 for which we recommend an ultimate bearing capacity of 200kPa. The above ultimate bearing capacities should be used in conjunction with the following reduction factors:

- SLS loading: 0.33
- ULS loading: 0.5
- Earthquake Loading: 0.7

Foundation requirements and inspections

Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents.

The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building.

5.4.2 Minimum building platform and finished floor levels (all lots)

The minimum building platform level for any structure requiring a building consent in accordance with the requirements of the Building Act 2004 for the subject lots is currently set at +4.8mRL (Moturiki Datum) although this level may be changed from time to time at the discretion of the Tauranga City Council. The building area on the subject lots varies between +4.9mRL and +5.5mRL based on the as-built final landform plans. Where an excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level.

Retaining walls - Lots 216 to 218, 291 to 293, 219, and 221 to 2221.0m high timber pole retaining walls are located along the northern boundary of Lots 216 to 218, 291 to 293 and southern boundary of Lots 219 and 221 to 222. These walls support the aforementioned Stage 2 residential platforms above the

[2] New Zealand Geotechnical Society (NZGS) and Ministry of Business Innovation & Employment (MBIE), Earthquake geotechnical engineering practice; Module 4; Earthquake resistant foundation design; Revision 0 November 2016

[3] MBIE, Repairing and rebuilding houses affected by the Canterbury earthquakes; Version 3, December 2012

storm water swale. Although not requiring building consent, all of the above-mentioned walls have been designed by Aurecon to comply with the NZ Building Code. Construction observations and certification of the walls has been conducted by Aurecon.

The standard yard setback distances of 1.5m as considered sufficient to mitigate building surcharge to these walls and as such, no building restriction line has been specifically designated for these walls. Notwithstanding this, no structure requiring a building consent, and no surcharge loads including driveways and landscape fills shall be placed within a horizontal distance of 1.5x the height of these walls.

5.4.3 Retaining walls - Lots 293, 294, 297, 298, 501, 502, 505, 506 and 509

A 2.0m high timber pole retaining wall is located on the southern boundary of these lots adjacent to NZTA land. Aurecon were engaged to prepare a detailed design for this wall and provided PS1 package which was submitted for building consent. A building consent for this wall was granted by Tauranga City Council. Aurecon carried out construction observations and certification on the wall and have prepared a PS4 which has been submitted to Tauranga City Council as part of the Code Compliance Certificate application. At the time of this report the application for Code Compliance Certification has been lodged with Tauranga City Council.

To mitigate the risk of building surcharge loading these walls, Aurecon recommend a Building Restriction Line (BRL) to be located 2.0m back from the as-built position of rear laggings of the wall. The position of this BRL is shown on Drawing 247593-0210-DRG-G-0115 and also include on the Title Drawings for Stage 2.

No structure requiring a building consent, and no surcharge loads including driveways and landscape fills shall be placed between the lot boundary and the BRL.

5.4.4 On-site disposal of stormwater

The stormwater collected on all lots is to be disposed of via in-ground soakage. The ground comprises predominantly pumice sand, fine to medium grained dune sand and site-won sand fill and natural cut sands. Soakage testing was carried out by Aurecon for Stage 2A and 2B respectively, to determine the permeability of the ground in order to derive recommended design soakage rates. The locations of the soakage tests are provided on the cut fill drawings included in Appendix B. The soakage test reports prepared by Aurecon are included with the Civil Asset Completion Report prepared by Lysaghts. Specific requirements for the design and construction of the soakage system are provided by Lysaght in the Terrace Views Subdivision Stage 2 Civil Asset Completion Report.

The distance of foundation construction to the soak hole rings is dependent on the depth of the soak holes. The following formula should be used to determine the building foundation offset distance:

Offset distance = $\mathrm{D} \div \sqrt{3}$, where D is the depth to base of the soakage measured from ground level.

5.4.5 Effluent disposal

Effluent disposal from all lots is to be piped via the established reticulation system provided at the boundary of each lot. On-site disposal of effluent is not permitted.

5.5 General recommendations for building

These recommendations are given so that owners and lot developers apply good construction practice to lot development to avoid costly and time consuming delays. There may be other practices that equally achieve good outcomes and therefore these recommendations are not conditions placed on lots but are given as general advice.

5.5.1 TC2 foundation types

Foundation systems compliant with the TC2 Category of the MBIE guidelines are available in several types and options. Types include shallow pile and piles with perimeter footings (Types A and B) and concrete slab on grade (Type C). Based on current construction practice in the Papamoa area, Type C foundations are considered likely to be used in new residential construction. A Type C, Option 4 design (Waffle slab over existing soil, Section 5.3.1 of the MBIE guidelines) is a commonly adopted TC2 solution for foundation design in Papamoa and is considered to be an appropriate option for the Site.

5.5.2 Placement of fill inside perimeter foundations

Where fill is placed inside the perimeter foundation walls to support a ground-bearing slab, it should be limited to 1.2m deep including the slab thickness and be made of imported granular fill. Where infill beneath building foundations is greater than 0.6m deep it is recommended that a TCC Category 2 Geo-Professional be engaged by the lot developer to oversee and certify the earthworks. It is recommended that fill be placed to achieve DCP test results of at least 5 blows per 100mm.

5.6 Advisory notes

5.6.1 Topsoil thickness

The thickness of topsoil has been determined at the points of subsurface investigation. The placement of topsoil by motor scraper does result in varying thicknesses across the subdivision. Generally, the thickness of topsoil is 0.3m or less however greater thicknesses of topsoil were identified in some hand augers and may be present across the lots. Results of the lot by lot testing are found in the hand auger borehole logs included in Appendix D.

Each lot number is notated on the bore log. Problems may arise when foundations are excavated to find that they need to be deepened because the thickness of topsoil is greater than 0.3m. This can be largely overcome at the time of planning the building development when some local spade excavations on the lines of the foundations will determine the depth of topsoil, the amount of under slab fill to make up for topsoil removal and any requirement to deepen foundations. No guarantee is given or implied that the topsoil depth on any lot created by this subdivision is 0.3m or less.

5.6.2 Natural soil layering

Excavations for building platforms and/or foundations may intersect soil layers of loose sands with greater compressibility. The quality, strength and density of naturally occurring sands varies across the Site and where loose sand is encountered in excavations then foundation deepening, broadening or both may be necessary.

6 Natural hazard completion report

Table 4: Natural hazards

Natural hazard	Applicable to Site?	Mitigation (if required)
Land below Tauranga City Council's minimum building platform level	N	Final landform of subject lots is between +4.9mRL and +5.5mRL. The minimum building platform level set by Tauranga City Council for the subject lots is +4.8mRL (Moturiki Datum)
Specific design for stormwater disposal	Y	Stormwater is disposed of via on-site soakage pits or other approved options. Soakage disposal shall be in accordance with the recommendations of the Civil Asset Completion Report.
Coastal flooding	N	–
Coastal erosion	N	–
Harbour inundation	N	–
Flood prone land	N	The subdivision is not located in an area considered to be of flood risk according to the Tauranga City Council online flood maps (accessed 27/09/2016)
Stormwater sensitive	N	–
Overland flows	N	–
Slope instability	N	–
Differential Settlement	N	Non-liquefaction related differential settlement is not predicted to occur within the subdivision.
Liquefaction of submerged sand layer	Y	The probability of damage to residential NZS3604 type buildings is considered to be low during Serviceability Limit State conditions. There is a risk of liquefaction induced ground damage as a result of an Ultimate Limit State event with up to approximately 225mm of settlement predicted to occur. Lateral spread is considered to be unlikely. The effects of liquefaction are expected to be mitigated by construction of a TC2 foundation system as described in Section 5.4.
Seismic shaking	Y	The effect to residential NZS3604 type buildings from seismic shaking can be influenced by sound construction methods and materials composition (lightweight and ductile roofing and cladding). Shaking hazards are enhanced by the use of construction products such as masonry cladding and concrete/tile roofing.

Based on the above, we consider that all of the subject units are suitable for building development with respect to natural hazards without the need to issue building consents pursuant to s72 of the Building Act.

7 Limitations

All assessments made in this report are based on the ground conditions indicated from published sources, site inspection and hand auger boreholes. Variations in ground conditions may occur between the investigation locations. In addition, there may be special conditions pertaining to the Site which have not been revealed by the investigation and which have not therefore been taken into account in the report. No warranty (either expressed or implied) that the actual conditions will conform exactly to the assessments contained in this report, is included.

This report does not remove the responsibility of the Owner / Builder / Building Certifier to satisfy themselves of foundation depth and suitability at the finally selected house location and to ensure foundation conditions are not allowed to deteriorate due to saturation or other causes.

Where data supplied by the developer or other external sources, including previous site inspection data, has been used, it has been assumed that the information is correct unless otherwise stated. No responsibility can be accepted by Aurecon Ltd for inaccuracies within the data supplied by others.

Any comments on groundwater conditions are based on observations made at the time of investigation unless otherwise stated. It should be noted that groundwater levels vary as a result of seasonal or other effects.

This report has been prepared to be read in full, including all appendices. No responsibility can be accepted by Aurecon Ltd for parties' relying on partial information from an incomplete report

This report is provided for sole use by the client and subsequent lot owners. It shall not be used, reproduced or interpreted for any purpose other than is specifically set out in the text of this report.

8 References

220166 – Geotechnical Suitability Report, Papamoa East Block, Revision 0 dated 29 August 2011, Aurecon.

247593 - Geotechnical Review, Parton Road Subdivision, Revision 1 dated 29 January 2016, Aurecon.

MBIE, Repairing and rebuilding houses affected by the Canterbury earthquakes; Version 3, December 2012

NZGS, 2005. Guidelines for the Classification and Field Description of Soils and Rocks in Engineering. NZ Geotechnical Society Inc., Wellington, New Zealand

Department of Building and Housing, 2011.Compliance Document for New Zealand Building Code, Clause B1, Structures.

NZS3604:2011. *New Zealand Standard, Timber framed buildings.* Standards New Zealand, Wellington, New Zealand

Tauranga City Council 2014 Infrastructure Development Code, *Design Standard DS-10 Natural Hazards and Earthworks*

Appendices



Appendix A
Statement of professional opinion and lot summary sheets



Appendix A
Statement of professional opinion and lot summary sheets

Aurecon New Zealand Limited
Ground Level 247 Cameron Road
Tauranga 3110

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Tauranga 3140
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W aurecongroup.com

Statement of professional opinion as to the geotechnical suitability of the land for building

Development:	Terrace Views Subdivision, Parton Road, Papamoa
Engineer Responsible for investigation:	Benjamin O'Loughlin
Qualifications:	BSc(Hons); CGeol; TCC Category 1 Geo-Professional

I, *Benjamin O'Loughlin,* an employee of Aurecon NZ Limited

Hereby confirm that I am an accredited Category 1 Engineering Geologist appropriately qualified with experience in geotechnical engineering to ascertain the suitability of the land for building development and was retained as the soils engineer to the above development.

1) An appropriate level of site investigation and construction supervision has been carried out under my direction and as described in our Geotechnical Completion Report reference 247593-Stage 2-GCR Rev 2 dated 12 July 2017.

2) In my professional opinion, not to be construed as a guarantee of certainty or completeness, I consider that;

   i. All residential subject lots within Stage 2 of the development (Lots 200 to 251(inclusive), Lot 253 to 299 (inclusive) and Lots 500 to 599 (inclusive)) are suitable on which to erect dwellings that comply with NZS 3604:2011 Timber Framed Buildings subject to the specific requirements of the Geotechnical Completion Report reference 247593-Stage 2-GCR Rev 2 dated 12 July 2017 being met.
   ii. Each lot is suitable for building development without the need to issue a building consent pursuant to s72 of the Building Act.

This opinion is given on the condition that:

   iii. The content of the Geotechnical Completion Report reference 247593-Stage 2-GCR Rev 2 dated 12 July 2017 is made available to each lot owner and that the specific requirements for building development set out in Section 5.4 of this report as they apply to each lot are followed.
   iv. The general recommendations and advisory notes (Sections 5.5 and 5.6) should be read and understood by lot owners and builders prior to building development.

3) This professional opinion is furnished to Tauranga City Council and Zariba Properties Limited, the developer, for their purpose alone, on the express condition that it will not be relied upon by any other person and does not relieve lot owners, their advisers, or the Territorial Authority from their respective responsibilities and does not remove the necessity for normal inspection of foundation conditions at the time of erection for any dwelling.

Signed: for and on behalf of Aurecon NZ Limited



Benjamin O'Loughlin
Tauranga City Council Category 1 Geo-Professional

Date
12/07//17

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
200	20 (0.3m)	N	N/A	N	Y	1.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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201	6 (0.3m)	N	N/A	N	Y	1.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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202	12 (0.3m)	N	N/A	N	Y	1.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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203	6 (0.3m)	N	N/A	N	Y	2.0	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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204	10 (0.3m)	N	N/A	N	Y	1.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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205	11 (0.3m)	N	N/A	N	Y	2.0	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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206	12 (0.3m)	N	N/A	N	Y	1.0	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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207	8 (0.3m)	N	N/A	N	Y	1.0	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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208	9 (0.3m)	N	N/A	N	Y	2.0	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
209	9 (0.3m)	N	N/A	N	Y	2.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
210	3 (0.3m)	N	N/A	N	Y	2.0	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
211	7 (1.0m)	N	N/A	N	Y	1.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
212	8 (0.8m)	N	N/A	N	Y	0.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
213	13 (0.3m)	N	N/A	N	Y	2.0	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
214	10 (0.3m)	N	N/A	N	Y	3.0	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
215	7(1.0m)	N	N/A	N	Y	0.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
216	5 (0.3m)	Y	0.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Retaining wall** A 1.0m high timber pole retaining wall is located on the southern boundary of the lot. No structure requiring a building consent, and no surcharge loads (including driveways and landscape fills) shall be placed within a horizontal distance of 1.5 x the height of this wall. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
217	5 (0.3m)	N	N/A	N	Y	1.0	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Retaining wall** A 1.0m high timber pole retaining wall is located on the southern boundary of the lot. No structure requiring a building consent, and no surcharge loads (including driveways and landscape fills) shall be placed within a horizontal distance of 1.5 x the height of this wall. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
218	4 (0.3m)	N	N/A	N	Y	1.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Retaining wall** A 1.0m high timber pole retaining wall is located on the southern boundary of the lot. No structure requiring a building consent, and no surcharge loads (including driveways and landscape fills) shall be placed within a horizontal distance of 1.5 x the height of this wall. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
291	4 (0.3m)	Y	0.5	N	Y	0.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Retaining wall** A 1.0m high timber pole retaining wall is located on the southern boundary of the lot. No structure requiring a building consent, and no surcharge loads (including driveways and landscape fills) shall be placed within a horizontal distance of 1.5 x the height of this wall. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
292	6 (0.3m)	Y	1.5	N	Y	0.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Retaining wall** A 1.0m high timber pole retaining wall is located on the southern boundary of the lot. No structure requiring a building consent, and no surcharge loads (including driveways and landscape fills) shall be placed within a horizontal distance of 1.5 x the height of this wall. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
293	4 (0.8m)	Y	1.5	N	Y	0.25	Y	Y	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Building Restriction Line (BRL)** A Building Restriction is defined to prevent undermining of the retaining wall present on the southern boundary of the lot. No building foundation or permanent structure requiring building consent shall be erected, no earthworks filling shall be constructed within the building exclusion zone as defined by the BRL. Any proposal to cross the BRL shall be specifically assessed by a TCC Category 1 soils engineer. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
294	4 (0.7m)	Y	3.5	N	N	N/A	Y	Y	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Building Restriction Line (BRL)** A Building Restriction is defined to prevent undermining of the retaining wall present on the southern boundary of the lot. No building foundation or permanent structure requiring building consent shall be erected, no earthworks filling shall be constructed within the building exclusion zone as defined by the BRL. Any proposal to cross the BRL shall be specifically assessed by a TCC Category 1 soils engineer. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
295	4 (0.8)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 200 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
296	3 (0.3m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 200 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
297	7 (0.7m)	Y	3.5	N	N	N/A	Y	Y	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Building Restriction Line (BRL)** A Building Restriction is defined to prevent undermining of the retaining wall present on the southern boundary of the lot. No building foundation or permanent structure requiring building consent shall be erected, no earthworks filling shall be constructed within the building exclusion zone as defined by the BRL. Any proposal to cross the BRL shall be specifically assessed by a TCC Category 1 soils engineer. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
298	8 (0.7m)	Y	3.5	N	N	N/A	Y	Y	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Building Restriction Line (BRL)** A Building Restriction is defined to prevent undermining of the retaining wall present on the southern boundary of the lot. No building foundation or permanent structure requiring building consent shall be erected, no earthworks filling shall be constructed within the building exclusion zone as defined by the BRL. Any proposal to cross the BRL shall be specifically assessed by a TCC Category 1 soils engineer. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
299	6 (0.3m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
500	4 (0.3m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
501	6 (1.0m)	Y	3.5	N	N	N/A	Y	Y	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Building Restriction Line (BRL)** A Building Restriction is defined to prevent undermining of the retaining wall present on the southern boundary of the lot. No building foundation or permanent structure requiring building consent shall be erected, no earthworks filling shall be constructed within the building exclusion zone as defined by the BRL. Any proposal to cross the BRL shall be specifically assessed by a TCC Category 1 soils engineer. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
502	6 (0.8m)	Y	3.5	N	N	N/A	Y	Y	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Building Restriction Line (BRL)** A Building Restriction is defined to prevent undermining of the retaining wall present on the southern boundary of the lot. No building foundation or permanent structure requiring building consent shall be erected, no earthworks filling shall be constructed within the building exclusion zone as defined by the BRL. Any proposal to cross the BRL shall be specifically assessed by a TCC Category 1 soils engineer. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
503	4 (0.3m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 200 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
504	6 (0.4m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
505	5 (1.3m)	Y	3.0	N	N	N/A	Y	Y	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Building Restriction Line (BRL)** A Building Restriction is defined to prevent undermining of the retaining wall present on the southern boundary of the lot. No building foundation or permanent structure requiring building consent shall be erected, no earthworks filling shall be constructed within the building exclusion zone as defined by the BRL. Any proposal to cross the BRL shall be specifically assessed by a TCC Category 1 soils engineer. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
506	3 (0.3m)	Y	3.5	N	N	N/A	Y	Y	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Building Restriction Line (BRL)** A Building Restriction is defined to prevent undermining of the retaining wall present on the southern boundary of the lot. No building foundation or permanent structure requiring building consent shall be erected, no earthworks filling shall be constructed within the building exclusion zone as defined by the BRL. Any proposal to cross the BRL shall be specifically assessed by a TCC Category 1 soils engineer. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
507	4 (1.0m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
508	6 (0.8m)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
509	2 (0.3m)	Y	3.5	N	N/A	0.5	Y	Y	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 200 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Building Restriction Line (BRL)** A Building Restriction is defined to prevent undermining of the retaining wall present on the southern boundary of the lot. No building foundation or permanent structure requiring building consent shall be erected, no earthworks filling shall be constructed within the building exclusion zone as defined by the BRL. Any proposal to cross the BRL shall be specifically assessed by a TCC Category 1 soils engineer. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
219	4 (0.3m)	Y	0.5	N	Y	0.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Retaining wall** A 1.0m high timber pole retaining wall is located on the southern boundary of the lot. No structure requiring a building consent, and no surcharge loads (including driveways and landscape fills) shall be placed within a horizontal distance of 1.5 x the height of this wall. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
220	3 (0.5m)	Y	0.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
221	5 (0.3m)	Y	0.5	N	Y	0.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Retaining wall** A 1.0m high timber pole retaining wall is located on the southern boundary of the lot. No structure requiring a building consent, and no surcharge loads (including driveways and landscape fills) shall be placed within a horizontal distance of 1.5 x the height of this wall. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
222	3 (1.0m)	Y	0.5	N	Y	0.25	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 200 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Retaining wall** A 1.0m high timber pole retaining wall is located on the southern boundary of the lot. No structure requiring a building consent, and no surcharge loads (including driveways and landscape fills) shall be placed within a horizontal distance of 1.5 x the height of this wall. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
223	3 (0.4m)	Y	0.25	N	Y	0.5	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
224	3 (0.3m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
225	5 (0.3m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
226	7 (0.3m)	Y	0.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
227	5 (1.6m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
228	6 (0.3m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
229	7 (0.3m)	Y	3.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
230	9 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
231	9 (0.3m)	Y	3.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
232	5 (0.3m)	Y	3.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
233	7 (0.3m)	Y	3.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
234	10 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
235	4 (0.3m)	Y	3.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
236	7 (0.3m)	Y	3.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
237	7 (0.3m)	Y	3.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
238	6 (0.5m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
239	9 (0.4m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
240	7 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
241	5 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
242	7 (0.3m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
243	8 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
244	4 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
245	5 (0.3m)	Y	3.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
246	10 (0.3m)	Y	3.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
247	7 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
248	6 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
249	5 (0.3m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
250	5 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
251	5 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
253	5 (0.5m)	Y	1.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
254	9 (0.3m)	Y	0.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
255	9 (0.3m)	Y	1.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
256	6 (0.5m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
257	8 (0.4m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
258	12 (0.3m)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
259	13 (0.3m)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
260	9 (0.3m)	Y	1.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
261	8 (0.4m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
262	9 (0.3m)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
263	6 (0.3m)	Y	0.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
264	4 (0.6m)	Y	0.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
265	6 (0.3m)	Y	0.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
266	8 (0.3m)	Y	1.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
267	7 (0.3m)	Y	1.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
268	15 (0.3m)	Y	1.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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269	8 (0.3m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
270	8 (0.3m)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
271	12 (0.3)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
272	9 (0.3m)	Y	1.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
273	11 (0.3m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
274	7 (0.3m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
275	4 (0.3m)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
276	5 (0.3m)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
277	7 (0.3m)	Y	1.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
278	8 (0.3m)	Y	1.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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279	5 (0.3m)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
280	5 (0.3m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

Summary of Geotechnical Data/Recommendations/Requirements for Individual Lots

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
281	6 (0.3m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
282	3 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 200 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
283	7 (0.3m)	Y	3.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP Blows per 100mm (min) (0.3m or below)	Subdivision Filling		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
284	4 (0.3m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
285	5 (0.3m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
286	5 (0.3m)	Y	2.0	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
287	5 (0.3m)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
288	5 (0.3m)	Y	1.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
289	4(0.3m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

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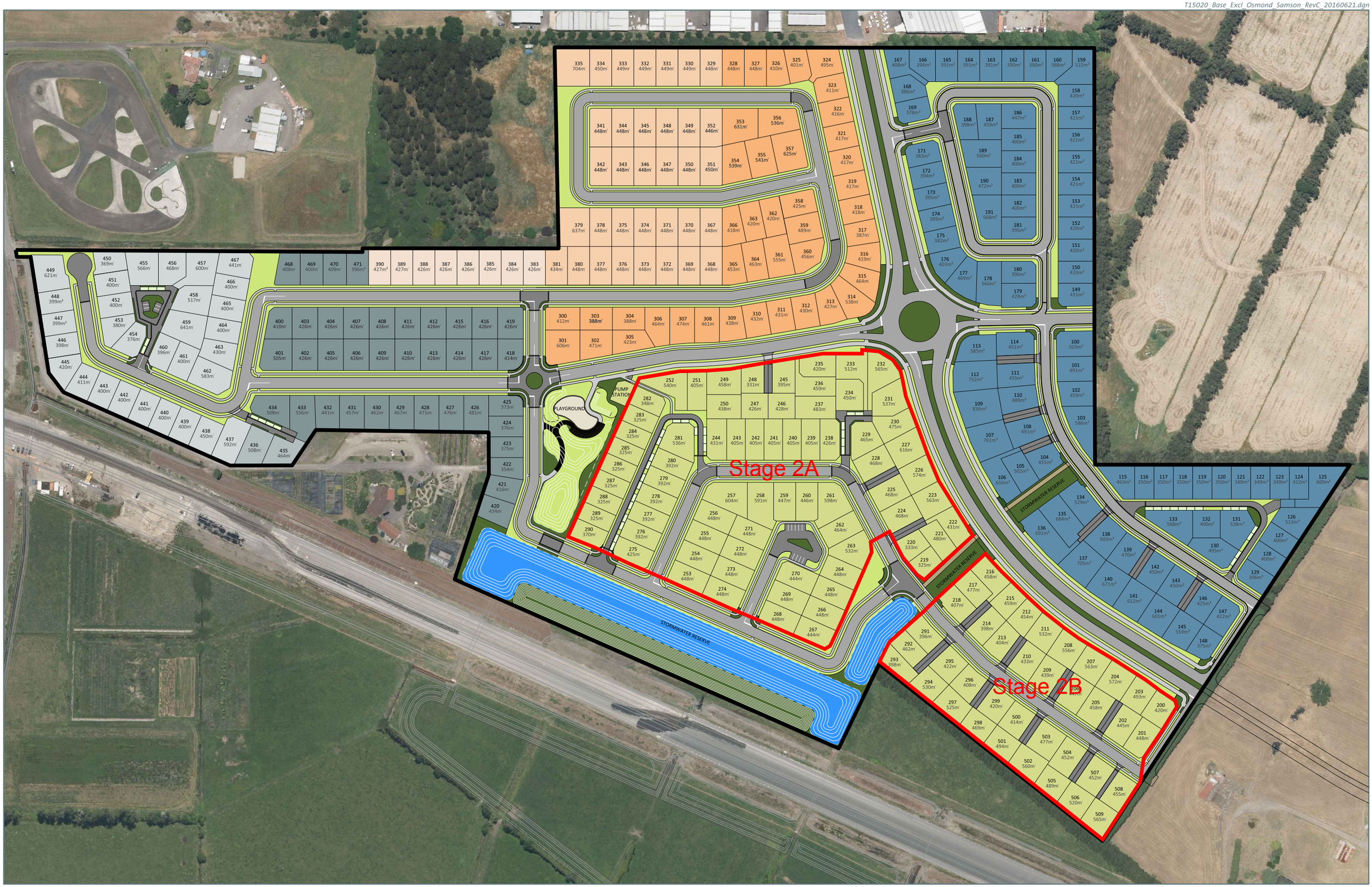
Subdivision: Terrace Views Subdivision Stage 2

Lot No.	Subsurface Data							Building Restriction Line	Recommendations and Restrictions
	DCP blows per 100mm (min) (0.3m or below)	Subdivision Filing		Natural Topography Unworked	Natural Topography Cut		Specific Design?		
		Y/N	Depth (M)	Y/N	Y/N	Depth (M)	Y/N	Y/N	
290	4 (0.3m)	Y	2.5	N	N	N/A	Y	N	**Building Foundations** The subject lot is founded on engineered fill, cut down natural ground, or a combination of both. Due to the liquefaction settlements predicted to occur within this lot it is considered that the soils do not meet the definition of 'good ground' in accordance with NZS3604:2011. Predicted liquefaction settlement and lateral spread under ULS conditions places this lot within a TC2/TC3 hybrid category within the MBIE guidelines for repairing and rebuilding houses affected by the Canterbury earthquakes. However, due to the thickness of non-liquefiable crust (at least 2.4m), it is considered that a foundation complying with the TC2 requirements of the MBIE guidelines will be sufficient to significantly improve foundation performance in ULS conditions. A MBIE 'TC2' foundation is required for this lot (refer Section 5.5.1 for further discussion of TC2 foundation options/types). An ultimate rupture bearing capacity of 300 kPa may be used for the design of foundations. This should be used in conjunction with the following reduction factors: ■ SLS loading: 0.33 ■ ULS loading: 0.5 ■ Earthquake Loading: 0.7 Buildings will need to be flexible to withstand up to 25mm of differential settlement over a 6m length, as indicated by Appendix B section B1 of the NZ Building Code Handbook and Approved Documents. The foundation formation is to be inspected by a Territorial Authority accredited building inspector prior to pouring the concrete. Foundations may need to be deepened or broadened or both should low strength soils be encountered during excavation. All topsoil shall be removed from beneath building foundations and floor slabs prior to building. Every effort has been made to limit the depth of topsoil in the lots to 0.3m or less, however final surface preparation had not been completed at the time of writing this report and topsoil thicknesses in excess of 0.3m may be present across the lots. Where topsoil is encountered during construction, foundations are to be deepened to found on engineered fill or natural ground below the topsoil layer. **Finished floor level** Finished floor levels for all buildings constructed on these lots are required to achieve the minimum level set by Tauranga City Council of +4.8mRL. Where excessive topsoil thickness is encountered during construction, undercut and replacement with engineered fill may be required to achieve the minimum finished floor level. **Stormwater and effluent disposal** Stormwater from this lot is to be disposed of via on site soakage. Specific requirements for construction of stormwater soakholes are addressed in a separate Civil Asset Completion Report. On site effluent disposal is not permitted. All effluent is to be reticulated to public services provided at lot boundaries and eventually to the stormwater pond.

Appendix B
Drawings

Appendix B
Drawings

T15020_Base_Excl_Osmond_Samson_RevC_20160621.dgn



Boffa Miskell
www.boffamiskell.co.nz

This plan has been prepared by Boffa Miskell Limited on the specific instructions of our Client. It is solely for our Client's use in accordance with the agreed scope of work. Any use or reliance by a third party is at that party's own risk. Where information has been supplied by the Client or obtained from other external sources, it has been assumed that it is accurate. No liability or responsibility is accepted by Boffa Miskell Limited for any errors or omissions to the extent that they arise from inaccurate information provided by the Client or any external source.

N

0 30m

Scale: 1:1,250 @ A1 / 1:2,500 @ A3

Data Sources: Lysaght Consultants Limited, BOPLASS Limited

Projection: NZGD2000 N.Z. Transverse Mercator

Legend

- Stage 1
- Stage 2
- Stage 3A
- Stage 3B
- Stage 3C
- Stage 4A
- Stage 4B
- Stage 4C

TERRACE VIEWS SUBDIVISION - PARTON ROAD, TAURANGA

Resource Consent June 2016

| Date: 21 June 2016 | Revision: C |

Plan prepared for Zariba Holdings Limited by Boffa Miskell Limited

Project Manager: **morne.hugo@boffamiskell.co.nz** | *Drawn:* BCL |*Checked:* MHU



aurecon
www.aurecongroup.com

CLIENT: ZARIBA PROPERTIES LIMITED

REV	DATE	REVISION DETAILS	APPROVED
A	12.06.17	FOR INFORMATION	A.Collier

SCALE	SIZE
1:500	A1

DRAWN: T.TE KANI
DESIGNED: T.TE KANI
CHECKED: B. O'LOUGHLIN

FOR INFORMATION
NOT FOR CONSTRUCTION

APPROVED
DATE 12.06.17
A. Collier
A. Collier

PROJECT: TERRACE VIEWS SUBDIVISION PAPAMOA

TITLE: STAGE 2A/2B PRE DEVELOPMENT LANDFORM PLAN

DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUMBER	REV
	247593	0210	DRG	G	0110	A

Plot Date: 12/6/2017 2:46:38 p.m. Office: NZTRG Filename: P:\PROJECTS\247593 - ZARIBA HASHA PARTON ROAD PAPAMOA\CAD\DRG\SCIV\247593-02-10-DRG-G-0110.DWG



LEGEND

STAGE BOUNDARY

5.80 CONTOUR 0.2m INTERVAL

SURVEY DATA SUPPLIED BY LYSAGHT CONSULTANTS LTD.

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CLIENT

ZARIBA PROPERTIES LIMITED

REV	DATE	REVISION DETAILS	APPROVED
A	12.06.17	FOR INFORMATION	A. Collier

SCALE	SIZE
1:500	A1

DRAWN: T.TE KANI
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FOR INFORMATION
NOT FOR CONSTRUCTION

APPROVED
DATE 12.06.17
A. Collier
A. Collier

PROJECT: TERRACE VIEWS SUBDIVISION PAPAMOA

TITLE: STAGE 2A/2B PRE DEVELOPMENT LANDFORM PLAN

DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUMBER	REV
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REV	DATE	REVISION DETAILS	APPROVED
A	12.06.17	FOR INFORMATION	A. Collier

SCALE	1:500
SIZE	A1
DRAWN	T.TE KANI
DESIGNED	T.TE KANI
CHECKED	B. O'LOUGHLIN

FOR INFORMATION
NOT FOR CONSTRUCTION

APPROVED
DATE 12.06.17
A. Collier
A. Collier

PROJECT	TERRACE VIEWS SUBDIVISION PAPAMOA
TITLE	STAGE 2A/2B CUT TO FILL EARTHWORKS & COMPLIANCE TEST LOCATION PLAN

DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUMBER	REV
	247593	0210	DRG	G	0112	A



SURVEY DATA SUPPLIED BY LYSAGHT CONSULTANTS LTD.

Plot Date: 19/6/2017 10:01:17 a.m. Office: NZTRG Filename: P:\PROJECTS\247593 - ZARIBA HASHA PAPTON ROAD PAPAMOA\CAD\DWGS\CIVIL\247593-02-10-DRG-G-0113.DWG

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REV	DATE	REVISION DETAILS	APPROVED
A	12.06.17	FOR INFORMATION	A. Collier

SCALE	1:500
SIZE	A1
DRAWN	T.TE KANI
DESIGNED	T.TE KANI
CHECKED	B. O'LOUGHLIN

FOR INFORMATION
NOT FOR CONSTRUCTION

APPROVED
DATE 12.06.17
A. Collier
A. Collier

PROJECT	TERRACE VIEWS SUBDIVISION PAPAMOA
TITLE	STAGE 2A/2B CUT TO FILL EARTHWORKS & COMPLIANCE TEST LOCATION PLAN

DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUMBER	REV
	247593	0210	DRG	G	0113	A



RevDate: 4/7/2017 4:43:12 p.m. Office: NZTRG Filename: P:\PROJECTS\247593_ZARIBA HASHA PARTON ROAD PAPAMOA\CAD\DRGS\CIVIL\247593 0210 DRG G 0114 B.DWG

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CLIENT
ZARIBA PROPERTIES LIMITED

REV	DATE	REVISION DETAILS	APPROVED
A	12.06.17	FOR INFORMATION	A. Collier
B	04.07.17	FOR INFORMATION WITH REVISIONS TO FINAL LANDFORM	A. Collier

SCALE	SIZE
1:500	A1

DRAWN: T.TE KANI
DESIGNED: T.TE KANI
CHECKED: B. O'LOUGHLIN

FOR INFORMATION
NOT FOR CONSTRUCTION

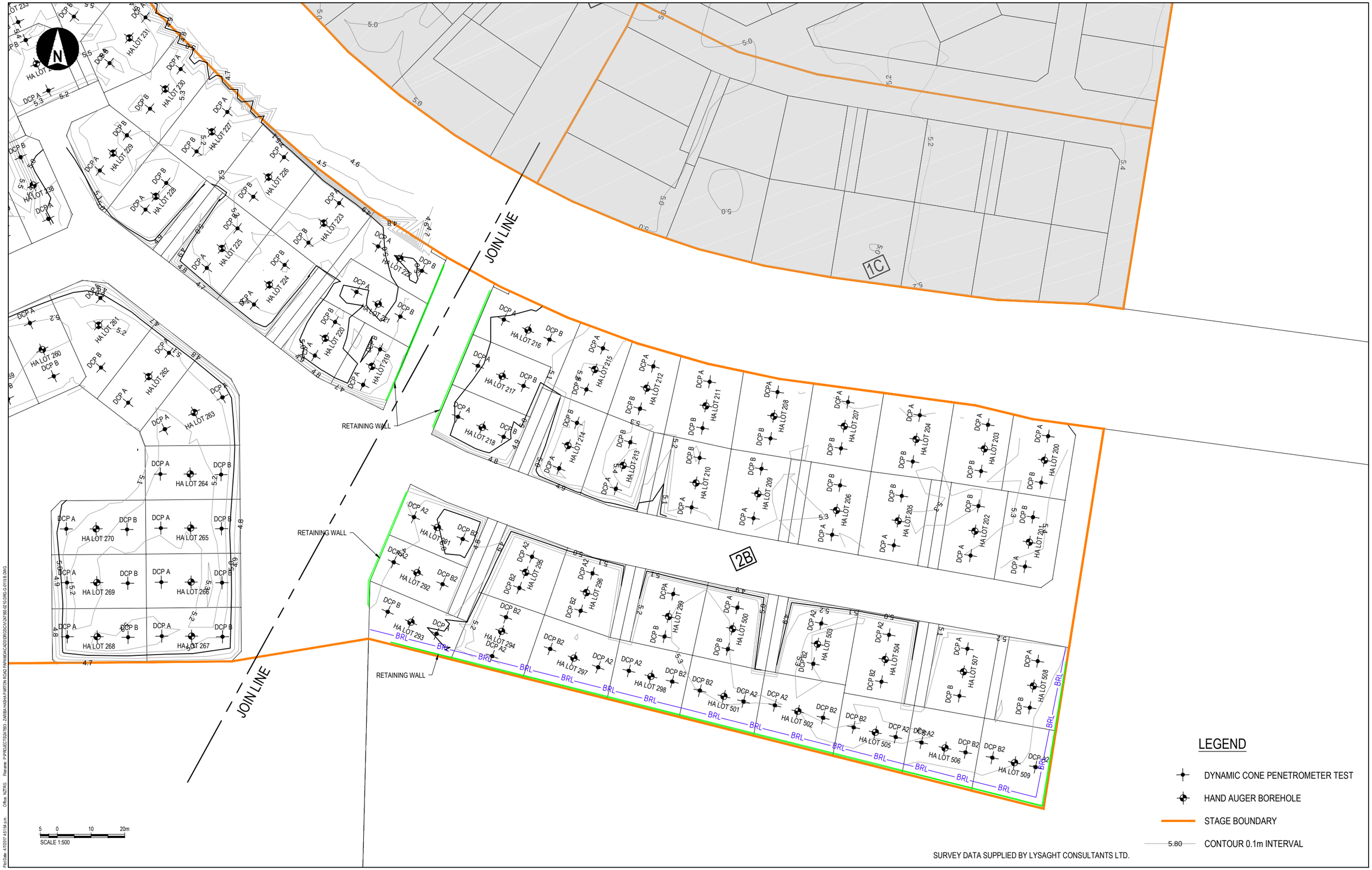
APPROVED
DATE 04.07.17
A. Collier
A. Collier

PROJECT: TERRACE VIEWS SUBDIVISION PAPAMOA

TITLE: STAGE 2A/2B FINAL AS-BUILT LANDFORM AND LOT BY LOT TEST LOCATION PLAN

DRAWING No.

PROJECT No.	WBS	TYPE	DISC	NUMBER	REV
247593	0210	DRG	G	0114	B



LEGEND

- DYNAMIC CONE PENETROMETER TEST
- HAND AUGER BOREHOLE
- STAGE BOUNDARY
- 5.80 CONTOUR 0.1m INTERVAL

SURVEY DATA SUPPLIED BY LYSAGHT CONSULTANTS LTD.

Plot Date: 4/7/2017 4:51:54 p.m. Filename: P:\PROJECTS\247593 - ZARIBA HASHA PARTON ROAD PAPAMOA\CAD\DRG\SCH\247593-0210-DRG-G-0115-B.DWG Office: NZTRG

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CLIENT: ZARIBA PROPERTIES LIMITED

REV	DATE	REVISION DETAILS	APPROVED
A	12.06.17	FOR INFORMATION	A. Collier
B	04.07.17	FOR INFORMATION WITH REVISIONS TO FINAL LANDFORM	A. Collier

SCALE	SIZE
1:500	A1

DRAWN: T.TE KANI
DESIGNED: T.TE KANI
CHECKED: B. O'LOUGHLIN

FOR INFORMATION
NOT FOR CONSTRUCTION

APPROVED
DATE 04.07.17
A. Collier
A. Collier

PROJECT: TERRACE VIEWS SUBDIVISION
PAPAMOA

TITLE: STAGE 2A/2B
FINAL AS-BUILT LANDFORM AND
LOT BY LOT TEST LOCATION PLAN

DRAWING No.: PROJECT No. 247593 – WBS 0210 – TYPE DRG – DISC G – NUMBER 0115 – REV B

Appendix C
Fill compliance testing



Appendix C
Fill compliance testing

Bay of Plenty Laboratory

Poplar Lane, Te Puke
Private Bag 12016, Tauranga 3143
Telephone: +64 7 542 9672
Facsimile: +64 7 542 2245
www.fultonhogan.com
0800 LABORATORY

Maximum Dry Density Report

Report No: MDD:BOP16S-03047
Issue No: 1

Client: Greg Watters
Tauranga Sundry Sales
Private Bag 12016
Tauranga Mail Centre

Tauranga 3143
NZ

Project: Zariba Properties Limited

The tests reported herein [unless otherwise indicated] have been performed in accordance with the laboratory's scope of accreditation. Samples are tested as received, in natural condition, unless stated otherwise in the comments. This report may only be reproduced in full.

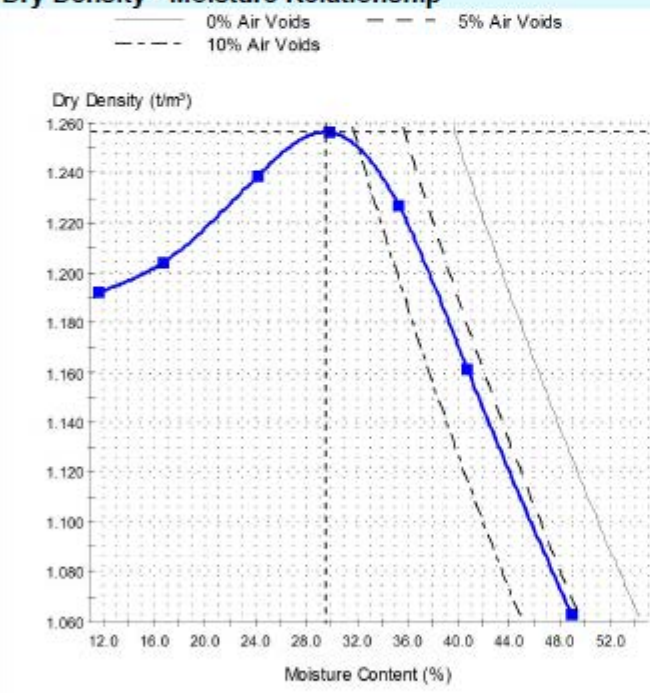
Approved Signatory: Barrack Carle

IANZ Accreditation No:749
Date of Issue: 12/12/2016

Sample Details

Sample ID:	BOP16S-03047	**Client Sample ID:**	
Material:	Rhyolite	**Sample Source:**	Paengaroa Sands Ltd Quarry
Site/Sampled From:	Stage 6 ; Truck S/pile	**Date Sampled:**	05/11/2016
Specification:	No Specification	**Sampled By:**	Barrack Carle
Sampling Method:	Locations as specified by client - Not Accredited	**Date Tested:**	10/12/2016
Technician:	Barrack Carle	**Sampling Endorsed?:**	No

Dry Density - Moisture Relationship



Test Results

NZS 4402:1986 Test 4.1.1 - 1986

Maximum Dry Density (t/m³):	**1.26**
Optimum Moisture Content (%):	**30**
Solid Density (t/m³):	2.510
Oversize Sieve (mm):	19.0
Oversize Material (%):	
Sample History:	<19mm

Comments

Soil Description: Medium - fine sand with some silt and gravel; Trace Cobble; Pumacious; Pinkish Brown; Dry.
Natural Water Content: 21%

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Opus International Consultants Ltd
Tauranga Laboratory
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PO Box 9057, Tauranga 3142
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17 August 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG18

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Richard McGee & Brett McDonald of Opus Laboratory on 15 July 2016.

Regards

Richard McGee
Senior Civil Engineering Technician

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density (tested) :	**2.65 t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**18 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	46	47	48	49	50	51	52
Test Probe Depth (mm)	300	300	300	300	300	300	300
Level	Finish	Finish	Finish	Finish	Finish	Finish	Finish
Wet Density (t/m³)	1.84	1.87	1.88	1.81	1.83	2.01	1.94
Dry Density (t/m³)	1.62	1.65	1.64	1.67	1.67	1.80	1.74
Water Content (%)	13.0	13.5	14.5	8.5	9.5	11.5	11.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	103	104	104	106	106	114	110

Oven Corrected Test Results							
Dry Density (t/m³)	1.62	1.64	1.64	1.67	1.66	1.79	1.73
Water Content (%)	13.4	13.6	15.1	8.3	10.2	12.4	12.4
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**102**	**104**	**104**	**106**	**105**	**113**	**109**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected by Richard McGee of Opus Laboratory. The maximum dry density & optimum water content values used are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16)

The test positions were surveyed by Higgins Contractors staff.

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IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Date reported : 17 August 2016

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 17 August 2016

Opus International Consultants Ltd
Tauranga Laboratory
Quality Management Systems Certified to ISO 9001

278 Chadwick Road, Greerton
PO Box 9057, Tauranga 3142, New Zealand

Telephone +64 7 578 5425
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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
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Optimum water content (tested) :	**18 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	53	54	55	56	57	58	59
Test Probe Depth (mm)	300	300	300	300	300	300	300
Level	Finish	Finish	Finish	Finish	Finish	Finish	Finish
Wet Density (t/m³)	1.84	1.88	1.82	1.84	1.94	1.91	1.86
Dry Density (t/m³)	1.66	1.73	1.62	1.63	1.73	1.71	1.68
Water Content (%)	10.5	8.5	12.5	13.0	12.0	12.0	10.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	105	109	102	103	109	108	106

Oven Corrected Test Results							
Dry Density (t/m³)	1.66	1.71	1.60	1.60	1.69	1.67	1.66
Water Content (%)	10.5	9.6	13.8	14.8	14.4	14.1	12.1
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**105**	**108**	**101**	**101**	**107**	**106**	**105**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected by Richard McGee of Opus Laboratory. The maximum dry density & optimum water content values used are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

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Date tested :	**15 July 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
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Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**18 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	60	61	62	63	64	65	66
Test Probe Depth (mm)	300	300	300	300	300	300	300
Level	Finish	Finish	Finish	Finish	Finish	Finish	Finish
Wet Density (t/m³)	1.86	1.89	1.87	1.86	1.89	1.90	1.90
Dry Density (t/m³)	1.68	1.65	1.68	1.67	1.71	1.72	1.71
Water Content (%)	10.5	15.0	11.0	11.5	10.5	10.5	11.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	107	104	106	106	108	109	108

Oven Corrected Test Results							
Dry Density (t/m³)	1.70	1.63	1.68	1.65	1.71	1.73	1.69
Water Content (%)	9.3	15.9	11.0	12.8	10.6	10.0	12.4
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**108**	**103**	**106**	**105**	**108**	**109**	**107**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected by Richard McGee of Opus Laboratory. The maximum dry density & optimum water content values used are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
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Optimum water content (tested) :	**18 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	67	68	69	70	71	72	73
Test Probe Depth (mm)	300	300	300	300	300	300	300
Level	Finish	Finish	Finish	Finish	Finish	Finish	Finish
Wet Density (t/m³)	1.91	1.89	1.89	1.89	1.90	1.92	1.91
Dry Density (t/m³)	1.72	1.70	1.68	1.68	1.70	1.70	1.70
Water Content (%)	11.0	11.5	12.5	12.5	12.0	12.5	12.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	109	107	106	106	107	108	107

Oven Corrected Test Results							
Dry Density (t/m³)	1.69	1.67	1.67	1.67	1.69	1.69	1.68
Water Content (%)	12.7	13.2	13.0	13.2	12.2	13.4	13.6
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**107**	**106**	**106**	**105**	**107**	**107**	**106**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected by Richard McGee of Opus Laboratory. The maximum dry density & optimum water content values used are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

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Location :	**Zone 6**
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Optimum water content (tested) :	**18 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	74	75	76	77	78	79	80
Test Probe Depth (mm)	300	300	300	300	300	300	300
Level	Finish	Finish	Finish	Finish	Finish	Finish	-1.5m
Wet Density (t/m³)	1.94	1.82	1.83	1.86	1.92	1.90	1.94
Dry Density (t/m³)	1.67	1.67	1.68	1.66	1.73	1.74	1.67
Water Content (%)	16.5	9.0	9.0	11.5	11.0	9.0	16.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	105	106	106	105	109	110	106

Oven Corrected Test Results							
Dry Density (t/m³)	1.69	1.65	1.67	1.64	1.69	1.74	1.67
Water Content (%)	15.1	9.8	9.7	13.1	13.3	9.5	15.6
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**107**	**105**	**106**	**104**	**107**	**110**	**106**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected by Richard McGee of Opus Laboratory. The maximum dry density & optimum water content values used are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16)

The test positions were surveyed by Higgins Contractors staff.

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IANZ ACCREDITED LABORATORY

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Date reported : 17 August 2016

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 17 August 2016

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density (tested) :	**2.65 t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**18 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	81	82	83				
Test Probe Depth (mm)	300	300	300				
Level	-1.3m	-0.5m	-1.0m				
Wet Density (t/m³)	1.95	1.95	1.98				
Dry Density (t/m³)	1.68	1.67	1.70				
Water Content (%)	16.0	16.5	16.5				
Air Voids (%)	--	--	--				
% of MDD	106	106	108				

Oven Corrected Test Results							
Dry Density (t/m³)	1.70	1.69	1.71				
Water Content (%)	14.2	15.6	15.4				
Air Voids (%)	--	--	--				
% of MDD	**108**	**107**	**109**				

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected by Richard McGee of Opus Laboratory. The maximum dry density & optimum water content values used are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16)

The test positions were surveyed by Higgins Contractors staff.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Test number : 46 Location : Adjacent to nuclear density test			Test number : 47 Location : Adjacent to nuclear density test			Test number : 48 Location : Adjacent to nuclear density test			Test number : 49 Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	1	**2**	0.2	2	**4**	0.2	3	**6**	0.2	2	**4**
0.3	4	**8**	0.3	4	**8**	0.3	6	**13**	0.3	5	**10**
0.4	4	**8**	0.4	5	**10**	0.4	9	**20**	0.4	8	**18**
0.5	4	**8**	0.5	10	**23**	0.5	12	**28**	0.5	10	**23**
0.6	5	**10**	0.6	13	**30**	0.6	13	**30**	0.6	15	**36**
0.7	5	**10**	0.7	>20	**>48**	0.7	14	**33**	0.7	18	**43**
0.8	8	**18**	0.8			0.8	18	**43**	0.8	>20	**>48**
0.9	10	**23**	0.9			0.9	>20	**>48**	0.9		
1.0	13	**30**	1.0			1.0			1.0		
1.1	>20	**>48**	1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Test number : 50 Location : Adjacent to nuclear density test			Test number : 51 Location : Adjacent to nuclear density test			Test number : 52 Location : Adjacent to nuclear density test			Test number : 53 Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	1	**2**	0.1	1	**2**
0.2	5	**10**	0.2	4	**8**	0.2	2	**4**	0.2	2	**4**
0.3	8	**18**	0.3	6	**13**	0.3	5	**10**	0.3	3	**6**
0.4	12	**28**	0.4	10	**23**	0.4	5	**10**	0.4	3	**6**
0.5	14	**33**	0.5	12	**28**	0.5	9	**20**	0.5	4	**8**
0.6	16	**38**	0.6	14	**33**	0.6	13	**30**	0.6	3	**6**
0.7	19	**46**	0.7	>20	**>48**	0.7	18	**43**	0.7	5	**10**
0.8	16	**38**	0.8			0.8	20	**48**	0.8	6	**13**
0.9	15	**36**	0.9			0.9	>20	**>48**	0.9	7	**16**
1.0	14	**33**	1.0			1.0			1.0	7	**16**
1.1	13	**30**	1.1			1.1			1.1	9	**20**
1.2	11	**26**	1.2			1.2			1.2	12	**28**
1.3	13	**30**	1.3			1.3			1.3	15	**36**
1.4	15	**36**	1.4			1.4			1.4	16	**38**
1.5	15	**36**	1.5			1.5			1.5	15	**36**
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	Notes
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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Test number : 54			Test number : 55			Test number : 56			Test number : 57		
Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	3	**6**	0.2	1	**2**	0.2	3	**6**	0.2	3	**6**
0.3	6	**13**	0.3	2	**4**	0.3	6	**13**	0.3	6	**13**
0.4	10	**23**	0.4	4	**8**	0.4	7	**16**	0.4	9	**20**
0.5	15	**36**	0.5	6	**13**	0.5	9	**20**	0.5	11	**26**
0.6	14	**33**	0.6	8	**18**	0.6	13	**30**	0.6	13	**30**
0.7	17	**41**	0.7	14	**33**	0.7	16	**38**	0.7	14	**33**
0.8	>20	**>48**	0.8	13	**30**	0.8	15	**36**	0.8	17	**41**
0.9			0.9	11	**26**	0.9	>20	**>48**	0.9	17	**41**
1.0			1.0	12	**28**	1.0			1.0	16	**38**
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Test number : 58			Test number : 59			Test number : 60			Test number : 61		
Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**		
Depth (m)		Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	1	**2**	0.2	3	**6**	0.2	1	**2**	0.2	2	**4**
0.3	4	**8**	0.3	6	**13**	0.3	7	**16**	0.3	4	**8**
0.4	6	**13**	0.4	15	**36**	0.4	10	**23**	0.4	5	**10**
0.5	12	**28**	0.5	14	**33**	0.5	14	**33**	0.5	8	**18**
0.6	17	**41**	0.6	18	**43**	0.6	18	**43**	0.6	10	**23**
0.7	>20	**>48**	0.7	>20	**>48**	0.7	18	**43**	0.7	10	**23**
0.8			0.8			0.8	17	**41**	0.8	16	**38**
0.9			0.9			0.9	16	**38**	0.9	16	**38**
1.0			1.0			1.0	20	**48**	1.0	>20	**>48**
1.1			1.1			1.1	>20	**>48**	1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	Notes
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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Test number : 62			Test number : 63			Test number : 64			Test number : 65		
Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**		
Depth (m)		Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	4	**8**	0.2	1	**2**	0.2	3	**6**	0.2	2	**4**
0.3	10	**23**	0.3	7	**16**	0.3	9	**20**	0.3	5	**10**
0.4	9	**20**	0.4	8	**18**	0.4	16	**38**	0.4	11	**26**
0.5	16	**38**	0.5	11	**26**	0.5	17	**41**	0.5	13	**30**
0.6	15	**36**	0.6	14	**33**	0.6	18	**43**	0.6	14	**33**
0.7	18	**43**	0.7	15	**36**	0.7	20	**48**	0.7	14	**33**
0.8	>20	**>48**	0.8	17	**41**	0.8	19	**46**	0.8	15	**36**
0.9			0.9	16	**38**	0.9	>20	**>48**	0.9	14	**33**
1.0			1.0	16	**38**	1.0			1.0	12	**28**
1.1			1.1	18	**43**	1.1			1.1	15	**36**
1.2			1.2	18	**43**	1.2			1.2	16	**38**
1.3			1.3	>20	**>48**	1.3			1.3	>20	**>48**
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	**Notes**
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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Test number : 66			Test number : 67			Test number : 68			Test number : 69		
Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**		
Depth (m)		Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	1	**2**	0.1	1	**2**
0.2	4	**8**	0.2	5	**10**	0.2	1	**2**	0.2	3	**6**
0.3	8	**18**	0.3	7	**16**	0.3	6	**13**	0.3	5	**10**
0.4	10	**23**	0.4	15	**36**	0.4	8	**18**	0.4	11	**26**
0.5	18	**43**	0.5	17	**41**	0.5	9	**20**	0.5	14	**33**
0.6	18	**43**	0.6	16	**38**	0.6	15	**36**	0.6	14	**33**
0.7	20	**48**	0.7	18	**43**	0.7	16	**38**	0.7	16	**38**
0.8	>20	**>48**	0.8	>20	**>48**	0.8	16	**38**	0.8	18	**43**
0.9			0.9			0.9	16	**38**	0.9	>20	**>48**
1.0			1.0			1.0	17	**41**	1.0		
1.1			1.1			1.1	>20	**>48**	1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Test number : 70			Test number : 71			Test number : 72			Test number : 73		
Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**		
Depth (m)		Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	1	**2**	0.2	1	**2**	0.2	1	**2**
0.3	4	**8**	0.3	2	**4**	0.3	3	**6**	0.3	4	**8**
0.4	5	**10**	0.4	4	**8**	0.4	3	**6**	0.4	6	**13**
0.5	5	**10**	0.5	5	**10**	0.5	5	**10**	0.5	8	**18**
0.6	6	**13**	0.6	5	**10**	0.6	8	**18**	0.6	8	**18**
0.7	5	**10**	0.7	5	**10**	0.7	9	**20**	0.7	10	**23**
0.8	5	**10**	0.8	8	**18**	0.8	12	**28**	0.8	14	**33**
0.9	5	**10**	0.9	6	**13**	0.9	15	**36**	0.9	18	**43**
1.0	4	**8**	1.0	8	**18**	1.0	19	**46**	1.0	>20	**>48**
1.1	5	**10**	1.1	7	**16**	1.1	20	**48**	1.1		
1.2	13	**30**	1.2	8	**18**	1.2	>20	**>48**	1.2		
1.3	12	**28**	1.3	8	**18**	1.3			1.3		
1.4	13	**30**	1.4	8	**18**	1.4			1.4		
1.5	12	**28**	1.5	8	**18**	1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

Date reported : 17 August 2016

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 17 August 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Test number : 74			Test number : 75			Test number : 76			Test number : 77		
Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**		
Depth (m)		Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	1	**2**	0.2	2	**4**	0.2	1	**2**
0.3	4	**8**	0.3	5	**10**	0.3	8	**18**	0.3	5	**10**
0.4	6	**13**	0.4	5	**10**	0.4	10	**23**	0.4	7	**16**
0.5	6	**13**	0.5	7	**16**	0.5	11	**26**	0.5	9	**20**
0.6	7	**16**	0.6	8	**18**	0.6	13	**30**	0.6	14	**33**
0.7	6	**13**	0.7	6	**13**	0.7	16	**38**	0.7	15	**36**
0.8	6	**13**	0.8	16	**38**	0.8	18	**43**	0.8	18	**43**
0.9	5	**10**	0.9	17	**41**	0.9	>20	**>48**	0.9	19	**46**
1.0	6	**13**	1.0	17	**41**	1.0			1.0	>20	**>48**
1.1	9	**20**	1.1	21	**51**	1.1			1.1		
1.2	12	**28**	1.2	>20	**>48**	1.2			1.2		
1.3	13	**30**	1.3			1.3			1.3		
1.4	12	**28**	1.4			1.4			1.4		
1.5	12	**28**	1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2	IANZ accreditation excludes the inferred CBR values.
Inferred CBR values taken from Austroads Pavement Design Manual 2004	This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Test number : 78			Test number : 79			Test number : 80			Test number : 81		
Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**		
Depth (m)		Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	3	**6**	0.1	2	**4**	0.1	1	**2**	0.1	1	**2**
0.2	4	**8**	0.2	3	**6**	0.2	2	**4**	0.2	2	**4**
0.3	7	**16**	0.3	8	**18**	0.3	5	**10**	0.3	4	**8**
0.4	8	**18**	0.4	8	**18**	0.4	6	**13**	0.4	6	**13**
0.5	10	**23**	0.5	11	**26**	0.5	8	**18**	0.5	7	**16**
0.6	13	**30**	0.6	15	**36**	0.6	8	**18**	0.6	7	**16**
0.7	14	**33**	0.7	14	**33**	0.7	9	**20**	0.7	10	**23**
0.8	16	**38**	0.8	17	**41**	0.8	10	**23**	0.8	9	**20**
0.9	>20	**>48**	0.9	>20	**>48**	0.9	10	**23**	0.9	10	**23**
1.0			1.0			1.0	10	**23**	1.0		
1.1			1.1			1.1	11	**26**	1.1		
1.2			1.2			1.2	12	**28**	1.2		
1.3			1.3			1.3	13	**30**	1.3		
1.4			1.4			1.4	15	**36**	1.4		
1.5			1.5			1.5	15	**36**	1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**15 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG18**
Client Order No :	**NMc-028162**

Test number : 82 Location : Adjacent to nuclear density test			Test number : 83 Location : Adjacent to nuclear density test			Test number : Location :			Test number : Location :		
Depth (m)		Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1			0.1		
0.2	1	**2**	0.2	2	**4**	0.2			0.2		
0.3	5	**10**	0.3	6	**13**	0.3			0.3		
0.4	7	**16**	0.4	8	**18**	0.4			0.4		
0.5	8	**18**	0.5	9	**20**	0.5			0.5		
0.6	10	**23**	0.6	9	**20**	0.6			0.6		
0.7	8	**18**	0.7	10	**23**	0.7			0.7		
0.8	9	**20**	0.8	7	**16**	0.8			0.8		
0.9	9	**20**	0.9	11	**26**	0.9			0.9		
1.0	9	**20**	1.0	14	**33**	1.0			1.0		
1.1	10	**23**	1.1	13	**30**	1.1			1.1		
1.2	8	**18**	1.2			1.2			1.2		
1.3	8	**18**	1.3			1.3			1.3		
1.4	7	**16**	1.4			1.4			1.4		
1.5	8	**18**	1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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24 August 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG43

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Richard McGee & Brett McDonald of Opus Laboratory on 29 July 2016.

Regards

Richard McGee
Senior Civil Engineering Technician

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**29 July 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG43**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	84C	85C	86C	87C	88CD	89CD	90CD
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.96	1.82	1.82	1.90	1.96	1.99	1.99
Dry Density (t/m³)	1.68	1.59	1.61	1.71	1.72	1.76	1.79
Water Content (%)	17.0	14.5	13.0	11.0	14.0	12.5	11.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	106	101	102	108	109	112	113

Oven Corrected Test Results							
Dry Density (t/m³)	1.71	1.61	1.60	1.69	1.72	1.76	1.76
Water Content (%)	14.5	13.0	13.9	12.0	14.4	12.9	13.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**108**	**102**	**101**	**107**	**109**	**111**	**111**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**29 July 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**– t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG43**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	92CD	93CD	94CD				
Test Probe Depth (mm)	300	300	300				
Wet Density (t/m³)	1.96	1.96	1.94				
Dry Density (t/m³)	1.73	1.71	1.70				
Water Content (%)	13.5	14.5	14.0				
Air Voids (%)	--	--	--				
% of MDD	109	108	108				

Oven Corrected Test Results							
Dry Density (t/m³)	1.71	1.71	1.69				
Water Content (%)	14.9	14.9	14.7				
Air Voids (%)	--	--	--				
% of MDD	**108**	**108**	**107**				

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**29 July 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG43**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	88B	90B	91B	92B	94B		
Test Probe Depth (mm)	300	300	300	300	300		
Wet Density (t/m³)	1.77	1.84	1.99	1.88	1.87		
Dry Density (t/m³)	1.63	1.61	1.77	1.69	1.65		
Water Content (%)	9.0	14.5	12.5	11.0	13.5		
Air Voids (%)	--	--	--	--	--		
% of MDD	100	99	109	104	101		

Oven Corrected Test Results							
Dry Density (t/m³)	1.60	1.62	1.77	1.63	1.64		
Water Content (%)	10.7	13.9	12.5	15.2	14.0		
Air Voids (%)	--	--	--	--	--		
% of MDD	**98**	**99**	**109**	**100**	**101**		

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**29 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG43**
Client Order No :	**NMc-028162**

Test number : 84C Location : Adjacent to nuclear density test			Test number : 85C Location : Adjacent to nuclear density test			Test number : 86C Location : Adjacent to nuclear density test			Test number : 87C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	N/A	-	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	N/A	-	0.2	1	**2**	0.2	1	**2**	0.2	1	**2**
0.3	N/A	-	0.3	2	**4**	0.3	4	**8**	0.3	3	**6**
0.4	1	**2**	0.4	4	**8**	0.4	7	**16**	0.4	6	**13**
0.5	2	**4**	0.5	6	**13**	0.5	8	**18**	0.5	5	**10**
0.6	3	**6**	0.6	7	**16**	0.6	10	**23**	0.6	7	**16**
0.7	6	**13**	0.7	11	**26**	0.7	12	**28**	0.7	9	**20**
0.8	8	**18**	0.8	13	**30**	0.8	12	**28**	0.8	10	**23**
0.9	11	**26**	0.9	15	**36**	0.9	12	**28**	0.9	10	**23**
1.0	11	**26**	1.0	17	**41**	1.0	15	**36**	1.0		
1.1	9	**20**	1.1	18	**43**	1.1	14	**33**	1.1		
1.2	10	**23**	1.2			1.2	18	**43**	1.2		
1.3	8	**18**	1.3			1.3	>20	**>48**	1.3		
1.4	9	**20**	1.4			1.4			1.4		
1.5	8	**18**	1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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Date : 24 August 2016

Opus International Consultants Ltd
Tauranga Laboratory
Quality Management Systems Certified to ISO 9001

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**29 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG43**
Client Order No :	**NMc-028162**

Test number : 88B Location : Adjacent to nuclear density test			Test number : 88CD Location : Adjacent to nuclear density test			Test number : 89CD Location : Adjacent to nuclear density test			Test number : 90B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	1	**2**	0.2	1	**2**	0.2	5	**10**	0.2	1	**2**
0.3	4	**8**	0.3	7	**16**	0.3	9	**20**	0.3	2	**4**
0.4	4	**8**	0.4	10	**23**	0.4	>20	**>48**	0.4	5	**10**
0.5	5	**10**	0.5	12	**28**	0.5			0.5	5	**10**
0.6	7	**16**	0.6	12	**28**	0.6			0.6	8	**18**
0.7	10	**23**	0.7	13	**30**	0.7			0.7	13	**30**
0.8	13	**30**	0.8	18	**43**	0.8			0.8	18	**43**
0.9	15	**36**	0.9	17	**41**	0.9			0.9	>20	**>48**
1.0	>20	**>48**	1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**29 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG43**
Client Order No :	**NMc-028162**

Test number : 90CD Location : Adjacent to nuclear density test			Test number : 91B Location : Adjacent to nuclear density test			Test number : 92B Location : Adjacent to nuclear density test			Test number : 92CD Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	2	**4**	0.1	2	**4**	0.1	1	**2**	0.1	2	**4**
0.2	3	**6**	0.2	4	**8**	0.2	4	**8**	0.2	5	**10**
0.3	8	**18**	0.3	12	**28**	0.3	7	**16**	0.3	14	**33**
0.4	11	**26**	0.4	16	**38**	0.4	10	**23**	0.4	15	**36**
0.5	12	**28**	0.5	18	**43**	0.5	11	**26**	0.5	>20	**>48**
0.6	13	**30**	0.6	>20	**>48**	0.6	9	**20**	0.6		
0.7	>20	**>48**	0.7			0.7	12	**28**	0.7		
0.8			0.8			0.8	16	**38**	0.8		
0.9			0.9			0.9	17	**41**	0.9		
1.0			1.0			1.0	>20	**>48**	1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Brett McDonald (Opus Laboratory)**
Date tested :	**29 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG43**
Client Order No :	**NMc-028162**

Test number : **93CD** Location : **Adjacent to nuclear density test**			Test number : **94B** Location : **Adjacent to nuclear density test**			Test number : **94CD** Location : **Adjacent to nuclear density test**			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	2	**4**	0.1		
0.2	3	**6**	0.2	1	**2**	0.2	4	**8**	0.2		
0.3	5	**10**	0.3	5	**10**	0.3	8	**18**	0.3		
0.4	7	**16**	0.4	6	**13**	0.4	10	**23**	0.4		
0.5	9	**20**	0.5	7	**16**	0.5	12	**28**	0.5		
0.6	13	**30**	0.6	7	**16**	0.6	15	**36**	0.6		
0.7	15	**36**	0.7	7	**16**	0.7	19	**46**	0.7		
0.8	15	**36**	0.8	10	**23**	0.8	>20	**>48**	0.8		
0.9	18	**43**	0.9	14	**33**	0.9			0.9		
1.0	>20	**>48**	1.0	13	**30**	1.0			1.0		
1.1			1.1	15	**36**	1.1			1.1		
1.2			1.2	12	**28**	1.2			1.2		
1.3			1.3	15	**36**	1.3			1.3		
1.4			1.4	16	**38**	1.4			1.4		
1.5			1.5	18	**43**	1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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2 September 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG44

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Richard McGee & Greg Cleaver of Opus Laboratory on 30 July 2016.

Regards

Bruce Hudson
Laboratory Manager

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	95CD	96CD	97CD	98CD	99CD	100CD	101CD
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.91	1.87	2.01	1.93	1.97	1.85	1.92
Dry Density (t/m³)	1.74	1.69	1.78	1.71	1.77	1.68	1.72
Water Content (%)	9.5	10.5	12.5	12.5	11.0	10.0	11.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	110	107	113	108	112	106	109

Oven Corrected Test Results							
Dry Density (t/m³)	1.75	1.65	1.78	1.70	1.77	1.66	1.73
Water Content (%)	8.7	13.2	12.7	13.4	11.4	11.6	11.1
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**111**	**104**	**113**	**107**	**112**	**105**	**109**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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Designation : *Laboratory Manager*
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OPUS

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Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
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Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	102CD	103CD	104CD	105CD	106CD	107CD	108CD
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.94	1.99	1.92	2.01	1.87	1.90	1.92
Dry Density (t/m³)	1.72	1.74	1.68	1.80	1.69	1.64	1.63
Water Content (%)	13.0	14.0	14.5	11.5	10.5	16.0	18.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	109	110	106	114	107	104	103

Oven Corrected Test Results							
Dry Density (t/m³)	1.73	1.74	1.69	1.80	1.69	1.64	1.64
Water Content (%)	12.2	14.5	13.7	11.8	10.5	15.7	17.1
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**110**	**110**	**107**	**114**	**107**	**104**	**104**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
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Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	109CD	110CD	111CD				
Test Probe Depth (mm)	300	300	300				
Wet Density (t/m³)	1.94	1.95	1.96				
Dry Density (t/m³)	1.69	1.76	1.74				
Water Content (%)	14.5	11.0	12.5				
Air Voids (%)	--	--					
% of MDD	107	111	110				

Oven Corrected Test Results							
Dry Density (t/m³)	1.69	1.75	1.74				
Water Content (%)	14.9	11.4	12.3				
Air Voids (%)	--	--					
% of MDD	**107**	**111**	**110**				

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	96B	98B	100B	102B	104B	106B	108B
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.81	1.93	1.82	1.97	1.80	1.84	1.84
Dry Density (t/m³)	1.65	1.72	1.68	1.74	1.61	1.69	1.70
Water Content (%)	10.0	12.0	8.5	13.0	11.5	9.0	8.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	101	105	103	107	99	104	104

Oven Corrected Test Results							
Dry Density (t/m³)	1.63	1.71	1.67	1.74	1.61	1.67	1.69
Water Content (%)	11.1	12.6	9.3	13.0	11.7	10.2	9.2
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**100**	**105**	**102**	**107**	**99**	**103**	**103**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

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Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
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Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	110B						
Test Probe Depth (mm)	300						
Wet Density (t/m³)	1.87						
Dry Density (t/m³)	1.66						
Water Content (%)	12.5						
Air Voids (%)	--						
% of MDD	102						

Oven Corrected Test Results

Dry Density (t/m³)	1.65						
Water Content (%)	13.2						
Air Voids (%)	--						
% of MDD	**101**						

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Test number : 95CD Location : Adjacent to nuclear density test			Test number : 96B Location : Adjacent to nuclear density test			Test number : 96CD Location : Adjacent to nuclear density test			Test number : 97CD Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	2	**4**
0.2	4	**8**	0.2	1	**2**	0.2	3	**6**	0.2	4	**8**
0.3	6	**13**	0.3	4	**8**	0.3	7	**16**	0.3	5	**10**
0.4	11	**26**	0.4	5	**10**	0.4	12	**28**	0.4	11	**26**
0.5	15	**36**	0.5	7	**16**	0.5	14	**33**	0.5	14	**33**
0.6	13	**30**	0.6	7	**16**	0.6	18	**43**	0.6	17	**41**
0.7	>20	**>48**	0.7	13	**30**	0.7	>20	**>48**	0.7	19	**46**
0.8			0.8	15	**36**	0.8			0.8	20	**48**
0.9			0.9	16	**38**	0.9			0.9	>20	**>48**
1.0			1.0	12	**28**	1.0			1.0		
1.1			1.1	17	**41**	1.1			1.1		
1.2			1.2	>20	**>48**	1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Date reported : 2 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 2 September 2016

Opus International Consultants Ltd
Tauranga Laboratory
Quality Management Systems Certified to ISO 9001

278 Chadwick Road, Greerton
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Telephone +64 7 578 5425
Facsimile +64 7 578 3382
Website www.opus.co.nz

PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Test number : 98B Location : Adjacent to nuclear density test			Test number : 98CD Location : Adjacent to nuclear density test			Test number : 99CD Location : Adjacent to nuclear density test			Test number : 100B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	2	**4**	0.1	1	**2**
0.2	1	**2**	0.2	5	**10**	0.2	4	**8**	0.2	1	**2**
0.3	4	**8**	0.3	8	**18**	0.3	6	**13**	0.3	4	**8**
0.4	6	**13**	0.4	13	**30**	0.4	11	**26**	0.4	5	**10**
0.5	6	**13**	0.5	16	**38**	0.5	14	**33**	0.5	5	**10**
0.6	8	**18**	0.6	>20	**>48**	0.6	17	**41**	0.6	8	**18**
0.7	10	**23**	0.7			0.7	>20	**>48**	0.7	10	**23**
0.8	12	**28**	0.8			0.8			0.8	12	**28**
0.9	13	**30**	0.9			0.9			0.9	12	**28**
1.0	12	**28**	1.0			1.0			1.0	12	**28**
1.1	15	**36**	1.1			1.1			1.1	16	**38**
1.2	17	**41**	1.2			1.2			1.2	15	**36**
1.3	18	**43**	1.3			1.3			1.3	17	**41**
1.4	18	**43**	1.4			1.4			1.4	18	**43**
1.5	16	**38**	1.5			1.5			1.5	18	**43**
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Test number : **100CD** Location : **Adjacent to nuclear density test**			Test number : **101CD** Location : **Adjacent to nuclear density test**			Test number : **102B** Location : **Adjacent to nuclear density test**			Test number : **102CD** Location : **Adjacent to nuclear density test**		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	2	**4**	0.1	2	**4**	0.1	2	**4**	0.1	1	**2**
0.2	4	**8**	0.2	6	**13**	0.2	5	**10**	0.2	3	**6**
0.3	8	**18**	0.3	9	**20**	0.3	5	**10**	0.3	5	**10**
0.4	13	**30**	0.4	13	**30**	0.4	10	**23**	0.4	6	**13**
0.5	12	**28**	0.5	14	**33**	0.5	18	**43**	0.5	7	**16**
0.6	14	**33**	0.6	13	**30**	0.6	17	**41**	0.6	6	**13**
0.7	15	**36**	0.7	17	**41**	0.7	>20	**>48**	0.7	10	**23**
0.8	16	**38**	0.8	>20	**>48**	0.8			0.8	11	**26**
0.9	18	**43**	0.9			0.9			0.9	12	**28**
1.0			1.0			1.0			1.0	11	**26**
1.1			1.1			1.1			1.1	13	**30**
1.2			1.2			1.2			1.2	14	**33**
1.3			1.3			1.3			1.3	14	**33**
1.4			1.4			1.4			1.4	16	**38**
1.5			1.5			1.5			1.5	17	**41**
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Test number : 103CD Location : Adjacent to nuclear density test			Test number : 104B Location : Adjacent to nuclear density test			Test number : 104CD Location : Adjacent to nuclear density test			Test number : 105CD Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	2	**4**	0.1	1	**2**	0.1	2	**4**	0.1	2	**4**
0.2	7	**16**	0.2	1	**2**	0.2	4	**8**	0.2	5	**10**
0.3	15	**36**	0.3	4	**8**	0.3	5	**10**	0.3	12	**28**
0.4	>20	**>48**	0.4	7	**16**	0.4	9	**20**	0.4	12	**28**
0.5			0.5	7	**16**	0.5	13	**30**	0.5	13	**30**
0.6			0.6	7	**16**	0.6	16	**38**	0.6	17	**41**
0.7			0.7	8	**18**	0.7	>20	**>48**	0.7	>20	**>48**
0.8			0.8	10	**23**	0.8			0.8		
0.9			0.9	11	**26**	0.9			0.9		
1.0			1.0	13	**30**	1.0			1.0		
1.1			1.1	16	**38**	1.1			1.1		
1.2			1.2	17	**41**	1.2			1.2		
1.3			1.3	>20	**>48**	1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

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Date reported : 2 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 2 September 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Test number : 106B Location : Adjacent to nuclear density test			Test number : 106CD Location : Adjacent to nuclear density test			Test number : 107CD Location : Adjacent to nuclear density test			Test number : 108B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	3	**6**	0.1	2	**4**	0.1	1	**2**
0.2	1	**2**	0.2	4	**8**	0.2	4	**8**	0.2	1	**2**
0.3	5	**10**	0.3	9	**20**	0.3	5	**10**	0.3	5	**10**
0.4	6	**13**	0.4	10	**23**	0.4	8	**18**	0.4	6	**13**
0.5	7	**16**	0.5	11	**26**	0.5	12	**28**	0.5	10	**23**
0.6	8	**18**	0.6	12	**28**	0.6	15	**36**	0.6	13	**30**
0.7	7	**16**	0.7	8	**18**	0.7	>20	**>48**	0.7	14	**33**
0.8	10	**23**	0.8	7	**16**	0.8			0.8	>20	**>48**
0.9	11	**26**	0.9	13	**30**	0.9			0.9		
1.0	12	**28**	1.0	14	**33**	1.0			1.0		
1.1			1.1	15	**36**	1.1			1.1		
1.2			1.2	14	**33**	1.2			1.2		
1.3			1.3	17	**41**	1.3			1.3		
1.4			1.4	>20	**>48**	1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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Designation : *Laboratory Manager*

Date : 2 September 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Test number : 108CD Location : Adjacent to nuclear density test			Test number : 109CD Location : Adjacent to nuclear density test			Test number : 110B Location : Adjacent to nuclear density test			Test number : 110CD Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	2	**4**	0.1	2	**4**	0.1	1	**2**	0.1	2	**4**
0.2	2	**4**	0.2	2	**4**	0.2	1	**2**	0.2	4	**8**
0.3	4	**8**	0.3	5	**10**	0.3	4	**8**	0.3	6	**13**
0.4	7	**16**	0.4	6	**13**	0.4	6	**13**	0.4	6	**13**
0.5	8	**18**	0.5	9	**20**	0.5	8	**18**	0.5	5	**10**
0.6	13	**30**	0.6	9	**20**	0.6	11	**26**	0.6	9	**20**
0.7	14	**33**	0.7	13	**30**	0.7	12	**28**	0.7	11	**26**
0.8	15	**36**	0.8	13	**30**	0.8	13	**30**	0.8	14	**33**
0.9	15	**36**	0.9	13	**30**	0.9	13	**30**	0.9	15	**36**
1.0			1.0			1.0	12	**28**	1.0	15	**36**
1.1			1.1			1.1	15	**36**	1.1		
1.2			1.2			1.2	17	**41**	1.2		
1.3			1.3			1.3	>20	**>48**	1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Date reported : 2 September 2016

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 2 September 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Greg Cleaver (Opus Laboratory)**
Date tested :	**30 July 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG44**
Client Order No :	**NMc-028162**

Test number : **111CD** Location : **Adjacent to nuclear density test**			Test number : Location :			Test number : Location :			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	2	**4**	0.1			0.1			0.1		
0.2	5	**10**	0.2			0.2			0.2		
0.3	9	**20**	0.3			0.3			0.3		
0.4	10	**23**	0.4			0.4			0.4		
0.5	15	**36**	0.5			0.5			0.5		
0.6	>20	**>48**	0.6			0.6			0.6		
0.7			0.7			0.7			0.7		
0.8			0.8			0.8			0.8		
0.9			0.9			0.9			0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

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Date reported : 2 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 2 September 2016

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11 September 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG126

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Richard McGee, Greg Cleaver & Brett McDonald of Opus Laboratory on 26 August 2016.

Regards

Bruce Hudson
Laboratory Manager

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee (Opus Laboratory)**
Date tested :	**26 August 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG126**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	112A	112B	113A	113B			
Test Probe Depth (mm)	300	300	300	300			
Wet Density (t/m³)	1.96	1.89	1.94	1.97			
Dry Density (t/m³)	1.71	1.68	1.68	1.72			
Water Content (%)	15.0	12.5	15.5	14.5			
Air Voids (%)	--	--	--	--			
% of MDD	105	103	103	105			

Oven Corrected Test Results							
Dry Density (t/m³)	1.72	1.68	1.68	1.74			
Water Content (%)	13.9	12.3	15.5	13.0			
Air Voids (%)	--	--	--	--			
% of MDD	**106**	**103**	**103**	**107**			

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Date reported : 11 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*
Date : 11 September 2016

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee (Opus Laboratory)**
Date tested :	**26 August 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG126**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	112C	113C					
Test Probe Depth (mm)	300	300					
Wet Density (t/m³)	1.94	1.95					
Dry Density (t/m³)	1.71	1.70					
Water Content (%)	13.5	15.0					
Air Voids (%)	--	--					
% of MDD	108	107					

Oven Corrected Test Results							
Dry Density (t/m³)	1.72	1.73					
Water Content (%)	12.9	12.8					
Air Voids (%)	--	--					
% of MDD	**109**	**109**					

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Date reported : 11 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*
Date : 11 September 2016

Opus International Consultants Ltd
Tauranga Laboratory
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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**26 August 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG126**
Client Order No :	**NMc-028162**

Test number : 112A Location : Adjacent to nuclear density test			Test number : 112B Location : Adjacent to nuclear density test			Test number : 112C Location : Adjacent to nuclear density test			Test number : 113A Location : Adjacent to nuclear density test		
Depth (m)		Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	2	**4**	0.2	5	**10**	0.2	1	**2**
0.3	4	**8**	0.3	6	**13**	0.3	4	**8**	0.3	3	**6**
0.4	8	**18**	0.4	8	**18**	0.4	7	**16**	0.4	4	**8**
0.5	10	**23**	0.5	10	**23**	0.5	9	**20**	0.5	6	**13**
0.6	13	**30**	0.6	16	**38**	0.6	11	**26**	0.6	8	**18**
0.7	16	**38**	0.7	>20	**>48**	0.7	13	**30**	0.7	11	**26**
0.8	17	**41**	0.8			0.8	15	**36**	0.8	14	**33**
0.9	>20	**>48**	0.9			0.9	18	**43**	0.9	17	**41**
1.0			1.0			1.0	>20	**>48**	1.0	>20	**>48**
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

Date reported : 11 September 2016

IANZ Approved Signatory

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Designation : *Laboratory Manager*

Date : 11 September 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**26 August 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG126**
Client Order No :	**NMc-028162**

Test number : 113B Location : Adjacent to nuclear density test			Test number : 113C Location : Adjacent to nuclear density test			Test number : Location :			Test number : Location :		
Depth (m)		Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1			0.1		
0.2	4	**8**	0.2	3	**6**	0.2			0.2		
0.3	6	**13**	0.3	5	**10**	0.3			0.3		
0.4	6	**13**	0.4	7	**16**	0.4			0.4		
0.5	8	**18**	0.5	9	**20**	0.5			0.5		
0.6	9	**20**	0.6	11	**26**	0.6			0.6		
0.7	14	**33**	0.7	15	**36**	0.7			0.7		
0.8	>20	**>48**	0.8	>20	**>48**	0.8			0.8		
0.9			0.9			0.9			0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Method	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

Date reported : 11 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 11 September 2016

IANZ ACCREDITED LABORATORY

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17 September 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG133

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Greg Cleaver & Brett McDonald of Opus Laboratory on 31 August 2016.

Regards

Bruce Hudson
Laboratory Manager

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**31 August 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG133**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	46B	48B	66B	68B			
Test Probe Depth (mm)	300	300	300	300			
Wet Density (t/m³)	1.92	1.87	1.75	1.82			
Dry Density (t/m³)	1.73	1.70	1.60	1.71			
Water Content (%)	11.0	10.0	9.0	6.5			
Air Voids (%)	--	--	--	--			
% of MDD	106	104	98	105			

Oven Corrected Test Results							
Dry Density (t/m³)	1.72	1.69	1.56	1.64			
Water Content (%)	11.7	10.8	11.9	10.5			
Air Voids (%)	--	--	--	--			
% of MDD	**106**	**104**	**96**	**101**			

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Date reported : 17 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*
Date : 17 September 2016

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**31 August 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG133**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	46CD	47CD	48CD	66CD	67CD	68CD	79CD
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.78	1.78	1.80	1.85	1.86	1.76	1.67
Dry Density (t/m³)	1.62	1.64	1.62	1.68	1.70	1.65	1.54
Water Content (%)	10.0	9.0	11.5	10.0	9.0	6.5	8.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	103	104	102	106	108	105	97

Oven Corrected Test Results							
Dry Density (t/m³)	1.61	1.59	1.62	1.61	1.66	1.59	1.50
Water Content (%)	11.0	12.1	11.6	14.8	11.6	10.5	11.3
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**102**	**101**	**102**	**102**	**105**	**101**	**95**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**31 August 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG133**
Client Order No :	**NMc-028162**

Test number : 46B Location : Adjacent to nuclear density test			Test number : 46CD Location : Adjacent to nuclear density test			Test number : 47CD Location : Adjacent to nuclear density test			Test number : 48B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	2	**4**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	2	**4**	0.2	2	**4**	0.2	4	**8**
0.3	6	**13**	0.3	5	**10**	0.3	4	**8**	0.3	5	**10**
0.4	10	**23**	0.4	7	**16**	0.4	6	**13**	0.4	6	**13**
0.5	13	**30**	0.5	9	**20**	0.5	9	**20**	0.5	8	**18**
0.6	16	**38**	0.6	13	**30**	0.6	9	**20**	0.6	10	**23**
0.7	13	**30**	0.7	14	**33**	0.7	9	**20**	0.7	9	**20**
0.8	14	**33**	0.8	13	**30**	0.8	14	**33**	0.8	7	**16**
0.9	17	**41**	0.9	7	**16**	0.9	19	**46**	0.9	8	**18**
1.0			1.0	7	**16**	1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**31 August 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG133**
Client Order No :	**NMc-028162**

Test number : 48CD Location : Adjacent to nuclear density test			Test number : 66B Location : Adjacent to nuclear density test			Test number : 66CD Location : Adjacent to nuclear density test			Test number : 67CD Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	3	**6**	0.2	2	**4**	0.2	2	**4**
0.3	4	**8**	0.3	4	**8**	0.3	4	**8**	0.3	4	**8**
0.4	4	**8**	0.4	6	**13**	0.4	6	**13**	0.4	7	**16**
0.5	4	**8**	0.5	8	**18**	0.5	9	**20**	0.5	9	**20**
0.6	4	**8**	0.6	8	**18**	0.6	7	**16**	0.6	10	**23**
0.7	4	**8**	0.7	9	**20**	0.7	9	**20**	0.7	11	**26**
0.8	5	**10**	0.8	10	**23**	0.8	10	**23**	0.8	11	**26**
0.9	7	**16**	0.9	10	**23**	0.9	12	**28**	0.9	12	**28**
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

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Date reported : 17 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 17 September 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**31 August 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG133**
Client Order No :	**NMc-028162**

Test number : 68B Location : Adjacent to nuclear density test			Test number : 68CD Location : Adjacent to nuclear density test			Test number : 79CD Location : Adjacent to nuclear density test			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1		
0.2	1	**2**	0.2	1	**2**	0.2	1	**2**	0.2		
0.3	3	**6**	0.3	4	**8**	0.3	4	**8**	0.3		
0.4	3	**6**	0.4	5	**10**	0.4	4	**8**	0.4		
0.5	4	**8**	0.5	9	**20**	0.5	4	**8**	0.5		
0.6	6	**13**	0.6	15	**36**	0.6	7	**16**	0.6		
0.7	8	**18**	0.7	15	**36**	0.7	10	**23**	0.7		
0.8	12	**28**	0.8	14	**33**	0.8	10	**23**	0.8		
0.9	14	**33**	0.9	16	**38**	0.9	12	**28**	0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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Date reported : 17 September 2016

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Designation : *Laboratory Manager*

Date : 17 September 2016

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12 September 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG150

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Richard McGee & Logan Tutty of Opus Laboratory on 6 September 2016.

Regards

Bruce Hudson
Laboratory Manager

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Logan Tutty (Opus Laboratory)**
Date tested :	**6 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG150**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	62B	64B	70B	72B	76B	78B	82B
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.81	1.75	1.82	1.85	1.81	1.93	1.87
Dry Density (t/m³)	1.68	1.62	1.66	1.70	1.63	1.68	1.69
Water Content (%)	7.5	8.0	9.5	9.0	10.5	14.5	10.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	103	99	102	104	100	103	104

Oven Corrected Test Results							
Dry Density (t/m³)	1.68	1.67	1.66	1.66	1.63	1.70	1.70
Water Content (%)	7.7	4.9	9.6	11.4	11.0	13.2	10.2
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**103**	**102**	**102**	**102**	**100**	**104**	**104**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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IANZ ACCREDITED LABORATORY

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Date reported : 12 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*
Date : 12 September 2016

Opus International Consultants Ltd
Tauranga Laboratory
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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Logan Tutty (Opus Laboratory)**
Date tested :	**6 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG150**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	62C	63C	64C	65C	70C	71C	72C
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.91	1.78	1.88	1.96	1.86	1.89	1.77
Dry Density (t/m³)	1.63	1.64	1.63	1.78	1.66	1.71	1.61
Water Content (%)	17.0	8.5	15.0	10.0	11.5	11.0	10.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	103	104	103	113	105	108	102

Oven Corrected Test Results							
Dry Density (t/m³)	1.64	1.65	1.67	1.79	1.66	1.74	1.61
Water Content (%)	16.3	7.9	12.0	9.7	11.9	8.5	10.4
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**104**	**104**	**106**	**113**	**105**	**110**	**102**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Logan Tutty (Opus Laboratory)**
Date tested :	**6 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG150**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	76C	77C	78C	82C			
Test Probe Depth (mm)	300	300	300	300			
Wet Density (t/m³)	1.82	1.94	1.85	1.83			
Dry Density (t/m³)	1.64	1.73	1.68	1.67			
Water Content (%)	11.0	12.0	10.0	9.5			
Air Voids (%)	--	--	--	--			
% of MDD	104	110	106	106			

Oven Corrected Test Results							
Dry Density (t/m³)	1.67	1.76	1.67	1.65			
Water Content (%)	8.8	10.3	11.0	10.4			
Air Voids (%)	--	--	--	--			
% of MDD	**106**	**111**	**105**	**105**			

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Logan Tutty (Opus Laboratory)**
Date tested :	**6 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG150**
Client Order No :	**NMc-028162**

Test number : 62B Location : Adjacent to nuclear density test			Test number : 62C Location : Adjacent to nuclear density test			Test number : 63C Location : Adjacent to nuclear density test			Test number : 64B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	3	**6**	0.2	2	**4**	0.2	2	**4**	0.2	3	**6**
0.3	6	**13**	0.3	4	**8**	0.3	5	**10**	0.3	7	**16**
0.4	9	**20**	0.4	6	**13**	0.4	5	**10**	0.4	11	**26**
0.5	11	**26**	0.5	8	**18**	0.5	6	**13**	0.5	13	**30**
0.6	16	**38**	0.6	8	**18**	0.6	5	**10**	0.6	19	**46**
0.7	>20	**>48**	0.7	8	**18**	0.7	6	**13**	0.7	>20	**>48**
0.8			0.8	9	**20**	0.8	6	**13**	0.8		
0.9			0.9	8	**18**	0.9	5	**10**	0.9		
1.0			1.0	6	**13**	1.0	6	**13**	1.0		
1.1			1.1	6	**13**	1.1	7	**16**	1.1		
1.2			1.2	6	**13**	1.2	6	**13**	1.2		
1.3			1.3	6	**13**	1.3	6	**13**	1.3		
1.4			1.4	6	**13**	1.4	7	**16**	1.4		
1.5			1.5	6	**13**	1.5	5	**10**	1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Logan Tutty (Opus Laboratory)**
Date tested :	**6 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG150**
Client Order No :	**NMc-028162**

Test number : 64C Location : Adjacent to nuclear density test			Test number : 65C Location : Adjacent to nuclear density test			Test number : 70B Location : Adjacent to nuclear density test			Test number : 70C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	4	**8**	0.2	5	**10**	0.2	2	**4**	0.2	3	**6**
0.3	5	**10**	0.3	9	**20**	0.3	6	**13**	0.3	4	**8**
0.4	6	**13**	0.4	11	**26**	0.4	8	**18**	0.4	6	**13**
0.5	7	**16**	0.5	14	**33**	0.5	9	**20**	0.5	10	**23**
0.6	8	**18**	0.6	20	**48**	0.6	13	**30**	0.6	12	**28**
0.7	10	**23**	0.7	>20	**>48**	0.7	13	**30**	0.7	13	**30**
0.8	10	**23**	0.8			0.8	14	**33**	0.8	14	**33**
0.9	10	**23**	0.9			0.9	>20	**>48**	0.9	12	**28**
1.0	7	**16**	1.0			1.0			1.0	10	**23**
1.1	7	**16**	1.1			1.1			1.1	11	**26**
1.2	7	**16**	1.2			1.2			1.2	9	**20**
1.3	8	**18**	1.3			1.3			1.3	6	**13**
1.4	7	**16**	1.4			1.4			1.4	6	**13**
1.5	7	**16**	1.5			1.5			1.5	7	**16**
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Logan Tutty (Opus Laboratory)**
Date tested :	**6 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG150**
Client Order No :	**NMc-028162**

Test number : 71C Location : Adjacent to nuclear density test			Test number : 72B Location : Adjacent to nuclear density test			Test number : 72C Location : Adjacent to nuclear density test			Test number : 76B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	2	**4**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	6	**13**	0.2	3	**6**	0.2	2	**4**	0.2	2	**4**
0.3	6	**13**	0.3	5	**10**	0.3	4	**8**	0.3	6	**13**
0.4	7	**16**	0.4	6	**13**	0.4	5	**10**	0.4	10	**23**
0.5	7	**16**	0.5	7	**16**	0.5	5	**10**	0.5	13	**30**
0.6	12	**28**	0.6	6	**13**	0.6	5	**10**	0.6	14	**33**
0.7	15	**36**	0.7	7	**16**	0.7	5	**10**	0.7	>20	**>48**
0.8	18	**43**	0.8	6	**13**	0.8	5	**10**	0.8		
0.9	>20	**>48**	0.9	5	**10**	0.9	5	**10**	0.9		
1.0			1.0			1.0	6	**13**	1.0		
1.1			1.1			1.1	7	**16**	1.1		
1.2			1.2			1.2	7	**16**	1.2		
1.3			1.3			1.3	6	**13**	1.3		
1.4			1.4			1.4	5	**10**	1.4		
1.5			1.5			1.5	7	**16**	1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Logan Tutty (Opus Laboratory)**
Date tested :	**6 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG150**
Client Order No :	**NMc-028162**

Test number : 76C Location : Adjacent to nuclear density test			Test number : 77C Location : Adjacent to nuclear density test			Test number : 78B Location : Adjacent to nuclear density test			Test number : 78C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	2	**4**	0.1	1	**2**	0.1	2	**4**	0.1	1	**2**
0.2	4	**8**	0.2	5	**10**	0.2	3	**6**	0.2	3	**6**
0.3	8	**18**	0.3	6	**13**	0.3	4	**8**	0.3	5	**10**
0.4	14	**33**	0.4	9	**20**	0.4	9	**20**	0.4	5	**10**
0.5	15	**36**	0.5	11	**26**	0.5	13	**30**	0.5	7	**16**
0.6	17	**41**	0.6	14	**33**	0.6	>20	**>48**	0.6	9	**20**
0.7	>20	**>48**	0.7	12	**28**	0.7			0.7	10	**23**
0.8			0.8	12	**28**	0.8			0.8	11	**26**
0.9			0.9	10	**23**	0.9			0.9	13	**30**
1.0			1.0	9	**20**	1.0			1.0	17	**41**
1.1			1.1	8	**18**	1.1			1.1	>20	**>48**
1.2			1.2	7	**16**	1.2			1.2		
1.3			1.3	7	**16**	1.3			1.3		
1.4			1.4	7	**16**	1.4			1.4		
1.5			1.5	6	**13**	1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Richard McGee & Logan Tutty (Opus Laboratory)**
Date tested :	**6 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG150**
Client Order No :	**NMc-028162**

Test number : **82B** Location : **Adjacent to nuclear density test**			Test number : **82C** Location : **Adjacent to nuclear density test**			Test number : Location :			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1			0.1		
0.2	2	**4**	0.2	3	**6**	0.2			0.2		
0.3	6	**13**	0.3	6	**13**	0.3			0.3		
0.4	10	**23**	0.4	8	**18**	0.4			0.4		
0.5	12	**28**	0.5	11	**26**	0.5			0.5		
0.6	14	**33**	0.6	13	**30**	0.6			0.6		
0.7	17	**41**	0.7	15	**36**	0.7			0.7		
0.8	>20	**>20**	0.8	17	**41**	0.8			0.8		
0.9			0.9	>20	**>48**	0.9			0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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12 September 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG154

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Greg Cleaver & Brett McDonald of Opus Laboratory on 3 September 2016.

Regards

Bruce Hudson
Laboratory Manager

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**3 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG154**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	86A	86B	88A	90A	92A	94A	96A
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.94	1.96	1.90	1.94	1.86	1.90	1.98
Dry Density (t/m³)	1.76	1.78	1.74	1.79	1.74	1.77	1.77
Water Content (%)	10.5	10.0	9.0	8.5	7.0	7.5	12.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	108	109	107	110	107	108	108

Oven Corrected Test Results							
Dry Density (t/m³)	1.74	1.76	1.73	1.78	1.72	1.75	1.78
Water Content (%)	11.4	11.2	9.8	9.2	8.4	8.3	11.4
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**107**	**108**	**106**	**109**	**105**	**108**	**109**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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IANZ ACCREDITED LABORATORY

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Date reported : 12 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*
Date : 12 September 2016

Opus International Consultants Ltd
Tauranga Laboratory
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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**3 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG154**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	98A	100A	104A	106A	108A	110A	
Test Probe Depth (mm)	300	300	300	300	300	300	
Wet Density (t/m³)	1.94	1.93	1.88	1.95	1.97	1.91	
Dry Density (t/m³)	1.80	1.79	1.76	1.79	1.78	1.71	
Water Content (%)	8.0	7.5	7.0	9.0	10.5	11.5	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	110	110	108	110	109	105	

Oven Corrected Test Results							
Dry Density (t/m³)	1.80	1.79	1.76	1.78	1.77	1.71	
Water Content (%)	7.9	7.9	6.8	9.6	11.0	12.0	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	**111**	**110**	**108**	**109**	**109**	**105**	

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**3 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG154**
Client Order No :	**NMc-028162**

Test number : 86A Location : Adjacent to nuclear density test			Test number : 86B Location : Adjacent to nuclear density test			Test number : 88A Location : Adjacent to nuclear density test			Test number : 90A Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	3	**6**	0.2	2	**4**	0.2	3	**6**
0.3	4	**8**	0.3	7	**16**	0.3	5	**10**	0.3	5	**10**
0.4	6	**13**	0.4	10	**23**	0.4	7	**16**	0.4	9	**20**
0.5	9	**20**	0.5	12	**28**	0.5	10	**23**	0.5	12	**28**
0.6	12	**28**	0.6	11	**26**	0.6	12	**28**	0.6	14	**33**
0.7	>20	**>48**	0.7	14	**33**	0.7	13	**30**	0.7	17	**41**
0.8			0.8	13	**30**	0.8	16	**38**	0.8	>20	**>48**
0.9			0.9	19	**46**	0.9	>20	**>48**	0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**3 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG154**
Client Order No :	**NMc-028162**

Test number : 92A Location : Adjacent to nuclear density test			Test number : 94A Location : Adjacent to nuclear density test			Test number : 96A Location : Adjacent to nuclear density test			Test number : 98A Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	2	**4**	0.1	1	**2**
0.2	1	**2**	0.2	1	**2**	0.2	3	**6**	0.2	4	**8**
0.3	3	**6**	0.3	4	**8**	0.3	6	**13**	0.3	6	**13**
0.4	5	**10**	0.4	6	**13**	0.4	11	**26**	0.4	10	**23**
0.5	6	**13**	0.5	9	**20**	0.5	13	**30**	0.5	10	**23**
0.6	10	**23**	0.6	11	**26**	0.6	14	**33**	0.6	12	**28**
0.7	13	**30**	0.7	16	**38**	0.7	12	**28**	0.7	15	**36**
0.8	15	**36**	0.8	16	**38**	0.8	12	**28**	0.8	18	**43**
0.9	>20	**>48**	0.9	>20	**>48**	0.9	>20	**>48**	0.9	>20	**>48**
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**3 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG154**
Client Order No :	**NMc-028162**

Test number : 100A Location : Adjacent to nuclear density test			Test number : 104A Location : Adjacent to nuclear density test			Test number : 106A Location : Adjacent to nuclear density test			Test number : 108A Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	2	**4**	0.1	1	**2**	0.1	2	**4**	0.1	1	**2**
0.2	3	**6**	0.2	1	**2**	0.2	3	**6**	0.2	3	**6**
0.3	**4**	**8**	0.3	4	**8**	0.3	7	**16**	0.3	4	**8**
0.4	7	**16**	0.4	5	**10**	0.4	11	**26**	0.4	7	**16**
0.5	11	**26**	0.5	7	**16**	0.5	15	**36**	0.5	10	**23**
0.6	12	**28**	0.6	8	**18**	0.6	>20	**>48**	0.6	12	**28**
0.7	>20	**>48**	0.7	13	**30**	0.7			0.7	>20	**>48**
0.8			0.8	>20	**>48**	0.8			0.8		
0.9			0.9			0.9			0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**3 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG154**
Client Order No :	**NMc-028162**

Test number : 110A Location : Adjacent to nuclear density test			Test number : Location :			Test number : Location :			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1			0.1			0.1		
0.2	2	**4**	0.2			0.2			0.2		
0.3	3	**6**	0.3			0.3			0.3		
0.4	4	**8**	0.4			0.4			0.4		
0.5	5	**10**	0.5			0.5			0.5		
0.6	6	**13**	0.6			0.6			0.6		
0.7	5	**10**	0.7			0.7			0.7		
0.8	4	**8**	0.8			0.8			0.8		
0.9	4	**8**	0.9			0.9			0.9		
1.0	4	**8**	1.0			1.0			1.0		
1.1	5	**10**	1.1			1.1			1.1		
1.2	18	**43**	1.2			1.2			1.2		
1.3	>20	**>48**	1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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12 September 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG158

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Greg Cleaver & Logan Tutty of Opus Laboratory on 7 September 2016.

Regards

Bruce Hudson
Laboratory Manager

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**7 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG158**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	112A	112B	114A	114B	116A	118A	118B
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.93	1.88	1.93	2.03	1.90	1.89	1.84
Dry Density (t/m³)	1.78	1.77	1.77	1.84	1.78	1.82	1.71
Water Content (%)	8.5	6.5	9.0	10.5	6.5	4.0	7.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	109	109	108	113	109	112	105

Oven Corrected Test Results							
Dry Density (t/m³)	1.73	1.75	1.74	1.83	1.73	1.80	1.66
Water Content (%)	11.6	7.7	10.4	11.3	9.5	4.8	11.2
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**106**	**107**	**107**	**112**	**106**	**111**	**102**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**7 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG158**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	120A	120B	122A	124A	126A	126B	128A
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.92	1.90	1.87	1.90	1.81	1.91	1.79
Dry Density (t/m³)	1.82	1.75	1.76	1.78	1.72	1.76	1.67
Water Content (%)	5.5	8.5	6.5	6.5	5.5	8.5	7.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	111	107	108	109	105	108	103

Oven Corrected Test Results							
Dry Density (t/m³)	1.75	1.72	1.71	1.73	1.66	1.70	1.61
Water Content (%)	9.2	10.5	9.6	9.7	8.9	12.2	10.8
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**108**	**105**	**105**	**106**	**102**	**104**	**99**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**7 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG158**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	113C/D	114C/D	115C/D	117C/D	118C/D	120C/D	
Test Probe Depth (mm)	300	300	300	300	300	300	
Wet Density (t/m³)	1.84	1.94	1.83	1.83	1.94	1.86	
Dry Density (t/m³)	1.71	1.80	1.70	1.69	1.74	1.73	
Water Content (%)	7.5	8.0	7.5	8.0	11.0	7.0	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	108	114	108	107	110	110	

Oven Corrected Test Results							
Dry Density (t/m³)	1.66	1.75	1.66	1.65	1.69	1.67	
Water Content (%)	10.8	10.6	10.3	10.6	14.6	11.3	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	**105**	**111**	**105**	**104**	**107**	**106**	

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Date reported : 12 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*
Date : 12 September 2016

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Tauranga Laboratory
Quality Management Systems Certified to ISO 9001

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**7 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG154**
Client Order No :	**NMc-028162**

Test number : 112A Location : Adjacent to nuclear density test			Test number : 112B Location : Adjacent to nuclear density test			Test number : 113C/D Location : Adjacent to nuclear density test			Test number : 114A Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	3	**6**	0.2	4	**8**	0.2	1	**2**	0.2	3	**6**
0.3	6	**13**	0.3	8	**18**	0.3	3	**6**	0.3	4	**8**
0.4	10	**23**	0.4	11	**26**	0.4	5	**10**	0.4	9	**20**
0.5	12	**28**	0.5	15	**36**	0.5	7	**16**	0.5	12	**28**
0.6	>20	**>48**	0.6	>20	**>48**	0.6	7	**16**	0.6	>20	**>48**
0.7			0.7			0.7	7	**16**	0.7		
0.8			0.8			0.8	7	**16**	0.8		
0.9			0.9			0.9	11	**26**	0.9		
1.0			1.0			1.0	14	**33**	1.0		
1.1			1.1			1.1	16	**38**	1.1		
1.2			1.2			1.2	>20	**>48**	1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**7 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG158**
Client Order No :	**NMc-028162**

Test number : 114B Location : Adjacent to nuclear density test			Test number : 114C/D Location : Adjacent to nuclear density test			Test number : 115C/D Location : Adjacent to nuclear density test			Test number : 116A Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	3	**6**	0.1	2	**4**	0.1	1	**2**	0.1	1	**2**
0.2	5	**10**	0.2	6	**13**	0.2	2	**4**	0.2	2	**4**
0.3	10	**23**	0.3	10	**23**	0.3	4	**8**	0.3	5	**10**
0.4	11	**26**	0.4	12	**28**	0.4	7	**16**	0.4	8	**18**
0.5	17	**41**	0.5	19	**46**	0.5	10	**23**	0.5	14	**33**
0.6	>20	**>48**	0.6	>20	**>48**	0.6	17	**41**	0.6	>20	**>48**
0.7			0.7			0.7	>20	**>48**	0.7		
0.8			0.8			0.8			0.8		
0.9			0.9			0.9			0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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Designation : *Laboratory Manager*

Date : 12 September 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**7 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG158**
Client Order No :	**NMc-028162**

Test number : 117C/D Location : Adjacent to nuclear density test			Test number : 118A Location : Adjacent to nuclear density test			Test number : 118B Location : Adjacent to nuclear density test			Test number : 118C/D Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	2	**4**
0.2	2	**4**	0.2	2	**4**	0.2	4	**8**	0.2	4	**8**
0.3	4	**8**	0.3	5	**10**	0.3	7	**16**	0.3	8	**18**
0.4	4	**8**	0.4	7	**16**	0.4	9	**20**	0.4	12	**28**
0.5	4	**8**	0.5	12	**28**	0.5	12	**28**	0.5	18	**43**
0.6	4	**8**	0.6	16	**38**	0.6	18	**43**	0.6	>20	**>48**
0.7	5	**10**	0.7	>20	**>48**	0.7	>20	**>48**	0.7		
0.8	5	**10**	0.8			0.8			0.8		
0.9	4	**8**	0.9			0.9			0.9		
1.0	3	**6**	1.0			1.0			1.0		
1.1	3	**6**	1.1			1.1			1.1		
1.2	3	**6**	1.2			1.2			1.2		
1.3	4	**8**	1.3			1.3			1.3		
1.4	4	**8**	1.4			1.4			1.4		
1.5	4	**8**	1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**7 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG158**
Client Order No :	**NMc-028162**

Test number : 120A Location : Adjacent to nuclear density test			Test number : 120B Location : Adjacent to nuclear density test			Test number : 120C/D Location : Adjacent to nuclear density test			Test number : 122A Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	4	**8**	0.2	3	**6**	0.2	1	**2**
0.3	5	**10**	0.3	8	**18**	0.3	6	**13**	0.3	4	**8**
0.4	10	**23**	0.4	10	**23**	0.4	9	**20**	0.4	6	**13**
0.5	13	**30**	0.5	16	**38**	0.5	12	**28**	0.5	8	**18**
0.6	18	**43**	0.6	>20	**>20**	0.6	14	**33**	0.6	10	**23**
0.7	>20	**>48**	0.7			0.7	16	**38**	0.7	14	**33**
0.8			0.8			0.8	>20	**>48**	0.8	16	**38**
0.9			0.9			0.9			0.9	>20	**>48**
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**7 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG158**
Client Order No :	**NMc-028162**

Test number : 124A Location : Adjacent to nuclear density test			Test number : 126A Location : Adjacent to nuclear density test			Test number : 126B Location : Adjacent to nuclear density test			Test number : 128A Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	1	**2**	0.2	3	**6**	0.2	3	**6**
0.3	4	**8**	0.3	3	**6**	0.3	5	**10**	0.3	4	**8**
0.4	6	**13**	0.4	4	**8**	0.4	9	**20**	0.4	6	**13**
0.5	8	**18**	0.5	6	**13**	0.5	10	**23**	0.5	8	**18**
0.6	11	**26**	0.6	8	**18**	0.6	10	**23**	0.6	10	**23**
0.7	11	**26**	0.7	9	**20**	0.7	14	**33**	0.7	16	**38**
0.8	11	**26**	0.8	11	**26**	0.8	13	**30**	0.8	>20	**>48**
0.9	11	**26**	0.9	11	**26**	0.9	15	**36**	0.9		
1.0	11	**26**	1.0	16	**38**	1.0	18	**43**	1.0		
1.1	16	**38**	1.1	>20	**>48**	1.1	>20	**>48**	1.1		
1.2	>20	**>48**	1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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13 September 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG170

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Greg Cleaver & Logan Tutty of Opus Laboratory on 9 September 2016.

Regards

Bruce Hudson
Laboratory Manager

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 4**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**9 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG170**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	119C/D	121C/D	123C/D	125C/D	127C/D		
Test Probe Depth (mm)	300	300	300	300	300		
Wet Density (t/m³)	1.80	1.80	1.86	1.71	1.87		
Dry Density (t/m³)	1.67	1.68	1.69	1.59	1.71		
Water Content (%)	8.0	7.0	10.0	7.0	9.0		
Air Voids (%)	--	--	--	--	--		
% of MDD	105	106	107	101	108		

Oven Corrected Test Results							
Dry Density (t/m³)	1.67	1.68	1.68	1.58	1.71		
Water Content (%)	7.9	6.8	10.7	8.0	9.3		
Air Voids (%)	--	--	--	--	--		
% of MDD	**106**	**106**	**107**	**100**	**108**		

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 4**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**9 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG170**
Client Order No :	**NMc-028162**

Test number : 119C/D Location : Adjacent to nuclear density test			Test number : 121C/D Location : Adjacent to nuclear density test			Test number : 123C/D Location : Adjacent to nuclear density test			Test number : 125C/D Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	4	**8**	0.2	3	**6**	0.2	3	**6**	0.2	2	**4**
0.3	6	**13**	0.3	5	**10**	0.3	7	**16**	0.3	4	**8**
0.4	12	**28**	0.4	10	**23**	0.4	9	**20**	0.4	4	**8**
0.5	18	**43**	0.5	16	**38**	0.5	10	**23**	0.5	4	**8**
0.6	>20	**>48**	0.6	>20	**>48**	0.6	11	**26**	0.6	4	**8**
0.7			0.7			0.7	11	**26**	0.7	4	**8**
0.8			0.8			0.8	8	**18**	0.8	5	**10**
0.9			0.9			0.9	8	**18**	0.9	5	**10**
1.0			1.0			1.0	8	**18**	1.0	5	**10**
1.1			1.1			1.1	8	**18**	1.1	5	**10**
1.2			1.2			1.2	7	**16**	1.2	5	**10**
1.3			1.3			1.3	8	**18**	1.3	5	**10**
1.4			1.4			1.4	8	**18**	1.4	5	**10**
1.5			1.5			1.5	9	**20**	1.5	5	**10**
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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278 Chadwick Road, Greerton
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Telephone +64 7 578 5425
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Website www.opus.co.nz

PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 4**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**9 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG170**
Client Order No :	**NMc-028162**

Test number : **127C/D** Location : **Adjacent to nuclear density test**			Test number : Location :			Test number : Location :			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1			0.1			0.1		
0.2	3	**6**	0.2			0.2			0.2		
0.3	6	**13**	0.3			0.3			0.3		
0.4	9	**20**	0.4			0.4			0.4		
0.5	12	**28**	0.5			0.5			0.5		
0.6	16	**38**	0.6			0.6			0.6		
0.7	>20	**>48**	0.7			0.7			0.7		
0.8			0.8			0.8			0.8		
0.9			0.9			0.9			0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Date reported : 13 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 13 September 2016

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15 September 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG191

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Greg Cleaver & Brett McDonald of Opus Laboratory on 12 September 2016.

Regards

Bruce Hudson
Laboratory Manager

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**12 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG191**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	129C/D	130C/D	131C/D	132C/D	133C/D	134C/D	135C/D
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.80	1.84	1.81	1.77	1.83	1.88	1.83
Dry Density (t/m³)	1.69	1.67	1.70	1.68	1.66	1.78	1.71
Water Content (%)	6.5	10.0	6.5	5.5	10.5	5.5	7.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	107	106	108	106	105	113	108

Oven Corrected Test Results

Dry Density (t/m³)	1.66	1.65	1.68	1.65	1.66	1.77	1.69
Water Content (%)	8.4	11.3	7.6	7.2	10.5	6.2	8.3
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**105**	**105**	**106**	**105**	**105**	**112**	**107**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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IANZ Approved Signatory

Designation : *Laboratory Manager*
Date : 15 September 2016

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**12 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**– t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG191**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	136C/D	137C/D	138C/D	139C/D	140C/D	141C/D	142C/D
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.81	1.82	1.82	1.83	1.87	1.85	1.88
Dry Density (t/m³)	1.71	1.69	1.69	1.70	1.76	1.72	1.76
Water Content (%)	6.0	8.0	7.5	7.5	6.5	7.5	7.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	108	107	107	108	111	109	111

Oven Corrected Test Results							
Dry Density (t/m³)	1.69	1.65	1.69	1.69	1.74	1.70	1.72
Water Content (%)	7.3	10.5	7.7	8.4	7.8	9.1	9.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**107**	**104**	**107**	**107**	**110**	**107**	**109**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**12 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG191**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	143C/D	144C/D	145C/D	146C/D	147C/D	148C/D	
Test Probe Depth (mm)	300	300	300	300	300	300	
Wet Density (t/m³)	1.82	1.86	1.84	1.75	1.80	1.86	
Dry Density (t/m³)	1.72	1.75	1.72	1.67	1.70	1.75	
Water Content (%)	6.0	6.5	7.0	5.0	5.5	6.5	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	109	111	109	105	108	111	

Oven Corrected Test Results

Dry Density (t/m³)	1.70	1.73	1.71	1.64	1.70	1.75	
Water Content (%)	7.1	7.8	7.6	7.0	5.7	6.1	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	**108**	**109**	**108**	**104**	**107**	**111**	

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16.)

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**12 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG191**
Client Order No :	**NMc-028162**

Test number : 129C/D Location : Adjacent to nuclear density test			Test number : 130C/D Location : Adjacent to nuclear density test			Test number : 131C/D Location : Adjacent to nuclear density test			Test number : 132C/D Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	5	**10**	0.2	1	**2**	0.2	1	**2**
0.3	2	**4**	0.3	4	**8**	0.3	3	**6**	0.3	3	**6**
0.4	4	**8**	0.4	6	**13**	0.4	7	**16**	0.4	4	**8**
0.5	5	**10**	0.5	9	**20**	0.5	9	**20**	0.5	7	**16**
0.6	5	**10**	0.6	10	**23**	0.6	12	**28**	0.6	9	**20**
0.7	4	**8**	0.7	11	**26**	0.7	12	**28**	0.7	10	**23**
0.8	4	**8**	0.8	>20	**>48**	0.8	16	**38**	0.8	13	**30**
0.9	5	**10**	0.9			0.9	>20	**>48**	0.9	13	**30**
1.0	5	**10**	1.0			1.0			1.0	12	**28**
1.1	5	**10**	1.1			1.1			1.1	14	**33**
1.2	5	**10**	1.2			1.2			1.2	16	**38**
1.3	5	**10**	1.3			1.3			1.3	>20	**>48**
1.4	5	**10**	1.4			1.4			1.4		
1.5	5	**10**	1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**12 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG191**
Client Order No :	**NMc-028162**

Test number : 133C/D Location : Adjacent to nuclear density test			Test number : 134C/D Location : Adjacent to nuclear density test			Test number : 135C/D Location : Adjacent to nuclear density test			Test number : 136C/D Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	3	**6**	0.2	2	**4**	0.2	1	**2**	0.2	2	**4**
0.3	4	**8**	0.3	4	**8**	0.3	3	**6**	0.3	4	**8**
0.4	6	**13**	0.4	5	**10**	0.4	5	**10**	0.4	5	**10**
0.5	8	**18**	0.5	5	**10**	0.5	6	**13**	0.5	6	**13**
0.6	11	**26**	0.6	7	**16**	0.6	7	**16**	0.6	7	**16**
0.7	13	**30**	0.7	7	**16**	0.7	7	**16**	0.7	7	**16**
0.8	16	**38**	0.8	6	**13**	0.8	7	**16**	0.8	6	**13**
0.9	>20	**>48**	0.9	5	**10**	0.9	6	**13**	0.9	7	**16**
1.0			1.0	5	**10**	1.0	7	**16**	1.0	6	**13**
1.1			1.1	4	**8**	1.1	10	**23**	1.1	7	**16**
1.2			1.2	5	**10**	1.2	18	**43**	1.2	6	**13**
1.3			1.3	5	**10**	1.3	>20	**>48**	1.3	7	**16**
1.4			1.4	5	**10**	1.4			1.4	7	**16**
1.5			1.5	5	**10**	1.5			1.5	6	**13**
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
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OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**12 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG191**
Client Order No :	**NMc-028162**

Test number : 137C/D Location : Adjacent to nuclear density test			Test number : 138C/D Location : Adjacent to nuclear density test			Test number : 139C/D Location : Adjacent to nuclear density test			Test number : 140C/D Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	4	**8**	0.2	3	**6**	0.2	2	**4**
0.3	3	**6**	0.3	5	**10**	0.3	6	**13**	0.3	4	**8**
0.4	5	**10**	0.4	6	**13**	0.4	8	**18**	0.4	6	**13**
0.5	6	**13**	0.5	8	**18**	0.5	8	**18**	0.5	10	**23**
0.6	7	**16**	0.6	9	**20**	0.6	9	**20**	0.6	13	**30**
0.7	9	**20**	0.7	10	**23**	0.7	13	**30**	0.7	13	**30**
0.8	8	**18**	0.8	9	**20**	0.8	13	**30**	0.8	13	**30**
0.9	8	**18**	0.9	8	**18**	0.9	16	**38**	0.9	16	**38**
1.0	9	**20**	1.0	7	**16**	1.0	>20	**>48**	1.0	18	**43**
1.1	12	**28**	1.1	9	**20**	1.1			1.1	>20	**>48**
1.2	14	**33**	1.2	9	**20**	1.2			1.2		
1.3	>20	**>48**	1.3	12	**28**	1.3			1.3		
1.4			1.4	14	**33**	1.4			1.4		
1.5			1.5	12	**28**	1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**12 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG191**
Client Order No :	**NMc-028162**

Test number : 141C/D Location : Adjacent to nuclear density test			Test number : 142C/D Location : Adjacent to nuclear density test			Test number : 143C/D Location : Adjacent to nuclear density test			Test number : 144C/D Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	2	**4**	0.1	1	**2**
0.2	2	**4**	0.2	3	**6**	0.2	2	**4**	0.2	3	**6**
0.3	3	**6**	0.3	4	**8**	0.3	5	**10**	0.3	4	**8**
0.4	5	**10**	0.4	6	**13**	0.4	7	**16**	0.4	5	**10**
0.5	8	**18**	0.5	8	**18**	0.5	7	**16**	0.5	7	**16**
0.6	11	**26**	0.6	7	**16**	0.6	8	**18**	0.6	7	**16**
0.7	14	**33**	0.7	7	**16**	0.7	8	**18**	0.7	8	**18**
0.8	16	**38**	0.8	9	**20**	0.8	10	**23**	0.8	7	**16**
0.9	>20	**>48**	0.9	11	**26**	0.9	14	**33**	0.9	10	**23**
1.0			1.0	14	**33**	1.0	17	**41**	1.0	14	**33**
1.1			1.1	18	**43**	1.1	>20	**>48**	1.1	18	**43**
1.2			1.2	>20	**>48**	1.2			1.2	>20	**>48**
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Date reported : 15 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 15 September 2016

Opus International Consultants Ltd
Tauranga Laboratory
Quality Management Systems Certified to ISO 9001

278 Chadwick Road, Greerton
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Telephone +64 7 578 5425
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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**12 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG191**
Client Order No :	**NMc-028162**

Test number : 145C/D Location : Adjacent to nuclear density test			Test number : 146C/D Location : Adjacent to nuclear density test			Test number : 147C/D Location : Adjacent to nuclear density test			Test number : 148C/D Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	4	**8**	0.2	3	**6**	0.2	2	**4**	0.2	2	**4**
0.3	5	**10**	0.3	3	**6**	0.3	4	**8**	0.3	5	**10**
0.4	7	**16**	0.4	7	**16**	0.4	4	**8**	0.4	6	**13**
0.5	9	**20**	0.5	7	**16**	0.5	6	**13**	0.5	7	**16**
0.6	7	**16**	0.6	8	**18**	0.6	7	**16**	0.6	10	**23**
0.7	10	**23**	0.7	12	**28**	0.7	9	**20**	0.7	11	**26**
0.8	8	**18**	0.8	16	**38**	0.8	12	**28**	0.8	14	**33**
0.9	15	**36**	0.9	>20	**>48**	0.9	13	**30**	0.9	18	**43**
1.0	17	**41**	1.0			1.0	16	**38**	1.0	17	**41**
1.1	>20	**>48**	1.1			1.1	>20	**>48**	1.1	>20	**>48**
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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16 September 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG192

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests, carried out on the compacted sand at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Greg Cleaver & Pete Carlyle of Opus Laboratory on 14 September 2016.

Regards

Bruce Hudson
Laboratory Manager

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Pete Carlyle (Opus Laboratory)**
Date tested :	**14 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG192**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	54B	54C	149B	149C	150B	150C	151B
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.83	1.79	1.79	1.96	1.95	1.77	1.79
Dry Density (t/m³)	1.71	1.64	1.68	1.73	1.82	1.65	1.70
Water Content (%)	7.0	9.5	6.0	13.0	7.0	7.5	5.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	105	100	103	106	112	101	105

Oven Corrected Test Results							
Dry Density (t/m³)	1.70	1.60	1.67	1.75	1.81	1.64	1.67
Water Content (%)	7.3	11.9	6.7	11.9	7.3	8.2	7.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**104**	**98**	**103**	**107**	**111**	**100**	**103**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Pete Carlyle (Opus Laboratory)**
Date tested :	**14 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG192**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	151C	152B	152C	153B	153C	154B	154C
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.72	1.83	1.68	1.88	1.68	1.76	1.79
Dry Density (t/m³)	1.62	1.72	1.59	1.77	1.57	1.66	1.70
Water Content (%)	6.0	6.0	5.5	6.0	7.0	6.0	5.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	99	106	98	109	97	102	104

Oven Corrected Test Results

Dry Density (t/m³)	1.62	1.71	1.57	1.78	1.55	1.65	1.70
Water Content (%)	6.0	6.6	7.1	5.8	8.4	7.0	5.4
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**99**	**105**	**96**	**109**	**95**	**101**	**104**

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Pete Carlyle (Opus Laboratory)**
Date tested :	**14 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG192**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	155B	155C					
Test Probe Depth (mm)	300	300					
Wet Density (t/m³)	1.85	1.85					
Dry Density (t/m³)	1.76	1.75					
Water Content (%)	5.0	6.0					
Air Voids (%)	--	--					
% of MDD	108	107					

Oven Corrected Test Results							
Dry Density (t/m³)	1.74	1.73					
Water Content (%)	6.3	6.9					
Air Voids (%)	--	--					
% of MDD	**107**	**106**					

Test Method	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Pete Carlyle (Opus Laboratory)**
Date tested :	**14 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG192**
Client Order No :	**NMc-028162**

Test number : 54B Location : Adjacent to nuclear density test			Test number : 54C Location : Adjacent to nuclear density test			Test number : 149B Location : Adjacent to nuclear density test			Test number : 149C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	1	**2**	0.1	2	**4**
0.2	2	**4**	0.2	3	**6**	0.2	1	**2**	0.2	3	**6**
0.3	4	**8**	0.3	7	**16**	0.3	4	**8**	0.3	5	**10**
0.4	7	**16**	0.4	10	**23**	0.4	5	**10**	0.4	6	**13**
0.5	11	**26**	0.5	15	**36**	0.5	8	**18**	0.5	9	**20**
0.6	14	**33**	0.6	>20	**>48**	0.6	9	**20**	0.6	11	**26**
0.7	16	**38**	0.7			0.7	11	**26**	0.7	>20	**>48**
0.8	>20	**>48**	0.8			0.8	15	**36**	0.8		
0.9			0.9			0.9	18	**43**	0.9		
1.0			1.0			1.0	>20	**>48**	1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Pete Carlyle (Opus Laboratory)**
Date tested :	**14 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG192**
Client Order No :	**NMc-028162**

Test number : 150B Location : Adjacent to nuclear density test			Test number : 150C Location : Adjacent to nuclear density test			Test number : 151B Location : Adjacent to nuclear density test			Test number : 151C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	4	**8**	0.2	2	**4**	0.2	2	**4**
0.3	6	**13**	0.3	6	**13**	0.3	4	**8**	0.3	4	**8**
0.4	8	**18**	0.4	8	**18**	0.4	6	**13**	0.4	4	**8**
0.5	10	**23**	0.5	8	**18**	0.5	9	**20**	0.5	4	**8**
0.6	14	**33**	0.6	8	**18**	0.6	11	**26**	0.6	5	**10**
0.7	>20	**>48**	0.7	8	**18**	0.7	14	**33**	0.7	5	**10**
0.8			0.8	8	**18**	0.8	>20	**>48**	0.8	5	**10**
0.9			0.9	9	**20**	0.9			0.9	5	**10**
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Pete Carlyle (Opus Laboratory)**
Date tested :	**14 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG192**
Client Order No :	**NMc-028162**

Test number : 152B Location : Adjacent to nuclear density test			Test number : 152C Location : Adjacent to nuclear density test			Test number : 153B Location : Adjacent to nuclear density test			Test number : 153C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	1	**2**	0.1	1	**2**
0.2	3	**6**	0.2	5	**10**	0.2	3	**6**	0.2	4	**8**
0.3	4	**8**	0.3	7	**16**	0.3	6	**13**	0.3	6	**13**
0.4	7	**16**	0.4	8	**18**	0.4	11	**26**	0.4	8	**18**
0.5	9	**20**	0.5	12	**28**	0.5	12	**28**	0.5	9	**20**
0.6	11	**26**	0.6	16	**38**	0.6	13	**30**	0.6	10	**23**
0.7	12	**28**	0.7	>20	**>48**	0.7	15	**36**	0.7	10	**23**
0.8	12	**28**	0.8			0.8	17	**41**	0.8	14	**33**
0.9	14	**33**	0.9			0.9	>20	**>48**	0.9	16	**38**
1.0	16	**38**	1.0			1.0			1.0		
1.1	18	**43**	1.1			1.1			1.1		
1.2	>20	**>48**	1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Pete Carlyle (Opus Laboratory)**
Date tested :	**14 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG192**
Client Order No :	**NMc-028162**

Test number : 154B Location : Adjacent to nuclear density test			Test number : 154C Location : Adjacent to nuclear density test			Test number : 155B Location : Adjacent to nuclear density test			Test number : 155C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	1	**2**	0.2	2	**4**	0.2	2	**4**	0.2	2	**4**
0.3	4	**8**	0.3	4	**8**	0.3	4	**8**	0.3	2	**4**
0.4	5	**10**	0.4	5	**10**	0.4	7	**16**	0.4	4	**8**
0.5	8	**18**	0.5	5	**10**	0.5	10	**23**	0.5	5	**10**
0.6	10	**23**	0.6	5	**10**	0.6	12	**28**	0.6	5	**10**
0.7	11	**26**	0.7	4	**8**	0.7	14	**33**	0.7	5	**10**
0.8	14	**33**	0.8	5	**10**	0.8	17	**41**	0.8	5	**10**
0.9	17	**41**	0.9	5	**10**	0.9	>20	**>48**	0.9	5	**10**
1.0	>20	**>48**	1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Date reported : 16 September 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 16 September 2016

Opus International Consultants Ltd
Tauranga Laboratory
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278 Chadwick Road, Greerton
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6 October 2016

Mr R Meredith
Higgins Construction BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG262

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of scala penetrometer tests carried out on the bulk fill sand at Te Okuroa Drive Bulk Earthworks project – Stage 1.

Testing was carried out by Greg Cleaver & Brett McDonald of Opus Laboratory on 23 September 2016.

Regards

Greg Cleaver
Senior Civil Engineering Technician

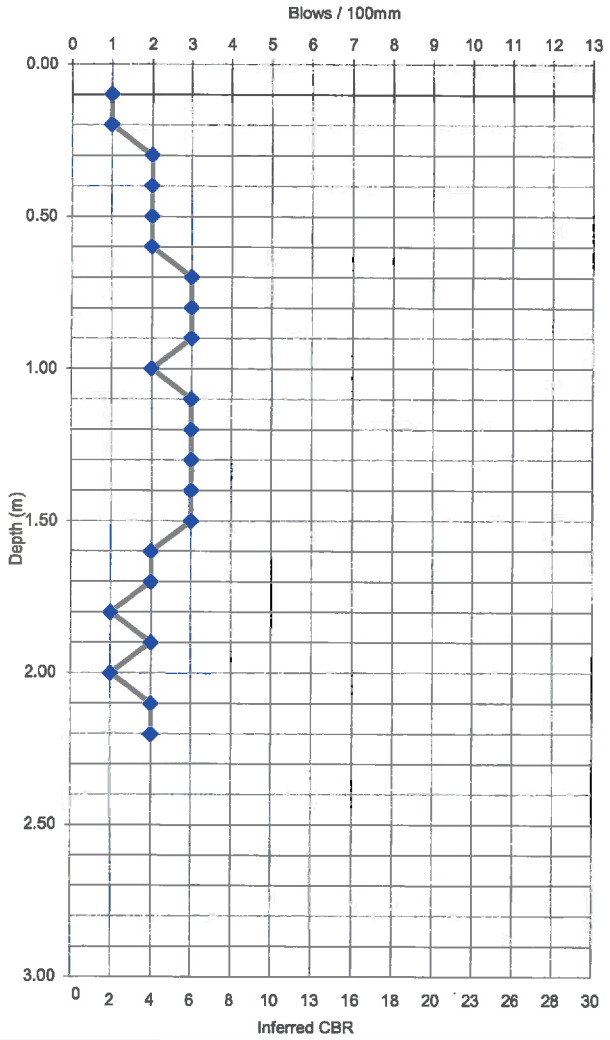
SCALA PENETROMETER TEST REPORT

OPUS

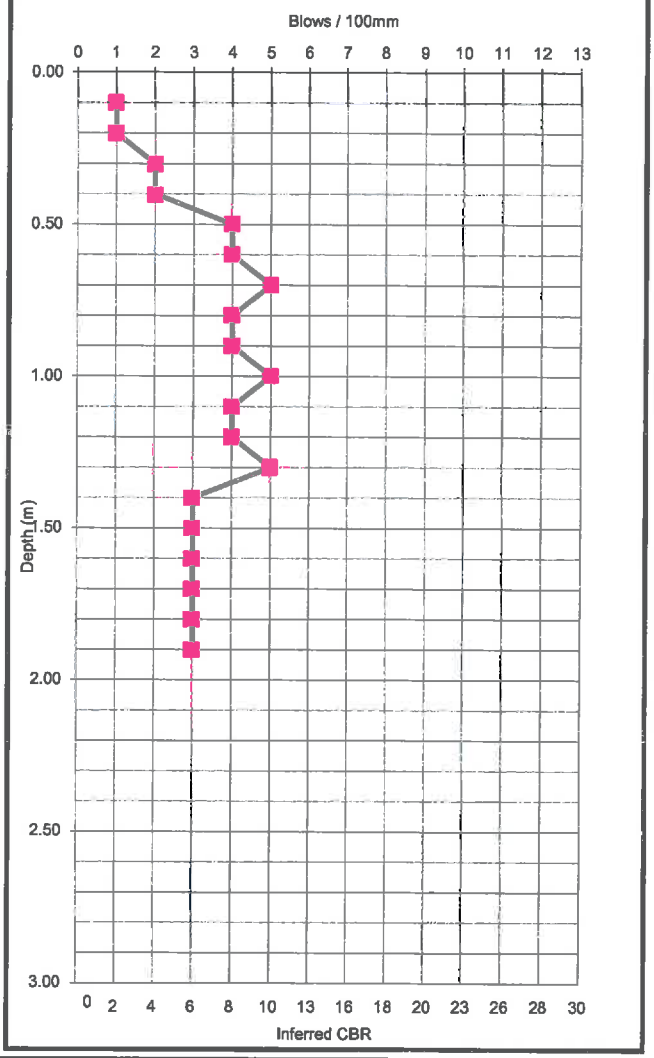
Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmoving Ltd**
Material tested :	**Bulk Fill Sand**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**23 September 2016**
Road :	**9**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG262**
Client Order No :	**NMc-028162**

Scala Penetrometer 1 : RL 3.5m



Scala Penetrometer 2 : RL 3.2m



Test Methods	Notes
Determination of Penetration Resistance of a Soil, NZS 4402 : 1988, Test 6.5.2	IANZ accreditation excludes the inferred CBR values.
Inferred CBR values taken from Austroads Pavement Design Manual 2004	This report may only be reproduced in full.

Date reported : 19 October 2016

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 19 October 2016

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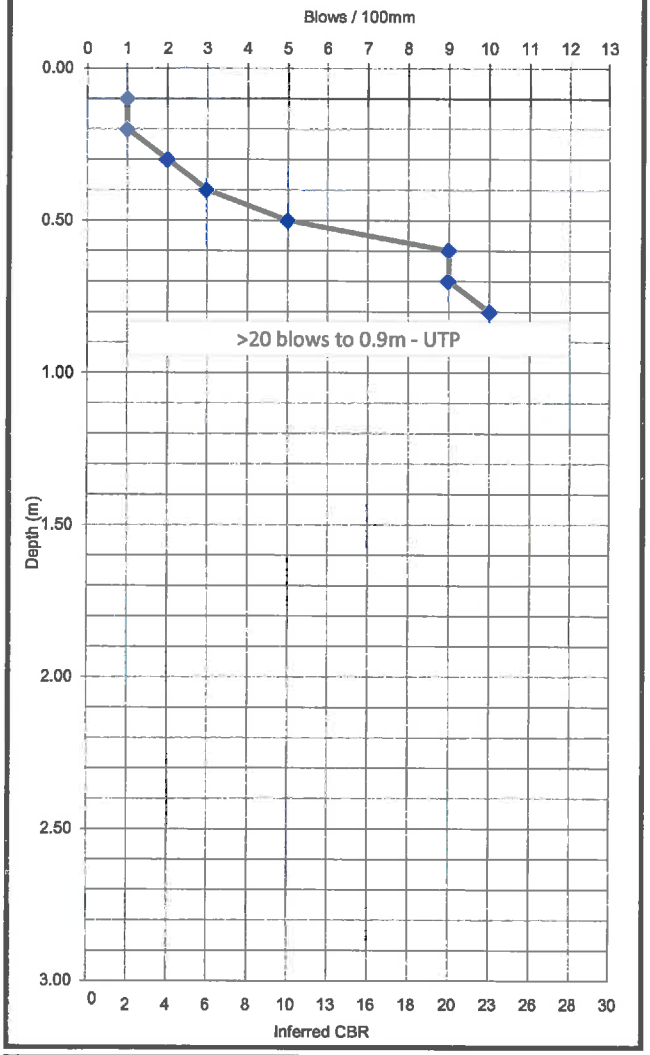
SCALA PENETROMETER TEST REPORT

OPUS

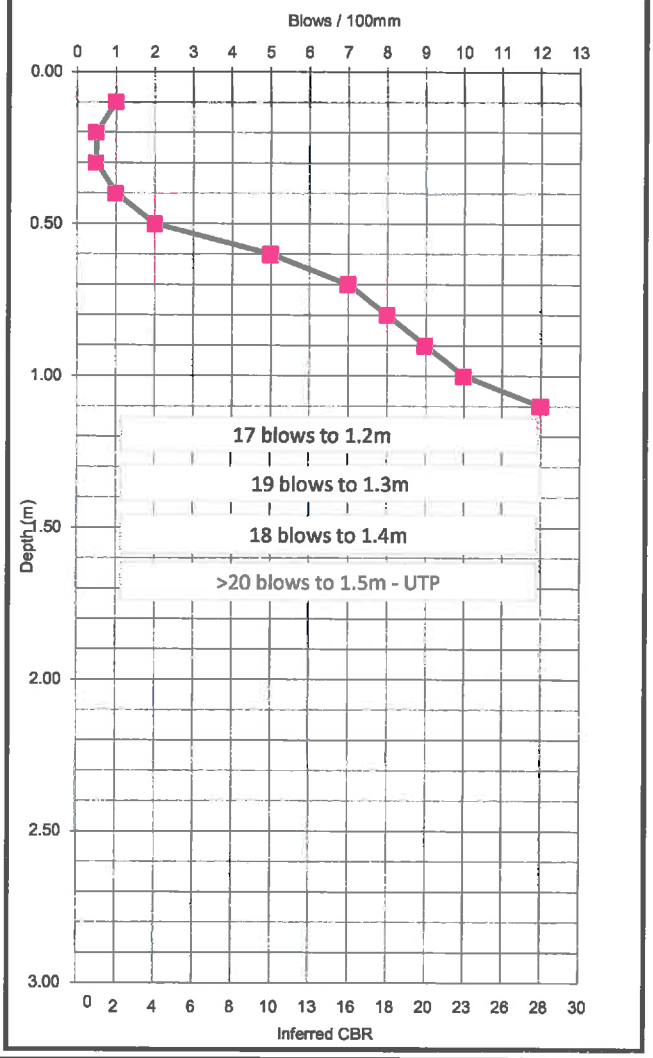
Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmoving Ltd**
Material tested :	**Bulk Fill Sand**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**23 September 2016**
Road :	**9**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG262**
Client Order No :	**NMc-028162**

Scala Penetrometer 3 : RL 4.0m



Scala Penetrometer 4 : RL 4.0m



Test Methods	Notes
Determination of Penetration Resistance of a Soil, NZS 4402 : 1988, Test 6.5.2	IANZ accreditation excludes the inferred CBR values.
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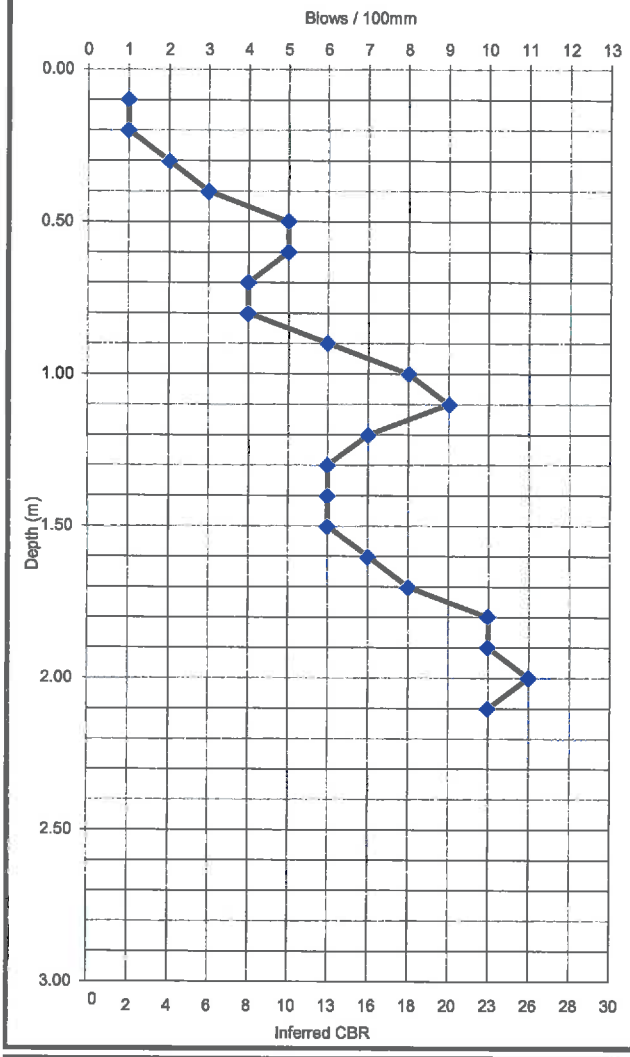
SCALA PENETROMETER TEST REPORT

OPUS

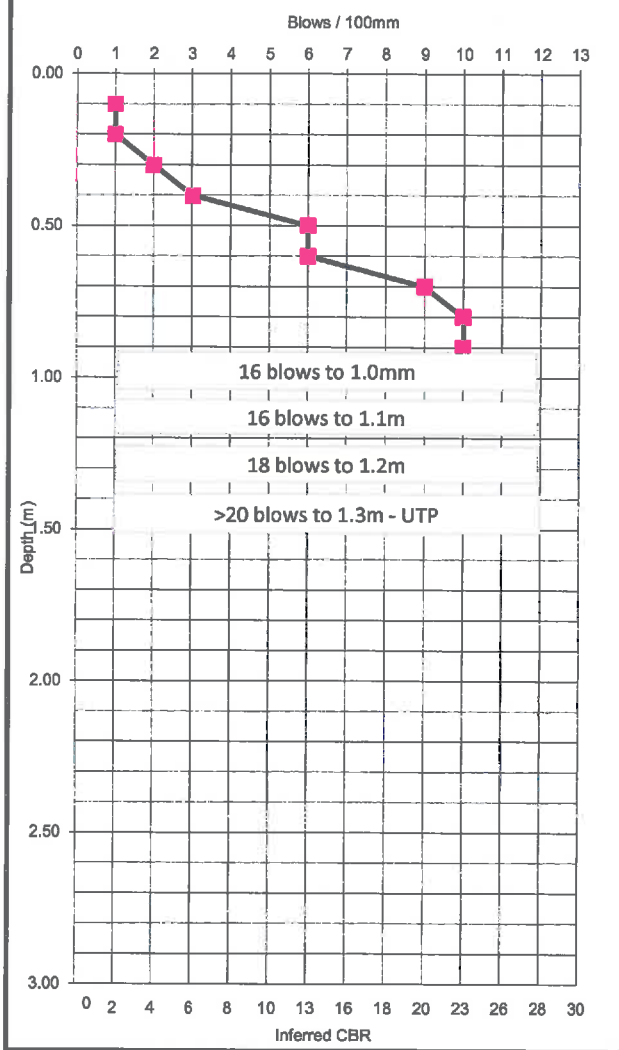
Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmoving Ltd**
Material tested :	**Bulk Fill Sand**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**23 September 2016**
Road :	**9**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG262**
Client Order No :	**NMc-028162**

Scala Penetrometer 5 : RL 3.4m



Scala Penetrometer 6 : RL 4.5m



Test Methods	Notes
Determination of Penetration Resistance of a Soil, NZS 4402 : 1988, Test 6.5.2	IANZ accreditation excludes the inferred CBR values.
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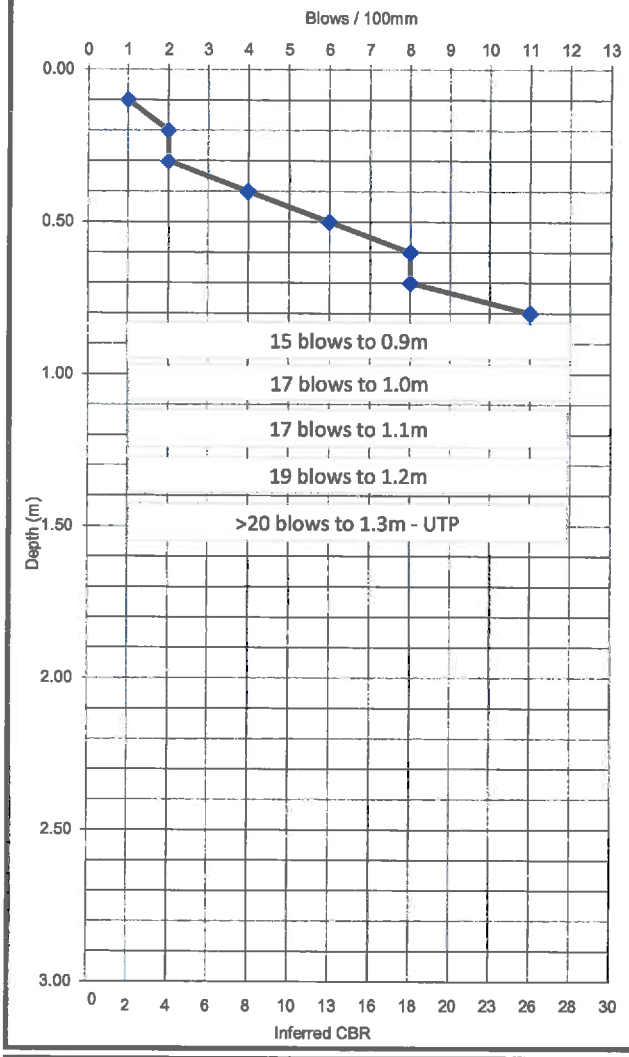
SCALA PENETROMETER TEST REPORT

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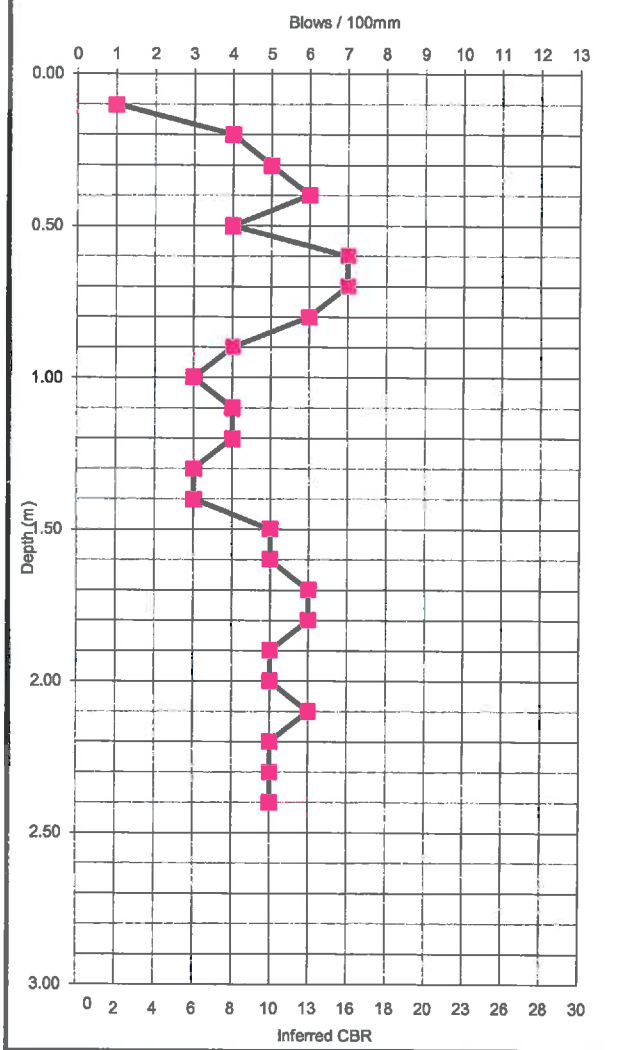
Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmoving Ltd**
Material tested :	**Bulk Fill Sand**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**23 September 2016**
Road :	**9**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG262**
Client Order No :	**NMc-028162**

Scala Penetrometer 7 : RL 4.7m



Scala Penetrometer 8 : RL 3.8m



Test Methods	Notes
Determination of Penetration Resistance of a Soil, NZS 4402 : 1988, Test 6.5.2	IANZ accreditation excludes the inferred CBR values.
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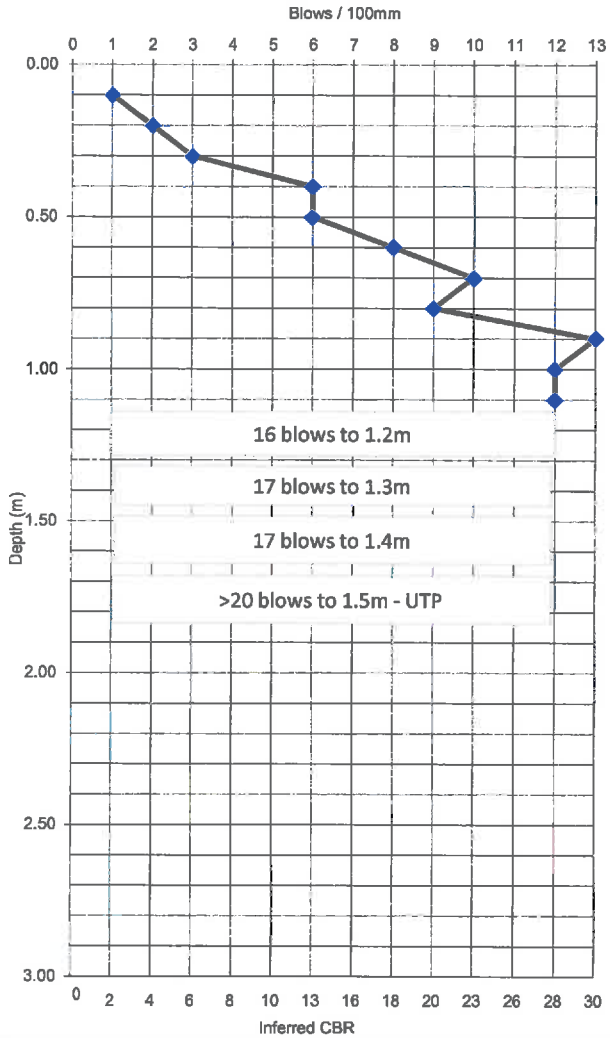
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SCALA PENETROMETER TEST REPORT

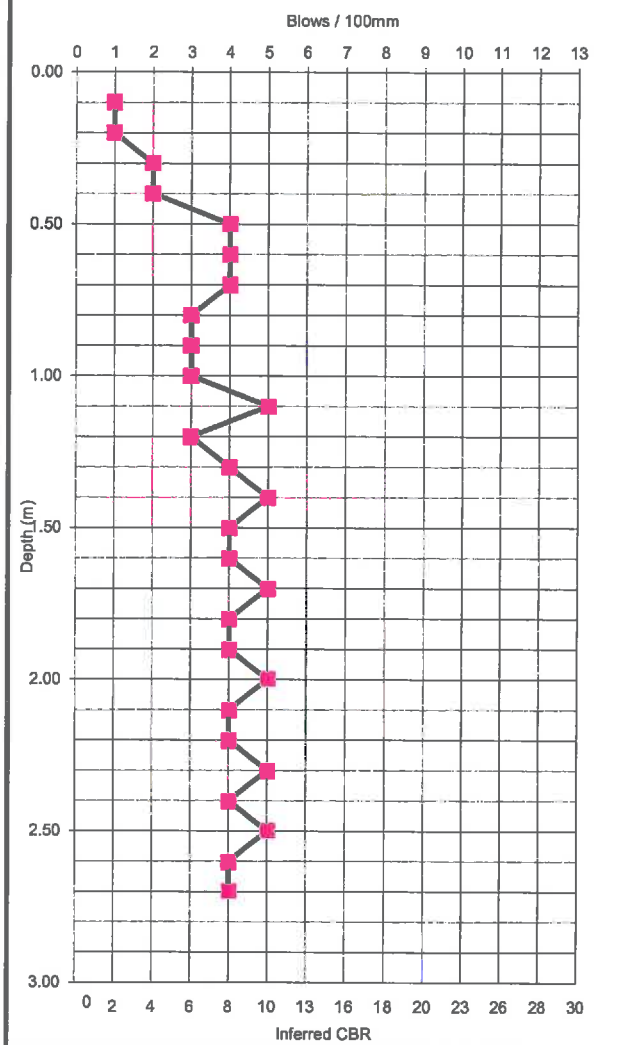
Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmoving Ltd**
Material tested :	**Bulk Fill Sand**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**23 September 2016**
Road :	**9**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG262**
Client Order No :	**NMc-028162**

Scala Penetrometer 9 : RL 4.8m



Scala Penetrometer 10 : RL 4.0m



Test Methods	Notes
Determination of Penetration Resistance of a Soil, NZS 4402 : 1988, Test 6.5.2	IANZ accreditation excludes the inferred CBR valus.
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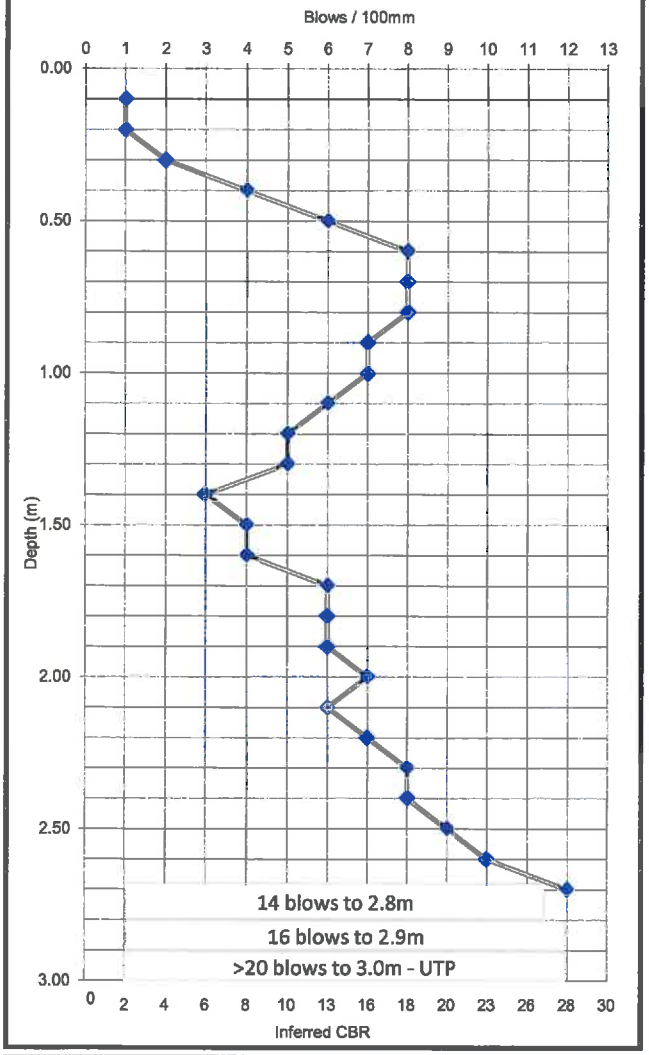
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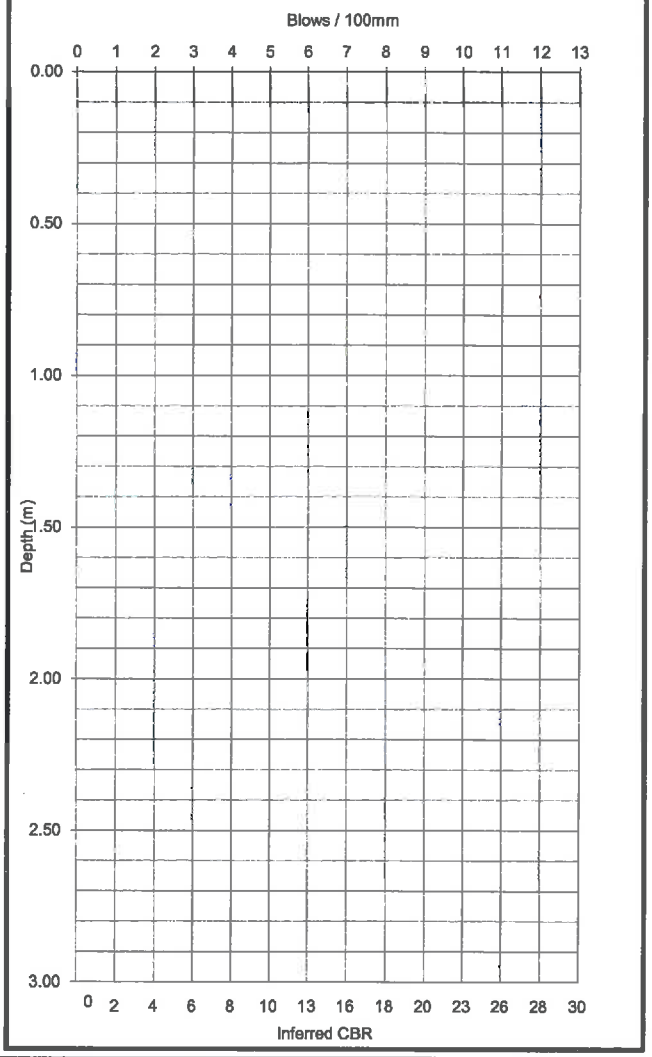
SCALA PENETROMETER TEST REPORT

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmoving Ltd**
Material tested :	**Bulk Fill Sand**
Tested by :	**Greg Cleaver & Brett McDonald (Opus Laboratory)**
Date tested :	**23 September 2016**
Road :	**9**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG262**
Client Order No :	**NMc-028162**

Scala Penetrometer 11 : RL 4.8m





Test Methods	Notes
Determination of Penetration Resistance of a Soil, NZS 4402 : 1988, Test 6.5.2	IANZ accreditation excludes the inferred CBR values.
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w: www.opus.co.nz

16 November 2016

Mr R Meredith
Higgins Contractors BOP Ltd
PO Box 4473
Mount Maunganui 3149

TG272

Dear Rowan

Te Okuroa Drive Bulk Earthworks Contract – Stage 1

Attached are the results of in-situ nuclear density, water content & scala penetrometer tests carried out on the compacted sand, at the Te Okuroa Drive bulk earthworks contract, Papamoa.

Site testing was carried out by Greg Cleaver & Jesse Salanoa of Opus Laboratory on 16 September 2016.

Regards

Greg Cleaver
Senior Civil Engineering Technician

EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jesse Salanoa (Opus Laboratory)**
Date tested :	**16 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG272**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	156A	156B	157A	157B	158A	158B	159A
Test Probe Depth (mm)							
Wet Density (t/m³)	1.77	1.72	1.76	1.79	1.74	1.86	1.80
Dry Density (t/m³)	1.64	1.63	1.60	1.70	1.65	1.68	1.69
Water Content (%)	8.0	5.0	9.5	5.5	5.5	10.5	6.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	101	100	98	104	101	103	104

Oven Corrected Test Results

Dry Density (t/m³)	1.63	1.62	1.60	1.68	1.60	1.68	1.67
Water Content (%)	8.7	6.1	9.7	6.8	8.5	10.4	7.7
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**100**	**99**	**98**	**103**	**98**	**103**	**102**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Date reported : 16 November 2016

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*
Date : 16 November 2016

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jesse Salanoa (Opus Laboratory)**
Date tested :	**16 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG272**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	159B	160A	160B	161A	161B	162A	162B
Test Probe Depth (mm)							
Wet Density (t/m³)	1.85	1.80	1.79	1.78	1.74	1.74	1.85
Dry Density (t/m³)	1.68	1.67	1.70	1.66	1.64	1.63	1.72
Water Content (%)	10.0	8.0	5.5	7.0	6.0	7.0	7.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	103	102	104	102	101	100	105

Oven Corrected Test Results

Dry Density (t/m³)	1.68	1.65	1.68	1.64	1.63	1.61	1.72
Water Content (%)	9.8	9.1	6.6	8.4	7.1	8.1	7.2
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**103**	**101**	**103**	**101**	**100**	**99**	**106**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jesse Salanoa (Opus Laboratory)**
Date tested :	**16 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG272**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	163A	163B	164A	164B	165A	165B	166A
Test Probe Depth (mm)							
Wet Density (t/m³)	1.74	1.84	1.83	1.77	1.81	1.89	1.73
Dry Density (t/m³)	1.61	1.70	1.69	1.59	1.69	1.75	1.61
Water Content (%)	8.0	8.0	8.0	11.5	6.5	8.0	7.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	99	104	104	97	104	107	99

Oven Corrected Test Results

Dry Density (t/m³)	1.59	1.69	1.66	1.53	1.65	1.73	1.57
Water Content (%)	9.8	9.0	10.1	15.9	9.1	8.9	10.3
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**97**	**103**	**102**	**94**	**101**	**106**	**96**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jesse Salanoa (Opus Laboratory)**
Date tested :	**16 September 2016**
Material description :	**Bulk Fill (Sand)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG272**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	166B	167A	167B				
Test Probe Depth (mm)							
Wet Density (t/m³)	1.85	1.83	1.85				
Dry Density (t/m³)	1.71	1.72	1.71				
Water Content (%)	8.0	6.5	8.5				
Air Voids (%)	--	--	--				
% of MDD	105	106	105				

Oven Corrected Test Results

Dry Density (t/m³)	1.70	1.69	1.69				
Water Content (%)	8.7	8.4	9.7				
Air Voids (%)	--	--	--				
% of MDD	**104**	**104**	**103**				

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jesse Salanoa (Opus Laboratory)**
Date tested :	**16 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG272**
Client Order No :	**NMc-028162**

Test number : 156A Location : Adjacent to nuclear density test			Test number : 156B Location : Adjacent to nuclear density test			Test number : 157A Location : Adjacent to nuclear density test			Test number : 157B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	2	**4**	0.2	2	**4**	0.2	3	**6**
0.3	3	**6**	0.3	4	**8**	0.3	3	**6**	0.3	6	**13**
0.4	5	**10**	0.4	8	**18**	0.4	3	**6**	0.4	9	**20**
0.5	7	**16**	0.5	12	**28**	0.5	4	**8**	0.5	9	**20**
0.6	9	**20**	0.6	12	**28**	0.6	5	**10**	0.6	9	**20**
0.7	9	**20**	0.7	18	**43**	0.7	6	**13**	0.7	11	**26**
0.8	10	**23**	0.8	>20	**>48**	0.8	7	**16**	0.8	11	**26**
0.9	9	**20**	0.9			0.9	9	**20**	0.9	11	**26**
1.0	9	**20**	1.0			1.0	10	**23**	1.0		
1.1	10	**23**	1.1			1.1	15	**36**	1.1		
1.2	16	**38**	1.2			1.2	>20	**>48**	1.2		
1.3	>20	**>48**	1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Date reported : 16 November 2016

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 16 November 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jesse Salanoa (Opus Laboratory)**
Date tested :	**16 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG272**
Client Order No :	**NMc-028162**

Test number : 158A Location : Adjacent to nuclear density test			Test number : 158B Location : Adjacent to nuclear density test			Test number : 159A Location : Adjacent to nuclear density test			Test number : 159B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	3	**6**	0.2	2	**4**	0.2	2	**4**
0.3	3	**6**	0.3	3	**6**	0.3	4	**8**	0.3	4	**8**
0.4	5	**10**	0.4	3	**6**	0.4	8	**18**	0.4	5	**10**
0.5	9	**20**	0.5	5	**10**	0.5	9	**20**	0.5	5	**10**
0.6	12	**28**	0.6	5	**10**	0.6	10	**23**	0.6	5	**10**
0.7	12	**28**	0.7	8	**18**	0.7	11	**26**	0.7	6	**13**
0.8	11	**26**	0.8	7	**16**	0.8	11	**26**	0.8	7	**16**
0.9	10	**23**	0.9	7	**16**	0.9	11	**26**	0.9	8	**18**
1.0	16	**38**	1.0			1.0	12	**28**	1.0		
1.1	>20	**>48**	1.1			1.1	12	**28**	1.1		
1.2			1.2			1.2	>20	**>48**	1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jesse Salanoa (Opus Laboratory)**
Date tested :	**16 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG272**
Client Order No :	**NMc-028162**

Test number : 160A Location : Adjacent to nuclear density test			Test number : 160B Location : Adjacent to nuclear density test			Test number : 161A Location : Adjacent to nuclear density test			Test number : 161B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	2	**4**	0.2	3	**6**	0.2	2	**4**	0.2	3	**6**
0.3	3	**6**	0.3	5	**10**	0.3	3	**6**	0.3	3	**6**
0.4	5	**10**	0.4	7	**16**	0.4	5	**10**	0.4	4	**8**
0.5	6	**13**	0.5	10	**23**	0.5	8	**18**	0.5	6	**13**
0.6	7	**16**	0.6	11	**26**	0.6	9	**20**	0.6	8	**18**
0.7	11	**26**	0.7	11	**26**	0.7	11	**26**	0.7	8	**18**
0.8	13	**30**	0.8	11	**26**	0.8	10	**23**	0.8	6	**13**
0.9	14	**33**	0.9	11	**26**	0.9	10	**23**	0.9	6	**13**
1.0	>20	**>48**	1.0			1.0	9	**20**	1.0		
1.1			1.1			1.1	9	**20**	1.1		
1.2			1.2			1.2	9	**20**	1.2		
1.3			1.3			1.3	8	**18**	1.3		
1.4			1.4			1.4	9	**20**	1.4		
1.5			1.5			1.5	9	**20**	1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jesse Salanoa (Opus Laboratory)**
Date tested :	**16 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG272**
Client Order No :	**NMc-028162**

Test number : 162A Location : Adjacent to nuclear density test			Test number : 162B Location : Adjacent to nuclear density test			Test number : 163A Location : Adjacent to nuclear density test			Test number : 163B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	1	**2**	0.2	4	**8**	0.2	2	**4**	0.2	3	**6**
0.3	3	**6**	0.3	4	**8**	0.3	3	**6**	0.3	6	**13**
0.4	5	**10**	0.4	6	**13**	0.4	5	**10**	0.4	6	**13**
0.5	7	**16**	0.5	7	**16**	0.5	8	**18**	0.5	8	**18**
0.6	9	**20**	0.6	7	**16**	0.6	10	**23**	0.6	9	**20**
0.7	10	**23**	0.7	6	**13**	0.7	16	**38**	0.7	11	**26**
0.8	11	**26**	0.8	7	**16**	0.8	>20	**>48**	0.8	12	**28**
0.9	14	**33**	0.9	7	**16**	0.9			0.9	12	**28**
1.0	14	**33**	1.0			1.0			1.0		
1.1	15	**36**	1.1			1.1			1.1		
1.2	11	**26**	1.2			1.2			1.2		
1.3	>20	**>48**	1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jesse Salanoa (Opus Laboratory)**
Date tested :	**16 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG272**
Client Order No :	**NMc-028162**

Test number : 164A Location : Adjacent to nuclear density test			Test number : 164B Location : Adjacent to nuclear density test			Test number : 165A Location : Adjacent to nuclear density test			Test number : 165B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	1	**2**	0.1	2	**4**
0.2	2	**4**	0.2	4	**8**	0.2	2	**4**	0.2	3	**6**
0.3	5	**10**	0.3	5	**10**	0.3	5	**10**	0.3	5	**10**
0.4	8	**18**	0.4	6	**13**	0.4	7	**16**	0.4	6	**13**
0.5	12	**28**	0.5	7	**16**	0.5	11	**26**	0.5	6	**13**
0.6	13	**30**	0.6	8	**18**	0.6	13	**30**	0.6	11	**26**
0.7	15	**36**	0.7	8	**18**	0.7	15	**36**	0.7	11	**26**
0.8	18	**43**	0.8	9	**20**	0.8	>20	**>48**	0.8	11	**26**
0.9	>20	**>48**	0.9	10	**23**	0.9			0.9	12	**28**
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jesse Salanoa (Opus Laboratory)**
Date tested :	**16 September 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG272**
Client Order No :	**NMc-028162**

Test number : 166A Location : Adjacent to nuclear density test			Test number : 166B Location : Adjacent to nuclear density test			Test number : 167A Location : Adjacent to nuclear density test			Test number : 167B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	1	**2**	0.2	3	**6**	0.2	2	**4**	0.2	3	**6**
0.3	3	**6**	0.3	5	**10**	0.3	4	**8**	0.3	4	**8**
0.4	7	**16**	0.4	9	**20**	0.4	6	**13**	0.4	7	**16**
0.5	9	**20**	0.5	10	**23**	0.5	9	**20**	0.5	8	**18**
0.6	10	**23**	0.6	12	**28**	0.6	13	**30**	0.6	8	**18**
0.7	12	**28**	0.7	14	**33**	0.7	14	**33**	0.7	8	**18**
0.8	19	**46**	0.8	14	**33**	0.8	13	**30**	0.8	8	**18**
0.9	>20	**>48**	0.9	16	**38**	0.9	16	**38**	0.9	9	**20**
1.0			1.0			1.0	>20	**>48**	1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**10 November 2016**
Sample description :	**Bulk Fill (Sand)**
Sample condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG383**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	176A	177A	178A	180A	183A	184A	
Test Probe Depth (mm)	300	300	300	300	300	300	
Wet Density (t/m³)	1.76	1.89	1.87	1.93	1.82	1.94	
Dry Density (t/m³)	1.58	1.72	1.71	1.73	1.64	1.78	
Water Content (%)	11.5	10.0	9.5	11.5	11.0	9.0	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	97	106	105	106	101	109	

Oven Corrected Test Results

Dry Density (t/m³)	1.58	1.73	1.70	1.73	1.65	1.78	
Water Content (%)	11.3	9.4	10.0	12.0	10.5	8.8	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	**97**	**106**	**104**	**106**	**101**	**109**	

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 1991, Test 4.2.1 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Date reported : 16 November 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**10 November 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG383**
Client Order No :	**NMc-028162**

Test number : 176A Location : Adjacent to nuclear density test			Test number : 177A Location : Adjacent to nuclear density test			Test number : 178A Location : Adjacent to nuclear density test			Test number : 180A Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	1	**2**	0.1	1	**2**
0.2	3	**6**	0.2	3	**6**	0.2	2	**4**	0.2	4	**8**
0.3	4	**8**	0.3	8	**18**	0.3	2	**4**	0.3	7	**16**
0.4	5	**10**	0.4	12	**28**	0.4	2	**4**	0.4	12	**28**
0.5	7	**16**	0.5	15	**36**	0.5	5	**10**	0.5	14	**33**
0.6	8	**18**	0.6	18	**43**	0.6	6	**13**	0.6	16	**38**
0.7	9	**20**	0.7	>20	**>48**	0.7	8	**18**	0.7	>20	**>48**
0.8	10	**23**	0.8	**Discontinued.**		0.8	9	**20**	0.8	**Discontinued.**	
0.9	10	**23**	0.9			0.9	9	**20**	0.9		
1.0	13	**30**	1.0			1.0	9	**20**	1.0		
1.1	13	**30**	1.1			1.1	8	**18**	1.1		
1.2	12	**28**	1.2			1.2	11	**26**	1.2		
1.3	13	**30**	1.3			1.3	12	**28**	1.3		
1.4	12	**28**	1.4			1.4	11	**26**	1.4		
1.5	13	**30**	1.5			1.5	11	**26**	1.5		

Test Methods	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

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Date reported : 16 November 2016

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 16 November 2016

Opus International Consultants Ltd
Tauranga Laboratory
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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**10 November 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG383**
Client Order No :	**NMc-028162**

Test number : 183A Location : Adjacent to nuclear density test			Test number : 184A Location : Adjacent to nuclear density test			Test number : Location :			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**						
0.2	2	**4**	0.2	2	**4**						
0.3	2	**4**	0.3	3	**6**						
0.4	4	**8**	0.4	4	**8**						
0.5	4	**8**	0.5	6	**13**						
0.6	5	**10**	0.6	8	**18**						
0.7	5	**10**	0.7	8	**18**						
0.8	5	**10**	0.8	8	**18**						
0.9	3	**6**	0.9	8	**18**						
1.0	3	**6**	1.0	8	**18**						
1.1	5	**10**	1.1	9	**20**						
1.2	4	**8**	1.2	10	**23**						
1.3	5	**10**	1.3	9	**20**						
1.4	5	**10**	1.4	9	**20**						
1.5	5	**10**	1.5	10	**23**						

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**21 November 2016**
Sample description :	**Bulk Fill (Sand)**
Sample condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG401**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	52B	56B	57B	58B	60B	102A	122B
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.77	1.92	1.73	1.87	1.71	1.89	1.86
Dry Density (t/m³)	1.70	1.72	1.57	1.70	1.62	1.75	1.58
Water Content (%)	4.2	11.7	9.9	10.2	5.7	8.0	17.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	104	106	97	104	99	107	97

Oven Corrected Test Results							
Dry Density (t/m³)	1.68	1.72	1.56	1.68	1.60	1.76	1.61
Water Content (%)	5.3	11.7	10.6	11.5	6.9	7.4	15.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**103**	**106**	**96**	**103**	**98**	**108**	**99**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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IANZ ACCREDITED LABORATORY

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Date reported : 1 December 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*
Date : 1 December 2016

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**21 November 2016**
Sample description :	**Bulk Fill (Sand)**
Sample condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG401**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	123B	124B					
Test Probe Depth (mm)	300	300					
Wet Density (t/m³)	1.90	1.82					
Dry Density (t/m³)	1.77	1.69					
Water Content (%)	7.4	8.1					
Air Voids (%)	--	--					
% of MDD	108	104					

Oven Corrected Test Results							
Dry Density (t/m³)	1.75	1.69					
Water Content (%)	8.6	8.2					
Air Voids (%)	--	--					
% of MDD	**107**	**103**					

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**21 & 29 November 2016**
Sample description :	**Bulk Fill (Sand)**
Sample condition :	**Compacted**
Nuclear densometer no :	**3440-13867**
Solid density (tested) :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**18 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG401**
Client Order No :	**NMc - 028162**

Nuclear Densometer Test Results							
Test Number	52C*	56C	60C	61C	75C	122C*	
Test Probe Depth (mm)	300	300	300	300	300	300	
Wet Density (t/m³)	1.68	1.87	1.74	1.69	1.75	1.64	
Dry Density (t/m³)	1.52	1.73	1.63	1.52	1.60	1.56	
Water Content (%)	10.4	8.1	6.5	11.6	8.9	4.6	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	96	109	103	96	101	99	

Oven Corrected Test Results							
Dry Density (t/m³)	1.51	1.72	1.63	1.50	1.60	1.55	
Water Content (%)	10.7	8.6	6.7	12.8	8.8	5.8	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	**96**	**109**	**103**	**95**	**102**	**98**	

Test Method	Notes
In-situ Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were pegged and surveyed by Higgins Contractors BOP Ltd staff. The solid density, maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16)

* IANZ accreditation excludes the nuclear density & oven corrected results of tests 52C & 122C as the wet density values fell outside the densometer calibration range of 1700 - 2650kg/m3.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**21 November 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG401**
Client Order No :	**NMc-028162**

Test number : 52B Location : Adjacent to nuclear density test			Test number : 52C Location : Adjacent to nuclear density test			Test number : 56B Location : Adjacent to nuclear density test			Test number : 56C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	2	**4**	0.1	2	**4**
0.2	3	**6**	0.2	1	**2**	0.2	2	**4**	0.2	2	**4**
0.3	6	**13**	0.3	2	**4**	0.3	5	**10**	0.3	4	**8**
0.4	10	**23**	0.4	2	**4**	0.4	7	**16**	0.4	5	**10**
0.5	16	**38**	0.5	2	**4**	0.5	10	**23**	0.5	6	**13**
0.6	>20	**>48**	0.6	6	**13**	0.6	9	**20**	0.6	7	**16**
0.7	**Discontinued.**		0.7	6	**13**	0.7	8	**18**	0.7	6	**13**
			0.8	6	**13**	0.8	8	**18**	0.8	5	**10**
			0.9	6	**13**	0.9	9	**20**	0.9	5	**10**
			1.0	7	**16**	1.0	10	**23**	1.0	5	**10**
			1.1	5	**10**				1.1	7	**16**
			1.2	6	**13**				1.2	7	**16**
			1.3	5	**10**				1.3	6	**13**
			1.4	5	**10**				1.4	5	**10**
			1.5	5	**10**				1.5	5	**10**

Test Methods	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

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Date reported : 1 December 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 1 December 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**21 November 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG401**
Client Order No :	**NMc-028162**

Test number : 57B Location : Adjacent to nuclear density test			Test number : 58B Location : Adjacent to nuclear density test			Test number : 60B Location : Adjacent to nuclear density test			Test number : 60C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	1	**2**	0.2	4	**8**	0.2	2	**4**	0.2	3	**6**
0.3	3	**6**	0.3	6	**13**	0.3	5	**10**	0.3	6	**13**
0.4	4	**8**	0.4	12	**28**	0.4	10	**23**	0.4	10	**23**
0.5	4	**8**	0.5	10	**23**	0.5	12	**28**	0.5	16	**38**
0.6	5	**10**	0.6	13	**30**	0.6	16	**38**	0.6	18	**43**
0.7	5	**10**	0.7	14	**33**	0.7	18	**43**	0.7	>20	**>48**
0.8	5	**10**	0.8	12	**28**	0.8	19	**46**		**Discontinued.**	
0.9	5	**10**	0.9	13	**30**	0.9	>20	**>48**			
1.0	5	**10**	1.0	14	**33**		**Discontinued.**				

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**21 November 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG401**
Client Order No :	**NMc-028162**

Test number : 61C Location : Adjacent to nuclear density test			Test number : 75C Location : Adjacent to nuclear density test			Test number : 102A Location : Adjacent to nuclear density test			Test number : 122B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	2	**4**	0.1	2	**4**
0.2	2	**4**	0.2	3	**6**	0.2	5	**10**	0.2	4	**8**
0.3	4	**8**	0.3	4	**8**	0.3	6	**13**	0.3	6	**13**
0.4	8	**18**	0.4	8	**18**	0.4	11	**26**	0.4	8	**18**
0.5	12	**28**	0.5	10	**23**	0.5	12	**28**	0.5	10	**23**
0.6	18	**43**	0.6	18	**43**	0.6	16	**38**	0.6	12	**28**
0.7	>20	**>48**	0.7	19	**46**	0.7	18	**43**	0.7	14	**33**
	Discontinued.		0.8	>20	**>48**	0.8	19	**46**	0.8	16	**38**
						0.9	>20	**>48**	0.9	16	**38**
							Discontinued.		1.0	15	**36**
										Discontinued.	

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**21 & 29 November 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG401**
Client Order No :	**NMc-028162**

Test number : 122C Location : Adjacent to nuclear density test			Test number : 123B Location : Adjacent to nuclear density test			Test number : 124B Location : Adjacent to nuclear density test			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	3	**6**	0.1	2	**4**	0.1	2	**4**			
0.2	8	**18**	0.2	3	**6**	0.2	4	**8**			
0.3	12	**28**	0.3	4	**8**	0.3	6	**13**			
0.4	16	**38**	0.4	8	**18**	0.4	9	**20**			
0.5	>20	**>48**	0.5	9	**20**	0.5	10	**23**			
0.6	**Discontinued.**		0.6	10	**23**	0.6	11	**26**			
			0.7	10	**23**	0.7	10	**23**			
			0.8	9	**20**	0.8	12	**28**			
			0.9	11	**26**	0.9	12	**28**			
			1.0	9	**20**	1.0	12	**28**			
				Discontinued.		**Discontinued.**					

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**25 November 2016**
Sample description :	**Bulk Fill (Sand)**
Sample condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG428**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	80A	80B	88B	90B	92B	150A	152A
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.89	1.95	1.86	1.70	1.98	1.84	1.78
Dry Density (t/m³)	1.67	1.80	1.71	1.57	1.79	1.69	1.66
Water Content (%)	13.1	8.3	8.3	7.8	10.3	8.7	7.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	103	111	105	97	110	104	102

Oven Corrected Test Results							
Dry Density (t/m³)	1.66	1.78	1.70	1.55	1.79	1.67	1.66
Water Content (%)	13.8	10.0	9.1	9.2	10.5	10.0	7.3
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**102**	**109**	**104**	**95**	**110**	**103**	**102**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Date reported : 1 December 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*
Date : 1 December 2016

Opus International Consultants Ltd
Tauranga Laboratory
Quality Management Systems Certified to ISO 9001

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**25 November 2016**
Sample description :	**Bulk Fill (Sand)**
Sample condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.63 t/m³**
Optimum water content (tested) :	**17 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG428**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	154A	174A					
Test Probe Depth (mm)	300	300					
Wet Density (t/m³)	1.78	1.97					
Dry Density (t/m³)	1.65	1.85					
Water Content (%)	7.9	6.3					
Air Voids (%)	--	--					
% of MDD	101	114					

Oven Corrected Test Results							
Dry Density (t/m³)	1.64	1.85					
Water Content (%)	8.4	6.3					
Air Voids (%)	--	--					
% of MDD	**101**	**114**					

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 2 samples obtained from the TEL stockpile. (refer 16/425, dated 10/6/16.)

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**25 November 2016**
Sample description :	**Bulk Fill (Sand)**
Sample condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density (tested) :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**18 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG428**
Client Order No :	**NMc - 028162**

Nuclear Densometer Test Results							
Test Number	79C	91C					
Test Probe Depth (mm)	300	300					
Wet Density (t/m³)	1.81	1.76					
Dry Density (t/m³)	1.66	1.61					
Water Content (%)	8.8	8.8					
Air Voids (%)	--	--					
% of MDD	105	102					

Oven Corrected Test Results							
Dry Density (t/m³)	1.64	1.61					
Water Content (%)	10.0	9.1					
Air Voids (%)	--	--					
% of MDD	**104**	**102**					

Test Method	Notes
In-situ Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were pegged and surveyed by Higgins Contractors BOP Ltd staff. The solid density, maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16)

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**25 November 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG428**
Client Order No :	**NMc-028162**

Test number : 79C Location : Adjacent to nuclear density test			Test number : 80A Location : Adjacent to nuclear density test			Test number : 80B Location : Adjacent to nuclear density test			Test number : 88B Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	2	**4**	0.1	3	**6**	0.1	2	**4**	0.1	2	**4**
0.2	2	**4**	0.2	6	**13**	0.2	5	**10**	0.2	5	**10**
0.3	5	**10**	0.3	9	**20**	0.3	9	**20**	0.3	10	**23**
0.4	6	**13**	0.4	15	**36**	0.4	13	**30**	0.4	14	**33**
0.5	6	**13**	0.5	19	**46**	0.5	16	**38**	0.5	16	**38**
0.6	6	**13**	0.6	>20	**>48**	0.6	18	**43**	0.6	19	**46**
0.7	5	**10**	0.7	**Discontinued.**		0.7	>20	**>48**	0.7	>20	**>48**
0.8	6	**13**	0.8			0.8	**Discontinued.**		0.8	**Discontinued.**	
0.9	6	**13**	0.9			0.9			0.9		
1.0	5	**10**	1.0			1.0			1.0		
1.1	7	**16**	1.1			1.1			1.1		
1.2	7	**16**	1.2			1.2			1.2		
1.3	5	**10**	1.3			1.3			1.3		
1.4	6	**13**	1.4			1.4			1.4		
1.5	6	**13**	1.5			1.5			1.5		

Test Methods	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Date reported : 1 December 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 1 December 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**25 November 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG428**
Client Order No :	**NMc-028162**

Test number : 90B Location : Adjacent to nuclear density test			Test number : 91C Location : Adjacent to nuclear density test			Test number : 92B Location : Adjacent to nuclear density test			Test number : 150A Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	2	**4**	0.1	2	**4**	0.1	2	**4**
0.2	1	**2**	0.2	3	**6**	0.2	6	**13**	0.2	2	**4**
0.3	1	**2**	0.3	5	**10**	0.3	10	**23**	0.3	5	**10**
0.4	1	**2**	0.4	4	**8**	0.4	16	**38**	0.4	9	**20**
0.5	1	**2**	0.5	13	**30**	0.5	19	**46**	0.5	11	**26**
0.6	1	**2**	0.6	16	**38**	0.6	>20	**>48**	0.6	11	**26**
0.7	1	**2**	0.7	19	**46**	0.7	**Discontinued.**		0.7	12	**28**
0.8	7	**16**	0.8	19	**46**	0.8			0.8	18	**43**
0.9	13	**30**	0.9	>20	**>48**	0.9			0.9	>20	**>48**
1.0	16	**38**	1.0	**Discontinued.**		1.0			1.0	**Discontinued.**	
1.1	>20	**>48**	1.1			1.1			1.1		
1.2	**Discontinued.**		1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

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Date reported : 1 December 2016

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 1 December 2016

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 6**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Jacob Steens (Opus Laboratory)**
Date tested :	**25 November 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG428**
Client Order No :	**NMc-028162**

Test number : 152A Location : Adjacent to nuclear density test			Test number : 154A Location : Adjacent to nuclear density test			Test number : 174A Location : Adjacent to nuclear density test			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	3	**6**	0.1	1	**2**	0.1	1	**2**			
0.2	4	**8**	0.2	3	**6**	0.2	1	**2**			
0.3	8	**18**	0.3	5	**10**	0.3	4	**8**			
0.4	11	**26**	0.4	10	**23**	0.4	5	**10**			
0.5	12	**28**	0.5	12	**28**	0.5	7	**16**			
0.6	16	**38**	0.6	14	**33**	0.6	16	**38**			
0.7	18	**43**	0.7	14	**33**	0.7	>20	**>48**			
0.8	19	**46**	0.8	16	**38**	0.8	**Discontinued.**				
0.9	>20	**>48**	0.9	19	**46**	0.9					
1.0	**Discontinued.**		1.0	>20	**>48**	1.0					
1.1			1.1	**Discontinued.**		1.1					
1.2			1.2			1.2					
1.3			1.3			1.3					
1.4			1.4			1.4					
1.5			1.5			1.5					

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**19 December 2016**
Sample description :	**Bulk Fill (Pumice)**
Sample condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.26 t/m³**
Optimum water content (tested) :	**30 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG499**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	176-1	176-2	178	180	184	186	
Test Probe Depth (mm)	300	300	300	300	300	300	
Wet Density (t/m³)	1.56	1.44	1.54	1.45	1.64	1.56	
Dry Density (t/m³)	1.20	1.24	1.23	1.22	1.40	1.32	
Water Content (%)	29.3	15.9	25.4	18.1	16.8	17.9	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	96	99	97	97	111	105	

Oven Corrected Test Results							
Dry Density (t/m³)	1.19	1.22	1.22	1.18	1.43	1.28	
Water Content (%)	31.0	18.5	25.7	22.6	14.2	21.9	
Air Voids (%)	--	--	--	--	--	--	
% of MDD	**94**	**97**	**97**	**94**	**114**	**101**	

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values were obtained from Fulton Hogan BOP Laboratory report MDD:BOP16S-03047, dated 12/12/16.

This report may only be reproduced in full.

Date reported : 23 January 2017

Approved

Designation : *Senior Civil Engineering Technician*
Date : 23 January 2017

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**19 December 2016**
Sample description :	**Bulk Fill (Sand)**
Sample condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**18 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG499**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	187C	188C	189C	191C	192C	193C	194C*
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.91	1.98	2.02	1.96	1.89	1.71	1.64
Dry Density (t/m³)	1.64	1.74	1.76	1.72	1.76	1.61	1.56
Water Content (%)	16.5	13.5	14.4	14.1	7.1	6.2	5.4
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	104	110	112	109	112	102	98

Oven Corrected Test Results							
Dry Density (t/m³)	1.62	1.73	1.78	1.71	1.73	1.58	1.54
Water Content (%)	18.0	14.1	13.6	14.7	9.1	8.3	6.3
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**102**	**110**	**112**	**108**	**110**	**100**	**98**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16)

*IANZ accreditation of this report excludes the nuclear densomter and oven corrected test results of test 194C as the wet density value fell outside the nuclear densometer calibration range of 1700 - 2650kg/m3.

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Designation : *Senior Civil Engineering Technician*
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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**19 December 2016**
Sample description :	**Bulk Fill (Sand)**
Sample condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**– t/m³**
Max dry density (tested) :	**1.58 t/m³**
Optimum water content (tested) :	**18 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG499**
Client Order No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	196C	198C*	200C*				
Test Probe Depth (mm)	300	300	300				
Wet Density (t/m³)	1.73	1.64	1.65				
Dry Density (t/m³)	1.64	1.56	1.58				
Water Content (%)	5.7	4.9	4.3				
Air Voids (%)	--	--	--				
% of MDD	104	99	100				

Oven Corrected Test Results							
Dry Density (t/m³)	1.63	1.56	1.57				
Water Content (%)	6.4	5.0	5.2				
Air Voids (%)	--	--	--				
% of MDD	**103**	**99**	**99**				

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values are the average of the 4 samples tested for zone 1. (refer 16/194, dated 11/04/16)

*IANZ accreditation of this report excludes the nuclear densomter and oven corrected test results of test 198C & 200C as the wet density values fell outside the nuclear densometer calibration range of 1700 - 2650kg/m3.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**19 December 2016**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG499**
Client Order No :	**NMc-028162**

Test number : 176-1 Location : Adjacent to nuclear density test			Test number : 176-2 Location : Adjacent to nuclear density test			Test number : 178 Location : Adjacent to nuclear density test			Test number : 180 Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	>20	>48	0.1	>20	>48	0.1	>20	>48	0.1	>20	>48
0.2	**Discontinued.**		0.2	**Discontinued.**		0.2	**Discontinued.**		0.2	**Discontinued.**	
0.3			0.3			0.3			0.3		
0.4			0.4			0.4			0.4		
0.5			0.5			0.5			0.5		
0.6			0.6			0.6			0.6		
0.7			0.7			0.7			0.7		
0.8			0.8			0.8			0.8		
0.9			0.9			0.9			0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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Designation : *Senior Civil Engineering Technician*

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**19 December 2016**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG499**
Client Order No :	**NMc-028162**

Test number : 184 Location : Adjacent to nuclear density test			Test number : 186 Location : Adjacent to nuclear density test			Test number : Location :			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	>20	>48	0.1	4	8	0.1			0.1		
0.2	Discontinued.		0.2	6	13	0.2			0.2		
0.3			0.3	6	13	0.3			0.3		
0.4			0.4	3	6	0.4			0.4		
0.5			0.5	4	8	0.5			0.5		
0.6			0.6	2	4	0.6			0.6		
0.7			0.7	2	4	0.7			0.7		
0.8			0.8	1	2	0.8			0.8		
0.9			0.9	1	2	0.9			0.9		
1.0			1.0	1	2	1.0			1.0		
1.1			1.1	1	2	1.1			1.1		
1.2			1.2	1	2	1.2			1.2		
1.3			1.3	1	2	1.3			1.3		
1.4			1.4	1	2	1.4			1.4		
1.5			1.5	1	2	1.5			1.5		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Date reported : 23 January 2017

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 23 January 2017

Opus International Consultants Ltd
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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**19 December 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG499**
Client Order No :	**NMc-028162**

Test number : 187C Location : Adjacent to nuclear density test			Test number : 188C Location : Adjacent to nuclear density test			Test number : 189C Location : Adjacent to nuclear density test			Test number : 191C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	1	**2**	0.2	2	**4**	0.2	2	**4**	0.2	2	**4**
0.3	2	**4**	0.3	4	**8**	0.3	3	**6**	0.3	4	**8**
0.4	3	**6**	0.4	5	**10**	0.4	4	**8**	0.4	5	**10**
0.5	5	**10**	0.5	5	**10**	0.5	4	**8**	0.5	6	**13**
0.6	4	**8**	0.6	7	**16**	0.6	4	**8**	0.6	5	**10**
0.7	4	**8**	0.7	7	**16**	0.7	4	**8**	0.7	4	**8**
0.8	3	**6**	0.8	7	**16**	0.8	4	**8**	0.8	2	**4**
0.9	3	**6**	0.9	6	**13**	0.9	4	**8**	0.9	2	**4**
1.0	3	**6**	1.0	7	**16**	1.0	4	**8**	1.0	2	**4**
1.1	4	**8**	1.1	7	**16**	1.1	3	**6**	1.1	1	**2**
1.2	4	**8**	1.2	8	**18**	1.2	3	**6**	1.2	3	**6**
1.3	4	**8**	1.3	8	**18**	1.3	3	**6**	1.3	2	**4**
1.4	4	**8**	1.4	7	**16**	1.4	4	**8**	1.4	3	**6**
1.5	4	**8**	1.5	8	**18**	1.5	3	**6**	1.5	2	**4**

Test Methods	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**19 December 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG499**
Client Order No :	**NMc-028162**

Test number : 192C Location : Adjacent to nuclear density test			Test number : 193C Location : Adjacent to nuclear density test			Test number : 194C Location : Adjacent to nuclear density test			Test number : 196C Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	**2**	0.1	1	**2**	0.1	1	**2**	0.1	1	**2**
0.2	1	**2**	0.2	1	**2**	0.2	1	**2**	0.2	1	**2**
0.3	1	**2**	0.3	3	**6**	0.3	3	**6**	0.3	2	**4**
0.4	3	**6**	0.4	4	**8**	0.4	4	**8**	0.4	3	**6**
0.5	3	**6**	0.5	4	**8**	0.5	5	**10**	0.5	4	**8**
0.6	3	**6**	0.6	4	**8**	0.6	5	**10**	0.6	4	**8**
0.7	3	**6**	0.7	4	**8**	0.7	4	**8**	0.7	6	**13**
0.8	4	**8**	0.8	4	**8**	0.8	4	**8**	0.8	7	**16**
0.9	4	**8**	0.9	5	**10**	0.9	6	**13**	0.9	7	**16**
1.0	3	**6**	1.0	4	**8**	1.0	6	**13**	1.0	8	**18**
1.1	4	**8**	1.1	5	**10**	1.1	6	**13**	1.1	7	**16**
1.2	3	**6**	1.2	5	**10**	1.2	7	**16**	1.2	9	**20**
1.3	4	**8**	1.3	4	**8**	1.3	6	**13**	1.3	9	**20**
1.4	4	**8**	1.4	5	**10**	1.4	7	**16**	1.4	10	**23**
1.5	3	**6**	1.5	5	**10**	1.5	7	**16**	1.5	8	**18**

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Greg Cleaver & Logan Tutty (Opus Laboratory)**
Date tested :	**19 December 2016**
Material tested :	**Bulk Fill (Sand)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG499**
Client Order No :	**NMc-028162**

Test number : 198C Location : Adjacent to nuclear density test			Test number : 200C Location : Adjacent to nuclear density test			Test number : Location :			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	1	2	0.1	1	2						
0.2	1	2	0.2	1	2						
0.3	3	6	0.3	2	4						
0.4	3	6	0.4	3	6						
0.5	4	8	0.5	5	10						
0.6	4	8	0.6	6	13						
0.7	4	8	0.7	7	16						
0.8	4	8	0.8	6	13						
0.9	4	8	0.9	7	16						
1.0	3	6	1.0	7	16						
1.1	2	4	1.1	8	18						
1.2	2	4	1.2	7	16						
1.3	3	6	1.3	6	13						
1.4	2	4	1.4	8	18						
1.5	2	4	1.5	8	18						

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. This report may only be reproduced in full.

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material description :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (supplied) :	**1.26 t/m³**
Optimum water content (supplied) :	**30 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	133*	134*	135*	136*	137*	138*	139*
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.52	1.46	1.53	1.52	1.46	1.56	1.34
Dry Density (t/m³)	1.33	1.29	1.35	1.34	1.29	1.33	1.16
Water Content (%)	14.5	12.7	13.1	13.4	12.9	17.1	16.0
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	105	103	107	106	103	106	92

Oven Corrected Test Results

Dry Density (t/m³)	1.27	1.38	1.32	1.29	1.26	1.27	1.11
Water Content (%)	19.8	5.8	15.5	17.3	16.0	22.5	20.4
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**101**	**109**	**105**	**103**	**100**	**101**	**88**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values were obtained from Fulton Hogan's Bay of Plenty Laboratory report MDD:BOP16S-03047, dated 12/12/2016.

* IANZ accreditation excludes the nuclear density & oven corrected test results as the wet density values fall outside the densometer calibration range of 1700 - 2650kg/m3.

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Date reported : 7 February 2017

IANZ Approved Signatory

Designation : *Laboratory Manager*
Date : 7 February 2017

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material description :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (supplied) :	**1.26 t/m³**
Optimum water content (supplied) :	**30 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	140*	141*	142*	143*	144*	145*	146*
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.38	1.46	1.54	1.57	1.58	1.53	1.54
Dry Density (t/m³)	1.22	1.27	1.33	1.38	1.40	1.33	1.36
Water Content (%)	13.0	15.1	16.3	13.3	12.1	15.0	12.8
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	97	101	105	110	112	106	108

Oven Corrected Test Results							
Dry Density (t/m³)	1.19	1.23	1.28	1.35	1.34	1.32	1.31
Water Content (%)	16.4	19.1	20.3	16.4	17.2	16.1	17.6
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**94**	**97**	**102**	**107**	**107**	**105**	**104**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values were obtained from Fulton Hogan's Bay of Plenty Laboratory report MDD:BOP16S-03047, dated 12/12/2016.

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material description :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (supplied) :	**1.26 t/m³**
Optimum water content (supplied) :	**30 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	147*	148*					
Test Probe Depth (mm)	300	300					
Wet Density (t/m³)	1.49	1.46					
Dry Density (t/m³)	1.36	1.25					
Water Content (%)	10.0	17.1					
Air Voids (%)	--	--					
% of MDD	108	99					

Oven Corrected Test Results							
Dry Density (t/m³)	1.33	1.20					
Water Content (%)	11.9	21.5					
Air Voids (%)	--	--					
% of MDD	**106**	**96**					

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values were obtained from Fulton Hogan's Bay of Plenty Laboratory report MDD:BOP16S-03047, dated 12/12/2016.

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material description :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**– t/m³**
Max dry density (supplied) :	**1.26 t/m³**
Optimum water content (supplied) :	**30 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	187*	188*	189*	190*	191*	192*	193*
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.52	1.45	1.51	1.46	1.52	1.51	1.51
Dry Density (t/m³)	1.37	1.31	1.36	1.29	1.32	1.34	1.37
Water Content (%)	10.3	11.0	11.4	12.8	15.1	12.5	10.2
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	109	104	108	103	105	107	108

Oven Corrected Test Results

Dry Density (t/m³)	1.34	1.28	1.30	1.24	1.29	1.32	1.33
Water Content (%)	12.8	13.0	16.7	17.4	17.8	14.1	12.9
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**107**	**102**	**103**	**99**	**102**	**105**	**106**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values were obtained from Fulton Hogan's Bay of Plenty Laboratory report MDD:BOP16S-03047, dated 12/12/2016.

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material description :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-64130**
Solid density :	**-- t/m³**
Max dry density (supplied) :	**1.26 t/m³**
Optimum water content (supplied) :	**30 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	194*	195*	196*	197*	198*	199*	200*
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.43	1.50	1.53	1.54	1.51	1.47	1.41
Dry Density (t/m³)	1.28	1.32	1.34	1.39	1.31	1.29	1.24
Water Content (%)	12.0	13.3	14.0	10.6	15.4	13.9	13.5
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	101	105	106	110	104	103	99

Oven Corrected Test Results							
Dry Density (t/m³)	1.23	1.28	1.34	1.36	1.25	1.25	1.21
Water Content (%)	16.1	16.9	14.3	12.9	21.4	18.0	16.6
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**98**	**102**	**106**	**108**	**99**	**99**	**96**

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values were obtained from Fulton Hogan's Bay of Plenty Laboratory report MDD:BOP16S-03047, dated 12/12/2016.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Order No :	**NMc-028162**

Test number : 133 Location : Adjacent to nuclear density test			Test number : 134 Location : Adjacent to nuclear density test			Test number : 135 Location : Adjacent to nuclear density test			Test number : 136 Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	8	**18**	0.1	5	**10**	0.1	8	**18**	0.1	5	**10**
0.2	7	**16**	0.2	6	**13**	0.2	8	**18**	0.2	6	**13**
0.3	8	**18**	0.3	5	**10**	0.3	9	**20**	0.3	6	**13**
0.4	7	**16**	0.4	6	**13**	0.4	10	**23**	0.4	6	**13**
0.5	7	**16**	0.5	7	**16**	0.5	8	**18**	0.5	5	**10**
0.6	8	**18**	0.6	6	**13**	0.6	10	**23**	0.6	6	**13**
0.7	6	**13**	0.7	7	**16**	0.7	9	**20**	0.7	7	**16**
0.8	8	**18**	0.8	8	**18**	0.8	9	**20**	0.8	8	**18**
0.9	9	**20**	0.9	8	**18**	0.9	10	**23**	0.9	7	**16**
1.0	7	**16**	1.0	8	**18**	1.0	10	**23**	1.0	7	**16**
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Date reported : 7 February 2017

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 7 February 2017

Opus International Consultants Ltd
Tauranga Laboratory
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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Order No :	**NMc-028162**

Test number : 137 Location : Adjacent to nuclear density test			Test number : 138 Location : Adjacent to nuclear density test			Test number : 139 Location : Adjacent to nuclear density test			Test number : 140 Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	10	**23**	0.1	4	**8**	0.1	5	**10**	0.1	5	**10**
0.2	10	**23**	0.2	5	**10**	0.2	4	**8**	0.2	5	**10**
0.3	8	**18**	0.3	5	**10**	0.3	5	**10**	0.3	5	**10**
0.4	7	**16**	0.4	4	**8**	0.4	5	**10**	0.4	5	**10**
0.5	8	**18**	0.5	6	**13**	0.5	6	**13**	0.5	5	**10**
0.6	9	**20**	0.6	7	**16**	0.6	7	**16**	0.6	5	**10**
0.7	8	**18**	0.7	6	**13**	0.7	6	**13**	0.7	4	**8**
0.8	7	**16**	0.8	6	**13**	0.8	7	**16**	0.8	5	**10**
0.9	8	**18**	0.9	7	**16**	0.9	7	**16**	0.9	6	**13**
1.0	9	**20**	1.0	6	**13**	1.0	7	**16**	1.0	7	**16**
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Order No :	**NMc-028162**

Test number : 141 Location : Adjacent to nuclear density test			Test number : 142 Location : Adjacent to nuclear density test			Test number : 143 Location : Adjacent to nuclear density test			Test number : 144 Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	3	**6**	0.1	5	**10**	0.1	5	**10**	0.1	4	**8**
0.2	6	**13**	0.2	9	**20**	0.2	5	**10**	0.2	5	**10**
0.3	7	**16**	0.3	8	**18**	0.3	7	**16**	0.3	7	**16**
0.4	7	**16**	0.4	6	**13**	0.4	7	**16**	0.4	7	**16**
0.5	6	**13**	0.5	6	**13**	0.5	6	**13**	0.5	6	**13**
0.6	7	**16**	0.6	7	**16**	0.6	7	**16**	0.6	7	**16**
0.7	8	**18**	0.7	8	**18**	0.7	8	**18**	0.7	8	**18**
0.8	9	**20**	0.8	8	**18**	0.8	8	**18**	0.8	8	**18**
0.9	9	**20**	0.9	9	**20**	0.9	9	**20**	0.9	8	**18**
1.0	10	**23**	1.0	9	**20**	1.0	9	**20**	1.0	8	**18**
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 5**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Order No :	**NMc-028162**

Test number : 145 Location : Adjacent to nuclear density test			Test number : 146 Location : Adjacent to nuclear density test			Test number : 147 Location : Adjacent to nuclear density test			Test number : 148 Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	5	**10**	0.1	4	**8**	0.1	4	**8**	0.1	1	**2**
0.2	5	**10**	0.2	5	**10**	0.2	5	**10**	0.2	3	**6**
0.3	6	**13**	0.3	5	**10**	0.3	5	**10**	0.3	4	**8**
0.4	7	**16**	0.4	5	**10**	0.4	7	**16**	0.4	4	**8**
0.5	7	**16**	0.5	6	**13**	0.5	6	**13**	0.5	5	**10**
0.6	8	**18**	0.6	6	**13**	0.6	5	**10**	0.6	6	**13**
0.7	7	**16**	0.7	7	**16**	0.7	7	**16**	0.7	5	**10**
0.8	8	**18**	0.8	6	**13**	0.8	8	**18**	0.8	6	**13**
0.9	9	**20**	0.9	9	**20**	0.9	9	**20**	0.9	6	**13**
1.0	9	**20**	1.0	8	**18**	1.0	9	**20**	1.0	6	**13**
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Order No :	**NMc-028162**

Test number : 187 Location : Adjacent to nuclear density test			Test number : 188 Location : Adjacent to nuclear density test			Test number : 189 Location : Adjacent to nuclear density test			Test number : 190 Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	14	**33**	0.1	8	**18**	0.1	8	**18**	0.1	8	**18**
0.2	13	**30**	0.2	14	**33**	0.2	8	**18**	0.2	9	**20**
0.3	10	**23**	0.3	18	**43**	0.3	11	**26**	0.3	8	**18**
0.4	9	**20**	0.4	>20	**>48**	0.4	14	**33**	0.4	10	**23**
0.5	10	**23**	0.5			0.5	16	**38**	0.5	14	**33**
0.6	9	**20**	0.6			0.6	18	**43**	0.6	15	**36**
0.7	11	**26**	0.7			0.7	>20	**>48**	0.7	16	**38**
0.8	15	**36**	0.8			0.8			0.8	>20	**>48**
0.9	18	**43**	0.9			0.9			0.9		
1.0	>20	**>48**	1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Order No :	**NMc-028162**

Test number : 191 Location : Adjacent to nuclear density test			Test number : 192 Location : Adjacent to nuclear density test			Test number : 193 Location : Adjacent to nuclear density test			Test number : 194 Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	9	**20**	0.1	10	**23**	0.1	13	**30**	0.1	10	**23**
0.2	10	**23**	0.2	12	**28**	0.2	13	**30**	0.2	12	**28**
0.3	10	**23**	0.3	12	**28**	0.3	11	**26**	0.3	13	**30**
0.4	9	**20**	0.4	14	**33**	0.4	9	**20**	0.4	16	**38**
0.5	10	**23**	0.5	>20	**>48**	0.5	8	**18**	0.5	14	**33**
0.6	12	**28**	0.6			0.6	10	**23**	0.6	17	**41**
0.7	14	**33**	0.7			0.7	14	**33**	0.7	>20	**>48**
0.8	18	**43**	0.8			0.8	18	**43**	0.8		
0.9	>20	**>48**	0.9			0.9	18	**43**	0.9		
1.0			1.0			1.0	>20	**>48**	1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Order No :	**NMc-028162**

Test number : 195 Location : Adjacent to nuclear density test			Test number : 196 Location : Adjacent to nuclear density test			Test number : 197 Location : Adjacent to nuclear density test			Test number : 198 Location : Adjacent to nuclear density test		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	7	**16**	0.1	5	**10**	0.1	8	**18**	0.1	8	**18**
0.2	10	**23**	0.2	8	**18**	0.2	11	**26**	0.2	9	**20**
0.3	10	**23**	0.3	7	**16**	0.3	10	**23**	0.3	13	**30**
0.4	12	**28**	0.4	7	**16**	0.4	12	**28**	0.4	14	**33**
0.5	14	**33**	0.5	6	**13**	0.5	14	**33**	0.5	12	**28**
0.6	16	**38**	0.6	7	**16**	0.6	16	**38**	0.6	17	**41**
0.7	18	**43**	0.7	8	**18**	0.7	18	**43**	0.7	>20	**>48**
0.8	>20	**>48**	0.8	7	**16**	0.8	18	**43**	0.8		
0.9			0.9	8	**18**	0.9	17	**41**	0.9		
1.0			1.0	8	**18**	1.0	>20	**>48**	1.0		
1.1			1.1	>20	**>48**	1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 1**
Location :	**Zone 7**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Brett McDonald & Jacob Steens (Opus Laboratory)**
Date tested :	**20 January 2016**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG558**
Client Order No :	**NMc-028162**

Test number : 199			Test number : 200			Test number :			Test number :		
Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location :			Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	8	**18**	0.1	7	**16**	0.1			0.1		
0.2	9	**20**	0.2	7	**16**	0.2			0.2		
0.3	9	**20**	0.3	7	**16**	0.3			0.3		
0.4	10	**23**	0.4	9	**20**	0.4			0.4		
0.5	9	**20**	0.5	12	**28**	0.5			0.5		
0.6	10	**23**	0.6	16	**38**	0.6			0.6		
0.7	12	**28**	0.7	>20	**>48**	0.7			0.7		
0.8	16	**38**	0.8			0.8			0.8		
0.9	>20	**>48**	0.9			0.9			0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Date reported : 7 February 2017

IANZ Approved Signatory

Designation : *Laboratory Manager*

Date : 7 February 2017

Opus International Consultants Ltd
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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 2B**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Jacob Steens & David Boodle (Opus Laboratory)**
Date tested :	**8 February 2017**
Material description :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**Unknown**
Max. dry density (supplied) :	**1.26 t/m³**
Optimum water content (supplied) :	**30 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG611**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results

Test Number	134*	136	138*	140*	142*	144*	146*
Test Probe Depth (mm)	300	300	300	300	300	300	300
Wet Density (t/m³)	1.50	1.72	1.42	1.47	1.50	1.52	1.48
Dry Density (t/m³)	1.38	1.60	1.31	1.33	1.36	1.40	1.35
Water Content (%)	8.5	7.0	8.1	10.2	10.1	8.9	10.1
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	109	127	104	106	108	111	107

Oven Corrected Test Results

Dry Density (t/m³)	1.34	1.57	1.29	1.30	1.34	1.39	1.29
Water Content (%)	11.5	9.4	9.8	12.3	11.6	9.3	15.4
Air Voids (%)	--	--	--	--	--	--	--
% of MDD	**106**	**124**	**103**	**104**	**106**	**111**	**102**

Test Methods	Notes
In-situ Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values were obtained from Fulton Hogan's Bay of Plenty Laboratory report MDD:BOP16S-03047, dated 12/12/2016.

* IANZ accreditation excludes the nuclear density & oven corrected results of tests 134, 138, 140, 142, 144 & 146 as the wet density values fell outside the densometer calibration range of 1700 - 2650kg/m3.

The laboratory water content test results are IANZ accredited.

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Date reported : 28 February 2017

IANZ ACCREDITED LABORATORY

Tests indicated as not accredited are outside the scope of the laboratory's accreditation

IANZ Approved Signatory

Designation : *Senior Civil Engineering Technician*

Date : 28 February 2017

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EARTHWORKS COMPACTION CONTROL TEST RESULTS

OPUS

Project :	**Te Okuroa Drive Bulk Earthworks Contract - Stage 2B**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Jacob Steens & David Boodle (Opus Laboratory)**
Date tested :	**8 February 2017**
Material description :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**
Nuclear densometer no :	**3440-31344**
Solid density :	**Unknown**
Max dry density (supplied) :	**1.26 t/m³**
Optimum water content (supplied) :	**30 %**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG611**
Client Ref No :	**NMc-028162**

Nuclear Densometer Test Results							
Test Number	148*						
Test Probe Depth (mm)	300						
Wet Density (t/m³)	1.42						
Dry Density (t/m³)	1.30						
Water Content (%)	9.1						
Air Voids (%)	--						
% of MDD	103						

Oven Corrected Test Results							
Dry Density (t/m³)	1.26						
Water Content (%)	12.9						
Air Voids (%)	--						
% of MDD	**100**						

Test Methods	Notes
Insitu Density & Water Content : NZS 4407 : 2015, Test 4.2 Water Content : NZS 4402 : 1986, Test 2.1	The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff. The maximum dry density and optimum water content values were obtained from Fulton Hogan's Bay of Plenty Laboratory report MDD:BOP16S-03047, dated 12/12/2016.

* IANZ accreditation excludes the nuclear density & oven corrected results of test 148
as the wet density value fell outside the densometer calibration range of 1700 - 2650kg/m3.
The laboratory water content test results are IANZ accredited.
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Date reported : 28 February 2017

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthwoks Contract - Stage 2B**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Jacob Steens & David Boodle (Opus Laboratory)**
Date tested :	**8 February 2017**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG611**
Client Ref No :	**NMc-028162**

Test number : 134			Test number : 136			Test number : 138			Test number : 140		
Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	7	**16**	0.1	4	**8**	0.1	5	**10**	0.1	4	**8**
0.2	9	**20**	0.2	7	**16**	0.2	5	**10**	0.2	6	**13**
0.3	14	**33**	0.3	8	**18**	0.3	5	**10**	0.3	9	**20**
0.4	19	**46**	0.4	12	**28**	0.4	7	**16**	0.4	16	**38**
0.5	>20	**>48**	0.5	15	**36**	0.5	9	**20**	0.5	16	**38**
0.6			0.6	18	**43**	0.6	7	**16**	0.6	>20	**>48**
0.7			0.7	>20	**>48**	0.7	9	**20**	0.7		
0.8			0.8			0.8	12	**28**	0.8		
0.9			0.9			0.9	12	**28**	0.9		
1.0			1.0			1.0	10	**23**	1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthwoks Contract - Stage 2B**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Jacob Steens & David Boodle (Opus Laboratory)**
Date tested :	**8 February 2017**
Material tested :	**Bulk Fill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG611**
Client Ref No :	**NMc-028162**

Test number : 142			Test number : 144			Test number : 146			Test number : 148		
Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**			Location : **Adjacent to nuclear density test**		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	6	**13**	0.1	13	**30**	0.1	9	**20**	0.1	3	**6**
0.2	12	**28**	0.2	15	**36**	0.2	12	**28**	0.2	5	**10**
0.3	12	**28**	0.3	19	**46**	0.3	10	**23**	0.3	8	**18**
0.4	>20	**>48**	0.4	>20	**>48**	0.4	14	**33**	0.4	10	**23**
0.5			0.5			0.5	14	**33**	0.5	9	**20**
0.6			0.6			0.6	16	**38**	0.6	10	**23**
0.7			0.7			0.7	>20	**>48**	0.7	11	**26**
0.8			0.8			0.8			0.8	11	**26**
0.9			0.9			0.9			0.9	9	**20**
1.0			1.0			1.0			1.0	10	**23**
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2.0			2.0			2.0		

Test Methods	Notes
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values. The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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PENETRATION RESISTANCE OF A SOIL TEST REPORT

OPUS

Project :	**Te Okuroa Drive Bulk Earthwoks Contract - Stage 2B**
Location :	**Papamoa**
Client :	**Higgins Contractors BOP Ltd**
Contractor :	**Andrew Young Earthmovers Ltd**
Tested by :	**Jacob Steens & David Boodle (Opus Laboratory)**
Date tested :	**8 February 2017**
Material tested :	**Retaining Wall Backfill (Pumice)**
Material condition :	**Compacted**

Project No :	**255568.02/0TL**
Lab Ref No :	**TG611**
Client Ref No :	**NMc-028162**

Test number : 1 Test level : **Finished Level**			Test number : 2 Test level : **Finished Level**			Test number : 3 Test level : **Finished Level**			Test number : Location :		
Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR	Depth (m)	Blows No.	Inf'd CBR
0.1	4	**8**	0.1	3	**6**	0.1	4	**8**	0.1		
0.2	6	**13**	0.2	4	**8**	0.2	6	**13**	0.2		
0.3	7	**16**	0.3	4	**8**	0.3	7	**16**	0.3		
0.4	5	**10**	0.4	7	**16**	0.4	5	**10**	0.4		
0.5	5	**10**	0.5	7	**16**	0.5	5	**10**	0.5		
0.6	5	**10**	0.6	5	**10**	0.6	5	**10**	0.6		
0.7	5	**10**	0.7	5	**10**	0.7	5	**10**	0.7		
0.8	6	**13**	0.8	5	**10**	0.8	5	**10**	0.8		
0.9	12	**28**	0.9	5	**10**	0.9	5	**10**	0.9		
1.0	16	**38**	1.0	5	**10**	1.0	5	**10**	1.0		
1.1	14	**33**	1.1	6	**13**	1.1	6	**13**	1.1		
1.2	15	**36**	1.2	7	**16**	1.2	5	**10**	1.2		
1.3	19	**46**	1.3	15	**36**	1.3	6	**13**	1.3		
1.4	>20	**>48**	1.4	17	**41**	1.4	5	**10**	1.4		
1.5			1.5	19	**46**	1.5	7	**16**	1.5		
1.6			1.6	>20	**>48**	1.6	8	**18**	1.6		
1.7			1.7			1.7	9	**20**	1.7		
1.8			1.8			1.8	9	**20**	1.8		
1.9			1.9			1.9	7	**16**	1.9		
2.0			2.0			2.0	10	**23**	2.0		

Test Methods	**Notes**
Determination of the Penetration Resistance, NZS 4402 : 1988, Test 6.5.2 Inferred CBR values taken from Austroads Pavement Design Manual 2004	IANZ accreditation excludes the inferred CBR values and the scala penetrometer results below 1.5 metres.

The test positions were selected and surveyed by Higgins Contractors BOP Ltd staff.

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Tel.: 09-2737300
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Test Report On Basecourse

Client Reference 20828

Report No. **25173**

Clients Order No.	5005800	**Sample No.**	20828
Sampled By	E.J.West	**Project**	1
Date Layed	Unknown	**Sample Source**	Kennedy Subdivision
Sampling Location	Road 2	**Project Name**	Higgins Contractors BOP
Sample Condition	Damp	**Date Received**	9/06/2017
Method	Not known		
	Endorsement does not include sampling		

Target Density	1.98	**Material Type**	GAP40 Basecourse	**Probe depth**	NA
				Gauge I D	27732
Target Moisture	8.5	**Source Of Data**	Client Supplied	**Solid Density**	2.58

Test Method Moisture Density Gauge - Backscatter ModeNZS 4007:1991 Test 4.2.2

Test #	Site	Offset CL (M)	Wet Density t/m³	Dry Density t/m³	% Water Content	% MDD
01	Road2/335/L	0.0	2.17	2.02	7.5	**102%**
02	Road2/350/R	0.0	2.18	2.04	7.0	**103%**
03	Road2/365/L	0.0	2.20	2.04	8.0	**103%**
04	Road4/10/L	0.0	2.20	2.05	7.5	**104%**
05	Road4/10/R	0.0	2.18	2.05	6.5	**104%**
06	Road4/140/L	0.0	2.18	2.05	6.5	**104%**
07	Road4/155/R	0.0	2.24	2.10	6.5	**106%**
08	Road4/170L	0.0	2.23	2.10	6.5	**106%**
09	Road4/185/R	0.0	2.16	2.02	6.5	**102%**
10	Road6/260/L	0.0	2.16	2.02	7.0	**102%**
					Mean Value	**104%**
					Min Value	**102%**

Date Tested 8/06/2017

Checked By

Monday, 12 June 2017

Tested By

E.J.West

Approved Signatory

David Jones

Form: Extrox.00

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All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Test Report On Top of Fill

Client Reference 20829

Report No. **25174**

Clients Order No.	5005880	**Sample No.**	20829
Sampled By	E.J.West	**Project**	1
Date Layed	20/03/2017	**Sample Source**	Terrace Views Subdivision
Sampling Location	Retaining wall	**Project Name**	Higgins Contractors BOP
Sample Condition	Damp	**Date Received**	9/06/2017
Method	Not known		
	Endorsement does not include sampling		

Target Density	1.26	**Material Type**	Rhyolite	**Probe depth**	NA
Target Moisture	30.0	**Source Of Data**	Client Supplied	**Gauge I D**	27732
				Solid Density	2.51

Test Method Moisture Density Gauge - Backscatter ModeNZS 4007:1991 Test 4.2.2

Test #	Site	Offset CL (M)	Wet Density t/m³	Dry Density t/m³	% Water Content	% MDD
01	A1/5.0	0.0	1.61	1.44	12.0	**114%**
02	B1/5.0	0.0	1.59	1.39	14.0	**110%**
03	B2/10.0	0.0	1.62	1.42	13.5	**113%**
04	C1/5.0	0.0	1.64	1.47	11.5	**117%**
05	C2/10.0	0.0	1.63	1.46	12.0	**116%**
06	D1/5.0	0.0	1.64	1.45	13.5	**115%**
07	D2/10.0	0.0	1.64	1.46	12.0	**116%**
08	E1/5.0	0.0	1.62	1.44	12.5	**114%**
09	E2/10.0	0.0	1.73	1.54	12.0	**122%**
					Mean Value	**115%**
					Min Value	**110%**

Date Tested 20/03/2017

Checked By

Monday, 12 June 2017

Tested By pp DF
E.J.West

Approved Signatory

David Jones

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Test Report On Natural Sand

Client Reference 20830

Report No. 25177

Clients Order No.	5005880	**Sample No.**	20830
Sampled By	E.J.West	**Project**	1
Date Layed	Unknown	**Sample Source**	Terrace Views Subdivision
Sampling Location	Retaining wall	**Project Name**	Higgins Contractors BOP
Sample Condition	Damp	**Date Received**	9/06/2017
Method	Not known		
	Endorsement does not include sampling		

Target Density	1.58	**Material Type**	Medium-fine SAND	**Probe depth**	NA
				Gauge I D	27732
Target Moisture	17.0	**Source Of Data**	Client Supplied	**Solid Density**	2.65

Test Method Moisture Density Gauge - Backscatter ModeNZS 4007:1991 Test 4.2.2

Test #	Site	Offset CL (M)	Wet Density t/m³	Dry Density t/m³	% Water Content	% MDD
01	H1/5.0	0.0	1.84	1.59	16.0	**101%**
02	H2/10.0	0.0	1.88	1.56	21.0	**98%**
03	I-1/5.0	0.0	1.92	1.66	16.0	**105%**
04	I- 2/10.0	0.0	1.88	1.55	21.0	**98%**
05	J1/5.0	0.0	1.84	1.62	13.5	**102%**
06	J2/10.0	0.0	1.82	1.60	14.0	**101%**
07	K1/5.0	0.0	1.79	1.57	14.5	**99%**
08	K2/10.0	0.0	1.81	1.58	14.0	**100%**
09	N1/5.0	0.0	1.85	1.63	13.5	**103%**
10	N2/10.0	0.0	1.81	1.58	15.0	**100%**
					Mean Value	**101%**
					Min Value	**98%**

Date Tested 21/03/2017

Checked By

Tuesday, 13 June 2017

Tested By

E.J.West

Approved Signatory

David Jones

Form: Extrox.00

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Name	Greg Holland
Client	Higgins Contractors Bay of Plenty
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	Mount Maunganui

Higgins Contractors Auckland Laboratory
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PO Box 51118, Pakuranga
Auckland, New Zealand
Tel.: 09-2737300
Fax: 09-2711245

Test Report On Top of Fill

Client Reference 20831

Report No. 25178

Clients Order No.	5005880	**Sample No.**	20831
Sampled By	E.J.West	**Project**	1
Date Layed	22/03/2017	**Sample Source**	Terrace Views Subdivision
Sampling Location	Retaining wall	**Project Name**	Higgins Contractors BOP
Sample Condition	Damp	**Date Received**	9/06/2017
Method	Not known		
	Endorsement does not include sampling		

Target Density	1.26	**Material Type**	Rhyolite	**Probe depth**	NA
				Gauge I D	27732
Target Moisture	30.0	**Source Of Data**	Client Supplied	**Solid Density**	2.51

Test Method Moisture Density Gauge - Backscatter ModeNZS 4007:1991 Test 4.2.2

Test #	Site	Offset CL (M)	Wet Density t/m³	Dry Density t/m³	% Water Content	% MDD
01	M1/5.0	0.0	1.60	1.36	17.5	**108%**
02	M2/10.0	0.0	1.63	1.38	18.0	**110%**
03	L1/5.0	0.0	1.65	1.41	17.0	**112%**
04	L2/10.0	0.0	1.66	1.44	15.5	**114%**
05	K1/5.0	0.0	1.61	1.39	15.5	**110%**
06	K2/10.0	0.0	1.68	1.40	19.5	**111%**
07	J1/5.0	0.0	1.67	1.44	16.0	**114%**
08	J2/10.0	0.0	1.64	1.36	20.5	**108%**
09	I-1/5.0	0.0	1.66	1.42	17.0	**112%**
10	I-2/10.0	0.0	1.58	1.35	17.0	**107%**
11	H1/5.0	0.0	1.62	1.40	15.5	**111%**
12	H2/10.0	0.0	1.68	1.42	18.5	**112%**
13	G1/5.0	0.0	1.69	1.51	12.0	**120%**
14	G2/10.0	0.0	1.68	1.45	16.0	**115%**
15	F1/5.0	0.0	1.64	1.46	12.0	**116%**
16	F2/10.0	0.0	1.74	1.53	14.0	**121%**

Date Tested 23/03/2017

Tested By PP E.J.West

Checked By

Approved Signatory

Tuesday, 13 June 2017

David Jones

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Test Report On Top of Fill

Client Reference 20831

Report No. **25178**

Clients Order No.	5005880	**Sample No.**	20831
Sampled By	E.J.West	**Project**	1
Date Layed	22/03/2017	**Sample Source**	Terrace Views Subdivision
Sampling Location	Retaining wall	**Project Name**	Higgins Contractors BOP
Sample Condition	Damp	**Date Received**	9/06/2017
Method	Not known		
	Endorsement does not include sampling		

Target Density	1.26	**Material Type**	Rhyolite	**Probe depth**	NA
				Gauge I D	27732
Target Moisture	30.0	**Source Of Data**	Client Supplied	**Solid Density**	2.51

Test Method Moisture Density Gauge - Backscatter ModeNZS 4007:1991 Test 4.2.2

Mean Value	**113%**
Min Value	**107%**

Date Tested 23/03/2017

Checked By

Tuesday, 13 June 2017

Form: Extrox.00

Tested By PP DF
E.J.West

Approved Signatory

David Jones

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Test Report On 750mm Lift Level

Client Reference 20832

Report No. 25179

Clients Order No.	5005880	**Sample No.**	20832
Sampled By	E.J.West	**Project**	1
Date Layed	22/03/2017	**Sample Source**	Terrace Views Subdivision
Sampling Location	Retaining wall	**Project Name**	Higgins Contractors BOP
Sample Condition	Damp	**Date Received**	9/06/2017
Method	Not known		
	Endorsement does not include sampling		

Target Density	1.26	**Material Type**	Rhyolite	**Probe depth**	NA
Target Moisture	30.0	**Source Of Data**	Client Supplied	**Gauge I D**	27732
				Solid Density	2.51

Test Method Moisture Density Gauge - Backscatter ModeNZS 4007:1991 Test 4.2.2

Test #	Site	Offset CL (M)	Wet Density t/m³	Dry Density t/m³	% Water Content	% MDD
01	M1/5.0	0.0	1.62	1.34	21.0	**106%**
02	L1/5.0	0.0	1.59	1.34	18.0	**107%**
03	K1/5.0	0.0	1.61	1.35	19.0	**107%**
04	K2/10.0	0.0	1.46	1.25	17.5	**99%**
05	J1/5.0	0.0	1.60	1.38	16.5	**109%**
06	J2/10.0	0.0	1.55	1.32	17.5	**105%**
07	I-1/5.0	0.0	1.58	1.32	19.0	**105%**
08	I-2/10.0	0.0	1.72	1.52	13.0	**121%**
09	H1/5.0	0.0	1.65	1.41	17.0	**112%**
10	H2/10.0	0.0	1.53	1.31	17.0	**104%**
					Mean Value	**107%**
					Min Value	**99%**

Date Tested 22/03/2017

Checked By

Monday, 12 June 2017

Tested By E.J.West

Approved Signatory David Jones

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Client	Higgins Contractors Bay of Plenty
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Test Report On Sand

Client Reference 20833

Report No. **25181**

Clients Order No.	5880/6180	**Sample No.**	20833
Sampled By	E.J.West	**Project**	1
Date Layed	23/04/2017	**Sample Source**	Terrace Views Subdivision
Sampling Location	Terrace Views	**Project Name**	Higgins Contractors BOP
Sample Condition	Damp	**Date Received**	9/06/2017
Method	Not known		
	Endorsement does not include sampling		

Target Density	1.58	**Material Type**	Medium-fine SAND	**Probe depth**	NA
				Gauge I D	27732
Target Moisture	17.0	**Source Of Data**	Client Supplied	**Solid Density**	2.65

Test Method Moisture Density Gauge - Backscatter ModeNZS 4007:1991 Test 4.2.2

Test #	Site	Offset CL (M)	Wet Density t/m³	Dry Density t/m³	% Water Content	% MDD
01	S1/6	0.0	1.74	1.60	9.0	**101%**
02	S2/6	0.0	1.76	1.64	7.0	**104%**
03	R1/16	0.0	1.81	1.67	8.5	**106%**
04	R2/16	0.0	1.72	1.60	8.0	**101%**
					Mean Value	**103%**
					Min Value	**101%**

Date Tested 24/04/2017

Checked By

Tuesday, 13 June 2017

Tested By

E.J.West

Approved Signatory

David Jones

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Test Report On 500mm below Fill

Client Reference 20834

Report No. 25182

Clients Order No.	5880/6180	**Sample No.**	20834
Sampled By	E.J.West	**Project**	1
Date Layed	Unknown	**Sample Source**	Terrace Views Subdivision
Sampling Location	Terrace Views	**Project Name**	Higgins Contractors BOP
Sample Condition	Damp	**Date Received**	9/06/2017
Method	Not known		
	Endorsement does not include sampling		

Target Density	1.58	**Material Type**	Medium-fine SAND	**Probe depth**	NA
				Gauge I D	27732
Target Moisture	17.0	**Source Of Data**	Client Supplied	**Solid Density**	2.65

Test Method Moisture Density Gauge - Backscatter ModeNZS 4007:1991 Test 4.2.2

Test #	Site	Offset CL (M)	Wet Density t/m³	Dry Density t/m³	% Water Content	% MDD
01	291	0.0	1.81	1.70	6.0	**108%**
02	292	0.0	1.81	1.72	5.5	**109%**
					Mean Value	**108%**
					Min Value	**108%**

Date Tested 24/04/2017

Checked By

Tuesday, 13 June 2017

Tested By PP DF
E.J.West

Approved Signatory

David Jones

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Client Name	J. West	**Report No. 25197.1**	**Higgins Auckland Laboratory**	
Client	Higgins BOP		PO Box 51118, Pakuranga	
Address	PO Box 4473		Tel: 09-2737300	

Project/Job site	Terrace Views	**Laboratory Sample No.**	20846.1
Date Received	15/06/2017	**Order No. / Job No. :**	5005880
Date Tested	8/05/2017	**Layer:**	Subgrade
Sampled by	J. West	**Approved sampling agent**	Yes

Test No Lot 293			**Test No**			**Test No**			**Test No**		
Meterage:			**Meterage:**			**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	1	2	0.1			0.1			0.1		
0.2	1	2	0.2			0.2			0.2		
0.3	2	4	0.3			0.3			0.3		
0.4	4	8	0.4			0.4			0.4		
0.5	5	10	0.5			0.5			0.5		
0.6	4	8	0.6			0.6			0.6		
0.7	7	16	0.7			0.7			0.7		
0.8	5	10	0.8			0.8			0.8		
0.9	5	10	0.9			0.9			0.9		
1.0	5	10	1.0			1.0			1.0		
1.1	6	13	1.1			1.1			1.1		
1.2	5	10	1.2			1.2			1.2		
1.3	5	10	1.3			1.3			1.3		
1.4	8	18	1.4			1.4			1.4		
1.5	7	16	1.5			1.5			1.5		
1.6	8	18	1.6			1.6			1.6		
1.7	6	13	1.7			1.7			1.7		
1.8	7	16	1.8			1.8			1.8		
1.9	7	16	1.9			1.9			1.9		
2.0			2			2.0			2.0		
2.1			2.1			2.1			2.1		
2.2			2.2			2.2			2.2		
2.3			2.3			2.3			2.3		
2.4			2.4			2.4			2.4		
2.5			2.5			2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Stage 5

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 15/06/2017

Checked:

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Client Name	J. West	**Report No. 25197.2**	**Higgins Auckland Laboratory**	
Client	Higgins BOP		PO Box 51118, Pakuranga	
Address	PO Box 4473		Tel: 09-2737300	
Project/Job site	Terrace Views	**Laboratory Sample No.**	20846.2	
Date Received	15/06/2017	**Order No. / Job No. :**	5005880	
Date Tested	9/05/2017	**Layer:**	Subgrade	
Sampled by	J. West	**Approved sampling agent**	Yes	

Test No Lot 293			**Test No**			**Test No**			**Test No**		
Meterage:			**Meterage:**			**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	1	2	0.1			0.1			0.1		
0.2	3	6	0.2			0.2			0.2		
0.3	6	13	0.3			0.3			0.3		
0.4	7	16	0.4			0.4			0.4		
0.5	9	20	0.5			0.5			0.5		
0.6	9	20	0.6			0.6			0.6		
0.7	9	20	0.7			0.7			0.7		
0.8	12	28	0.8			0.8			0.8		
0.9			0.9			0.9			0.9		
1.0			1.0			1.0			1.0		
1.1			1.1			1.1			1.1		
1.2			1.2			1.2			1.2		
1.3			1.3			1.3			1.3		
1.4			1.4			1.4			1.4		
1.5			1.5			1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2			2.0			2.0		
2.1			2.1			2.1			2.1		
2.2			2.2			2.2			2.2		
2.3			2.3			2.3			2.3		
2.4			2.4			2.4			2.4		
2.5			2.5			2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Stage 5

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 15/06/2017

Checked:

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Client Name	J. West	**Report No. 25197.3**	**Higgins Auckland Laboratory**	
Client	Higgins BOP		PO Box 51118, Pakuranga	
Address	PO Box 4473		Tel: 09-2737300	
Project/Job site	Terrace Views	**Laboratory Sample No.**	20846.3	
Date Received	15/06/2017	**Order No. / Job No. :**	5005880	
Date Tested	24/04/2017	**Layer:**	Fill	
Sampled by	J. West	**Approved sampling agent**	Yes	

Test No R2			**Test No**			**Test No**			**Test No**		
Meterage: 10.0			**Meterage:**			**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	1	2	0.1			0.1			0.1		
0.2	4	8	0.2			0.2			0.2		
0.3	5	10	0.3			0.3			0.3		
0.4	4	8	0.4			0.4			0.4		
0.5	8	18	0.5			0.5			0.5		
0.6	9	20	0.6			0.6			0.6		
0.7	5	10	0.7			0.7			0.7		
0.8	3	6	0.8			0.8			0.8		
0.9	4	8	0.9			0.9			0.9		
1.0	5	10	1.0			1.0			1.0		
1.1	10	23	1.1			1.1			1.1		
1.2	11	26	1.2			1.2			1.2		
1.3	8	18	1.3			1.3			1.3		
1.4	10	23	1.4			1.4			1.4		
1.5	11	26	1.5			1.5			1.5		
1.6	10	23	1.6			1.6			1.6		
1.7	12	28	1.7			1.7			1.7		
1.8	15	36	1.8			1.8			1.8		
1.9	17	41	1.9			1.9			1.9		
2.0			2			2.0			2.0		
2.1			2.1			2.1			2.1		
2.2			2.2			2.2			2.2		
2.3			2.3			2.3			2.3		
2.4			2.4			2.4			2.4		
2.5			2.5			2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Stage 5 Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 15/06/2017

Checked:

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Client Name	J. West	**Report No. 25197.4**	**Higgins Auckland Laboratory**	
Client	Higgins BOP		PO Box 51118, Pakuranga	
Address	PO Box 4473		Tel: 09-2737300	
Project/Job site	Terrace Views	**Laboratory Sample No.**	20846.4	
Date Received	15/06/2017	**Order No. / Job No. :**	5005880	
Date Tested	24/03/2017	**Layer:**	Fill	
Sampled by	J. West	**Approved sampling agent Yes**		

Test No N1			**Test No** N2			**Test No** S1			**Test No** S2		
Meterage: 5.0			**Meterage:** 10.0			**Meterage:** 5.0			**Meterage:** 10.0		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	4	8	0.1	3	6	0.1	1	2	0.1	1	2
0.2	7	16	0.2	5	10	0.2	1	2	0.2	2	4
0.3	5	10	0.3	6	13	0.3	2	4	0.3	5	10
0.4	4	8	0.4	6	13	0.4	4	8	0.4	6	13
0.5	7	16	0.5	5	10	0.5	6	13	0.5	5	10
0.6	7	16	0.6	7	16	0.6	7	16	0.6	5	10
0.7	12	28	0.7	6	13	0.7	7	16	0.7	3	6
0.8	10	23	0.8	11	26	0.8	5	10	0.8	5	10
0.9	9	20	0.9	8	18	0.9	6	13	0.9	10	23
1.0	7	16	1.0	9	20	1.0	10	23	1.0	11	26
1.1	10	23	1.1	9	20	1.1	10	23	1.1	11	26
1.2	10	23	1.2	9	20	1.2	10	23	1.2	12	28
1.3	8	18	1.3	6	13	1.3	12	28	1.3	16	38
1.4	7	16	1.4	7	16	1.4	14	33	1.4	15	36
1.5	10	23	1.5	6	13	1.5	10	23	1.5	15	36
1.6			1.6			1.6	13	30	1.6	16	38
1.7			1.7			1.7	10	23	1.7	18	43
1.8			1.8			1.8	12	28	1.8	18	43
1.9			1.9			1.9	12	28	1.9	17	41
2.0			2			2.0			2.0		
2.1			2.1			2.1			2.1		
2.2			2.2			2.2			2.2		
2.3			2.3			2.3			2.3		
2.4			2.4			2.4			2.4		
2.5			2.5			2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Stage 5 Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 15/06/2017

Checked:

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Client	**Name**	J. West	**Report No. 25197.4**	**Higgins Auckland Laboratory**
	Client	Higgins BOP		PO Box 51118, Pakuranga
	Address	PO Box 4473		Tel: 09-2737300

Project/Job site	Terrace Views	**Laboratory Sample No.**	20846.4
Date Received	15/06/2017	**Order No. / Job No. :**	5005880
Date Tested	24/03/2017	**Layer:**	Fill
Sampled by	J. West	**Approved sampling agent**	Yes

Test No R1			**Test No**			**Test No**			**Test No**		
Meterage: 5.0			**Meterage:**			**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	1	2	0.1			0.1			0.1		
0.2	2	4	0.2			0.2			0.2		
0.3	3	6	0.3			0.3			0.3		
0.4	4	8	0.4			0.4			0.4		
0.5	5	10	0.5			0.5			0.5		
0.6	5	10	0.6			0.6			0.6		
0.7	6	13	0.7			0.7			0.7		
0.8	8	18	0.8			0.8			0.8		
0.9	9	20	0.9			0.9			0.9		
1.0	8	18	1.0			1.0			1.0		
1.1	5	10	1.1			1.1			1.1		
1.2	5	10	1.2			1.2			1.2		
1.3	5	10	1.3			1.3			1.3		
1.4	5	10	1.4			1.4			1.4		
1.5	10	23	1.5			1.5			1.5		
1.6	12	28	1.6			1.6			1.6		
1.7	14	33	1.7			1.7			1.7		
1.8	17	41	1.8			1.8			1.8		
1.9	15	36	1.9			1.9			1.9		
2.0			2			2.0			2.0		
2.1			2.1			2.1			2.1		
2.2			2.2			2.2			2.2		
2.3			2.3			2.3			2.3		
2.4			2.4			2.4			2.4		
2.5			2.5			2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Stage 5 Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 15/06/2017

Checked:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Client	**Name**	J. West	**Report No. 25197.5**	**Higgins Auckland Laboratory**
	Client	Higgins BOP		PO Box 51118, Pakuranga
	Address	PO Box 4473		Tel: 09-2737300

Project/Job site	Terrace Views	**Laboratory Sample No.**	20846.5
Date Received	15/06/2017	**Order No. / Job No. :**	5005880
Date Tested	10/05/2017	**Layer:**	Subgrade
Sampled by	J. West	**Approved sampling agent**	Yes

Test No Lot 293			**Test No** Lot 293			**Test No**			**Test No**		
Meterage: A			**Meterage:** B			**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	1	2	0.1	1	2	0.1			0.1		
0.2	3	6	0.2	2	4	0.2			0.2		
0.3	5	10	0.3	3	6	0.3			0.3		
0.4	5	10	0.4	5	10	0.4			0.4		
0.5	6	13	0.5	5	10	0.5			0.5		
0.6	5	10	0.6	4	8	0.6			0.6		
0.7	7	16	0.7	5	10	0.7			0.7		
0.8	7	16	0.8	5	10	0.8			0.8		
0.9	9	20	0.9	5	10	0.9			0.9		
1.0	12	28	1.0	5	10	1.0			1.0		
1.1	8	18	1.1	7	16	1.1			1.1		
1.2	8	18	1.2	7	16	1.2			1.2		
1.3	10	23	1.3	9	20	1.3			1.3		
1.4	14	33	1.4	10	23	1.4			1.4		
1.5	19	46	1.5	13	30	1.5			1.5		
1.6	18	43	1.6	14	33	1.6			1.6		
1.7	18	43	1.7	17	41	1.7			1.7		
1.8	15	36	1.8	15	36	1.8			1.8		
1.9	13	30	1.9	13	30	1.9			1.9		
2.0	8	18	2	11	26	2.0			2.0		
2.1	10	23	2.1	11	26	2.1			2.1		
2.2	10	23	2.2	10	23	2.2			2.2		
2.3	10	23	2.3	12	28	2.3			2.3		
2.4	15	36	2.4	10	23	2.4			2.4		
2.5	12	28	2.5	9	20	2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Stage 5

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 15/06/2017

Checked:

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Form No. AK2.9Vs1

Client	**Name**	J. West	**Report No. 25197.6**	**Higgins Auckland Laboratory**
	Client	Higgins BOP		PO Box 51118, Pakuranga
	Address	PO Box 4473		Tel: 09-2737300

Project/Job site	Terrace Views	**Laboratory Sample No.**	20846.6
Date Received	15/06/2017	**Order No. / Job No. :**	5005880
Date Tested	18/04/2017	**Layer:**	Fill
Sampled by	J. West	**Approved sampling agent**	Yes

Test No	PI		**Test No**			**Test No**			**Test No**		
Meterage:	5		**Meterage:**			**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	7	16	0.1			0.1			0.1		
0.2	6	13	0.2			0.2			0.2		
0.3	4	8	0.3			0.3			0.3		
0.4	5	10	0.4			0.4			0.4		
0.5	3	6	0.5			0.5			0.5		
0.6	5	10	0.6			0.6			0.6		
0.7	10	23	0.7			0.7			0.7		
0.8	10	23	0.8			0.8			0.8		
0.9	11	26	0.9			0.9			0.9		
1.0	11	26	1.0			1.0			1.0		
1.1	9	20	1.1			1.1			1.1		
1.2	11	26	1.2			1.2			1.2		
1.3	13	30	1.3			1.3			1.3		
1.4	11	26	1.4			1.4			1.4		
1.5	8	18	1.5			1.5			1.5		
1.6	10	23	1.6			1.6			1.6		
1.7	11	26	1.7			1.7			1.7		
1.8	9	20	1.8			1.8			1.8		
1.9	11	26	1.9			1.9			1.9		
2.0	12	28	2			2.0			2.0		
2.1	10	23	2.1			2.1			2.1		
2.2	11	26	2.2			2.2			2.2		
2.3	9	20	2.3			2.3			2.3		
2.4	13	30	2.4			2.4			2.4		
2.5	10	23	2.5			2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Stage 5 Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 15/06/2017

Checked:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Client Name	J. West	**Report No. 25197.7**	**Higgins Auckland Laboratory**	
Client	Higgins BOP		PO Box 51118, Pakuranga	
Address	PO Box 4473		Tel: 09-2737300	
Project/Job site	Terrace Views	**Laboratory Sample No.**	20846.7	
Date Received	15/06/2017	**Order No. / Job No. :**	5005880	
Date Tested	18/04/2017	**Layer:**	Fill	
Sampled by	J. West	**Approved sampling agent**	Yes	

Test No Q1			**Test No**			**Test No**			**Test No**		
Meterage: 5			**Meterage:**			**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	2	4	0.1			0.1			0.1		
0.2	4	8	0.2			0.2			0.2		
0.3	10	23	0.3			0.3			0.3		
0.4	10	23	0.4			0.4			0.4		
0.5	10	23	0.5			0.5			0.5		
0.6	7	16	0.6			0.6			0.6		
0.7	5	10	0.7			0.7			0.7		
0.8	4	8	0.8			0.8			0.8		
0.9	5	10	0.9			0.9			0.9		
1.0	7	16	1.0			1.0			1.0		
1.1	6	13	1.1			1.1			1.1		
1.2	8	18	1.2			1.2			1.2		
1.3	7	16	1.3			1.3			1.3		
1.4	8	18	1.4			1.4			1.4		
1.5	9	20	1.5			1.5			1.5		
1.6	9	20	1.6			1.6			1.6		
1.7	11	26	1.7			1.7			1.7		
1.8	8	18	1.8			1.8			1.8		
1.9	7	16	1.9			1.9			1.9		
2.0	10	23	2			2.0			2.0		
2.1	8	18	2.1			2.1			2.1		
2.2	11	26	2.2			2.2			2.2		
2.3	11	26	2.3			2.3			2.3		
2.4	6	13	2.4			2.4			2.4		
2.5	10	23	2.5			2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Stage 5 Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 15/06/2017

Checked:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Client	**Name**	J. West	**Report No. 25197.7**	**Higgins Auckland Laboratory**
	Client	Higgins BOP		PO Box 51118, Pakuranga
	Address	PO Box 4473		Tel: 09-2737300

Project/Job site	Terrace Views	**Laboratory Sample No.**	20846.7
Date Received	15/06/2017	**Order No. / Job No. :**	5005880
Date Tested	18/04/2017	**Layer:**	Fill
Sampled by	J. West	**Approved sampling agent**	Yes

Test No P2			**Test No** Q2			**Test No** O1			**Test No** O2		
Meterage: 10			**Meterage:** 10			**Meterage:** 5			**Meterage:** 10		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	1	2	0.1	1	2	0.1	3	6	0.1	6	13
0.2	1	2	0.2	2	4	0.2	4	8	0.2	16	38
0.3	2	4	0.3	3	6	0.3	5	10	0.3	16	38
0.4	3	6	0.4	4	8	0.4	7	16	0.4	14	33
0.5	6	13	0.5	6	13	0.5	10	23	0.5	12	28
0.6	6	13	0.6	4	8	0.6	12	28	0.6	9	20
0.7	5	10	0.7	5	10	0.7	10	23	0.7	11	26
0.8	7	16	0.8	5	10	0.8	9	20	0.8	8	18
0.9	8	18	0.9	6	13	0.9	7	16	0.9	7	16
1.0	9	20	1.0	7	16	1.0	6	13	1.0	5	10
1.1	10	23	1.1	8	18	1.1	6	13	1.1	7	16
1.2	11	26	1.2	14	33	1.2	6	13	1.2	7	16
1.3	11	26	1.3	14	33	1.3	6	13	1.3	9	20
1.4	10	23	1.4	12	28	1.4	7	16	1.4	7	16
1.5	12	28	1.5	12	28	1.5	8	18	1.5	6	13
1.6			1.6			1.6	6	13	1.6	6	13
1.7			1.7			1.7	5	10	1.7	8	18
1.8			1.8			1.8	5	10	1.8	8	18
1.9			1.9			1.9	7	16	1.9	9	20
2.0			2			2.0	10	23	2.0		
2.1			2.1			2.1	13	30	2.1		
2.2			2.2			2.2	12	28	2.2		
2.3			2.3			2.3	18	43	2.3		
2.4			2.4			2.4	17	41	2.4		
2.5			2.5			2.5	19	46	2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Stage 5 Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 15/06/2017

Checked:

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Client Name	J. West	**Report No. 25197.8**	**Higgins Auckland Laboratory**	
Client	Higgins BOP		PO Box 51118, Pakuranga	
Address	PO Box 4473		Tel: 09-2737300	
Project/Job site	Terrace Views	**Laboratory Sample No.**	20846.8	
Date Received	15/06/2017	**Order No. / Job No. :**	5005880	
Date Tested	23/03/2017	**Layer:**	Subgrade	
Sampled by	J. West	**Approved sampling agent**	Yes	

Test No H1			**Test No** H2			**Test No**			**Test No**		
Meterage: 5			**Meterage:** 10			**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	6	13	0.1	4	8	0.1			0.1		
0.2	9	20	0.2	6	13	0.2			0.2		
0.3	11	26	0.3	5	10	0.3			0.3		
0.4	9	20	0.4	5	10	0.4			0.4		
0.5	10	23	0.5	5	10	0.5			0.5		
0.6	17	41	0.6	13	30	0.6			0.6		
0.7	19	46	0.7	14	33	0.7			0.7		
0.8	21	51	0.8	12	28	0.8			0.8		
0.9	12	28	0.9	10	23	0.9			0.9		
1.0	14	33	1.0	9	20	1.0			1.0		
1.1	22	53	1.1	13	30	1.1			1.1		
1.2	19	46	1.2	19	46	1.2			1.2		
1.3	29	72	1.3	16	38	1.3			1.3		
1.4	20	48	1.4	16	38	1.4			1.4		
1.5	20	48	1.5	17	41	1.5			1.5		
1.6	19	46	1.6	22	53	1.6			1.6		
1.7	17	41	1.7	21	51	1.7			1.7		
1.8	22	53	1.8	19	46	1.8			1.8		
1.9	24	58	1.9	18	43	1.9			1.9		
2.0	30	74	2	26	64	2.0			2.0		
2.1	29	72	2.1	20	48	2.1			2.1		
2.2	27	67	2.2	22	53	2.2			2.2		
2.3	30	74	2.3	20	48	2.3			2.3		
2.4	26	64	2.4	27	67	2.4			2.4		
2.5	27	67	2.5	24	58	2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Stage 5 Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 15/06/2017

Checked:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Client Name	J. West	**Report No.** 25237	**Higgins Auckland Laboratory**	
Client	Higgins BOP		PO Box 51118, Pakuranga	
Address	PO Box 4473		Tel: 09-2737300	
Project/Job site	Terrace Views	**Laboratory Sample No.**	20885	
Date Received	16/06/2017	**Order No. / Job No. :**	5005880	
Date Tested	20/03/2017	**Layer:**	Finished Level Fill	
Sampled by	J. West	**Approved sampling agent**	Yes	

Test No	B1		**Test No**	B2		**Test No**	C2		**Test No**	C1	
Meterage:	10	**Offset 5**	**Meterage:**	10	**Offset 10**	**Meterage:**	20	**Offset 10**	**Meterage:**	10	**Offset 5**
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	6	13	0.1	4	8	0.1	5	10	0.1	5	10
0.2	8	18	0.2	8	18	0.2	6	13	0.2	7	16
0.3	7	16	0.3	8	18	0.3	7	16	0.3	10	23
0.4	11	26	0.4	8	18	0.4	5	10	0.4	10	23
0.5	13	30	0.5	7	16	0.5	5	10	0.5	8	18
0.6	12	28	0.6	7	16	0.6	5	10	0.6	11	26
0.7	16	38	0.7	6	13	0.7	7	16	0.7	10	23
0.8	16	38	0.8	4	8	0.8	9	20	0.8	6	13
0.9	12	28	0.9	5	10	0.9	9	20	0.9	13	30
1.0	12	28	1.0	6	13	1.0	14	33	1.0	10	23
1.1	13	30	1.1	11	26	1.1	20	48	1.1	13	30
1.2	12	28	1.2	14	33	1.2	21	51	1.2	12	28
1.3	10	23	1.3			1.3			1.3	14	33
1.4	9	20	1.4			1.4			1.4	13	30
1.5	13	30	1.5			1.5			1.5	15	36
1.6	22	53	1.6			1.6			1.6	11	26
1.7			1.7			1.7			1.7	11	26
1.8			1.8			1.8			1.8	10	23
1.9			1.9			1.9			1.9	20	48
2.0			2			2.0			2.0	13	30
2.1			2.1			2.1			2.1	14	33
2.2			2.2			2.2			2.2	13	30
2.3			2.3			2.3			2.3	13	30
2.4			2.4			2.4			2.4	11	26
2.5			2.5			2.5			2.5	9	20
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 16/06/2017

Checked:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Client Name	J. West	**Report No.**	**25238**	**Higgins Auckland Laboratory**
Client	Higgins BOP			PO Box 51118, Pakuranga
Address	PO Box 4473			Tel: 09-2737300
Project/Job site	Terrace Views	**Laboratory Sample No.**		20886
Date Received	16/06/2017	**Order No. / Job No. :**		5005880
Date Tested	21/03/2017	**Layer:**		Fill,Finished Level
Sampled by	J. West	**Approved sampling agent**	**Yes**	

Test No D1			**Test No** D2			**Test No** E1			**Test No** E2		
Meterage: 30		**Offset 5**	**Meterage:** 30		**Offset 10**	**Meterage:** 40		**Offset 5**	**Meterage:** 40		**Offset 10**
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	4	8	0.1	2	4	0.1	7	16	0.1	5	10
0.2	9	20	0.2	9	20	0.2	11	26	0.2	6	13
0.3	10	23	0.3	8	18	0.3	14	33	0.3	10	23
0.4	8	18	0.4	7	16	0.4	13	30	0.4	10	23
0.5	8	18	0.5	5	10	0.5	10	23	0.5	12	28
0.6	10	23	0.6	5	10	0.6	7	16	0.6	12	28
0.7	12	28	0.7	7	16	0.7	8	18	0.7	8	18
0.8	10	23	0.8	8	18	0.8	9	20	0.8	12	28
0.9	8	18	0.9	10	23	0.9	7	16	0.9	14	33
1.0	13	30	1.0	11	26	1.0	9	20	1.0	13	30
1.1	13	30	1.1	13	30	1.1	16	38	1.1	12	28
1.2	12	28	1.2	15	36	1.2	17	41	1.2	11	26
1.3	14	33	1.3	23	56	1.3	24	58	1.3	10	23
1.4	16	38	1.4	23	56	1.4	23	56	1.4	11	26
1.5	14	33	1.5	24	58	1.5	21	51	1.5	10	23
1.6	14	33	1.6			1.6	17	41	1.6	16	38
1.7	16	38	1.7			1.7	14	33	1.7	18	43
1.8	13	30	1.8			1.8	27	67	1.8	24	58
1.9	12	28	1.9			1.9	20	48	1.9		
2.0	8	18	2			2.0	17	41	2.0		
2.1	5	10	2.1			2.1	23	56	2.1		
2.2	8	18	2.2			2.2	22	53	2.2		
2.3	12	28	2.3			2.3	24	58	2.3		
2.4	14	33	2.4			2.4	19	46	2.4		
2.5	13	30	2.5			2.5	19	46	2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 16/06/2017

Checked:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

new zealand accredited laboratory

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Client Name	J. West	**Report No.**	**25238**	**Higgins Auckland Laboratory**
Client	Higgins BOP			PO Box 51118, Pakuranga
Address	PO Box 4473			Tel: 09-2737300

Project/Job site	Terrace Views	**Laboratory Sample No.**	20886
Date Received	16/06/2017	**Order No. / Job No. :**	5005880
Date Tested	21/03/2017	**Layer:**	Fill,Finished Level
Sampled by	J. West	**Approved sampling agent Yes**	

Test No	F1		**Test No**	F2		**Test No**	G2		**Test No**	G1	
Meterage:	50	**Offset 5**	**Meterage:**	50	**Offset 10**	**Meterage:**	60	**Offset 10**	**Meterage:**	60	**Offset 5**
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	3	6	0.1	6	13	0.1	8	18	0.1	8	18
0.2	8	18	0.2	9	20	0.2	14	33	0.2	10	23
0.3	9	20	0.3	10	23	0.3	13	30	0.3	10	23
0.4	11	26	0.4	11	26	0.4	11	26	0.4	12	28
0.5	13	30	0.5	11	26	0.5	12	28	0.5	17	41
0.6	16	38	0.6	9	20	0.6	11	26	0.6	20	48
0.7	15	36	0.7	13	30	0.7	10	23	0.7	20	48
0.8	14	33	0.8	16	38	0.8	9	20	0.8	17	41
0.9	13	30	0.9	18	43	0.9	10	23	0.9	15	36
1.0	13	30	1.0	14	33	1.0	17	41	1.0	15	36
1.1	13	30	1.1	14	33	1.1	22	53	1.1	14	33
1.2	12	28	1.2	16	38	1.2	24	58	1.2	16	38
1.3	13	30	1.3	17	41	1.3	23	56	1.3	16	38
1.4	17	41	1.4	20	48	1.4	23	56	1.4	21	51
1.5	20	48	1.5	26	64	1.5	28	69	1.5	26	64
1.6	20	48	1.6	23	56	1.6	29	72	1.6	20	48
1.7	14	33	1.7	22	53	1.7	28	69	1.7	15	36
1.8	14	33	1.8	20	48	1.8	27	67	1.8	14	33
1.9			1.9			1.9	29	72	1.9	10	23
2.0			2			2.0	20	48	2.0	11	26
2.1			2.1			2.1	18	43	2.1	9	20
2.2			2.2			2.2	15	36	2.2	7	16
2.3			2.3			2.3	17	41	2.3	9	20
2.4			2.4			2.4	18	43	2.4	6	13
2.5			2.5			2.5	15	36	2.5	9	20
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 16/06/2017

Checked:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Client	**Name**	J. West	**Report No.** 25238	**Higgins Auckland Laboratory**
	Client	Higgins BOP		PO Box 51118, Pakuranga
	Address	PO Box 4473		Tel: 09-2737300

Project/Job site	Terrace Views	**Laboratory Sample No.**	20886
Date Received	16/06/2017	**Order No. / Job No. :**	5005880
Date Tested	21/03/2017	**Layer:**	Fill,Finished Level
Sampled by	J. West	**Approved sampling agent**	Yes

Test No	H1		**Test No**	H2		**Test No**			**Test No**		
Meterage:	70	**Offset 5**	**Meterage:**	70	**Offset 10**	**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	5	10	0.1	7	16	0.1			0.1		
0.2	8	18	0.2	9	20	0.2			0.2		
0.3	6	13	0.3	18	43	0.3			0.3		
0.4	11	26	0.4	15	36	0.4			0.4		
0.5	17	41	0.5	18	43	0.5			0.5		
0.6	19	46	0.6	15	36	0.6			0.6		
0.7	24	58	0.7	18	43	0.7			0.7		
0.8	19	46	0.8	13	30	0.8			0.8		
0.9	16	38	0.9	11	26	0.9			0.9		
1.0	19	46	1.0	10	23	1.0			1.0		
1.1	15	36	1.1	11	26	1.1			1.1		
1.2	18	43	1.2	10	23	1.2			1.2		
1.3	26	64	1.3	19	46	1.3			1.3		
1.4	28	69	1.4	24	58	1.4			1.4		
1.5	30	74	1.5	31	77	1.5			1.5		
1.6	25	61	1.6	30	74	1.6			1.6		
1.7	23	56	1.7	33	82	1.7			1.7		
1.8	17	41	1.8	28	69	1.8			1.8		
1.9	17	41	1.9	25	61	1.9			1.9		
2.0	13	30	2	22	53	2.0			2.0		
2.1	13	30	2.1	17	41	2.1			2.1		
2.2	11	26	2.2	15	36	2.2			2.2		
2.3	12	28	2.3	19	46	2.3			2.3		
2.4	10	23	2.4	18	43	2.4			2.4		
2.5	11	26	2.5	18	43	2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory....

D.Jones

Testing Technician....

J. West

Date 16/06/2017

Checked:

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Client Name	J. West	**Report No.** 25239	**Higgins Auckland Laboratory**	
Client	Higgins BOP		PO Box 51118, Pakuranga	
Address	PO Box 4473		Tel: 09-2737300	
Project/Job site	Terrace Views	**Laboratory Sample No.**	20887	
Date Received	16/06/2017	**Order No. / Job No. :**	5005880	
Date Tested	23/03/2017	**Layer:**	Fill,Finished Level	
Sampled by	J. West	**Approved sampling agent**	Yes	

Test No	I1		**Test No**	I2		**Test No**	J2		**Test No**	J1	
Meterage:	80	**Offset 5**	**Meterage:**	80	**Offset 10**	**Meterage:**	90	**Offset 10**	**Meterage:**	90	**Offset 5**
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	5	10	0.1	5	10	0.1	8	18	0.1	6	13
0.2	7	16	0.2	8	18	0.2	9	20	0.2	10	23
0.3	8	18	0.3	7	16	0.3	9	20	0.3	8	18
0.4	9	20	0.4	6	13	0.4	7	16	0.4	8	18
0.5	9	20	0.5	5	10	0.5	6	13	0.5	7	16
0.6	6	13	0.6	4	8	0.6	6	13	0.6	7	16
0.7	9	20	0.7	4	8	0.7	7	16	0.7	8	18
0.8	8	18	0.8	5	10	0.8	4	8	0.8	10	23
0.9	9	20	0.9	12	28	0.9	4	8	0.9	11	26
1.0	23	56	1.0	20	48	1.0	5	10	1.0	9	20
1.1	15	36	1.1	24	58	1.1	20	48	1.1	17	41
1.2	21	51	1.2	17	41	1.2	15	36	1.2	15	36
1.3	22	53	1.3	22	53	1.3	15	36	1.3	18	43
1.4	25	61	1.4	24	58	1.4	24	58	1.4	22	53
1.5	26	64	1.5	18	43	1.5	26	64	1.5	19	46
1.6	33	82	1.6	20	48	1.6	19	46	1.6	25	61
1.7	30	74	1.7	19	46	1.7	23	56	1.7	23	56
1.8	30	74	1.8	14	33	1.8	15	36	1.8	24	58
1.9	29	72	1.9	11	26	1.9	15	36	1.9	30	74
2.0	33	82	2	10	23	2.0	16	38	2.0	28	69
2.1	23	56	2.1	8	18	2.1	18	43	2.1	28	69
2.2	21	51	2.2	10	23	2.2	28	69	2.2	30	74
2.3	23	56	2.3	14	33	2.3	24	58	2.3	29	72
2.4	20	48	2.4	16	38	2.4	23	56	2.4	30	74
2.5	22	53	2.5	18	43	2.5	25	61	2.5	31	77
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 16/06/2017

Checked:

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Client Name	J. West	**Report No.** 25239	**Higgins Auckland Laboratory**	
Client	Higgins BOP		PO Box 51118, Pakuranga	
Address	PO Box 4473		Tel: 09-2737300	
Project/Job site	Terrace Views	**Laboratory Sample No.**	20887	
Date Received	16/06/2017	**Order No. / Job No. :**	5005880	
Date Tested	23/03/2017	**Layer:**	Fill,Finished Level	
Sampled by	J. West	**Approved sampling agent**	Yes	

Test No	K1		**Test No**	K2		**Test No**	L2		**Test No**	L1	
Meterage:	100	**Offset 5**	**Meterage:**	100	**Offset 10**	**Meterage:**	110	**Offset 10**	**Meterage:**	110	**Offset 5**
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	5	10	0.1	8	18	0.1	8	18	0.1	4	8
0.2	8	18	0.2	11	26	0.2	10	23	0.2	8	18
0.3	8	18	0.3	11	26	0.3	12	28	0.3	13	30
0.4	6	13	0.4	10	23	0.4	15	36	0.4	6	13
0.5	5	10	0.5	8	18	0.5	12	28	0.5	8	18
0.6	7	16	0.6	7	16	0.6	10	23	0.6	6	13
0.7	6	13	0.7	9	20	0.7	12	28	0.7	6	13
0.8	8	18	0.8	8	18	0.8	10	23	0.8	5	10
0.9	9	20	0.9	8	18	0.9	10	23	0.9	6	13
1.0	12	28	1.0	11	26	1.0	9	20	1.0	7	16
1.1	13	30	1.1	11	26	1.1	12	28	1.1	14	33
1.2	14	33	1.2	23	56	1.2	23	56	1.2	12	28
1.3	14	33	1.3	21	51	1.3	20	48	1.3	13	30
1.4	15	36	1.4	17	41	1.4	19	46	1.4	12	28
1.5	20	48	1.5	18	43	1.5	14	33	1.5	14	33
1.6	17	41	1.6	23	56	1.6	18	43	1.6	13	30
1.7	17	41	1.7	25	61	1.7	22	53	1.7	10	23
1.8	22	53	1.8	30	74	1.8	23	56	1.8	11	26
1.9	24	58	1.9	21	51	1.9	25	61	1.9	14	33
2.0	27	67	2	23	56	2.0	28	69	2.0	19	46
2.1	28	69	2.1	17	41	2.1	24	58	2.1	19	46
2.2	29	72	2.2	13	30	2.2	27	67	2.2	21	51
2.3	26	64	2.3	15	36	2.3	26	64	2.3	23	56
2.4	30	74	2.4	14	33	2.4	28	69	2.4	26	64
2.5	28	69	2.5	15	36	2.5	28	69	2.5	21	51
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... PP DF J. West

Date 16/06/2017

Checked:

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Client Name	J. West	**Report No.**	**25239**	**Higgins Auckland Laboratory**
Client	Higgins BOP			PO Box 51118, Pakuranga
Address	PO Box 4473			Tel: 09-2737300

Project/Job site	Terrace Views	**Laboratory Sample No.**	20887
Date Received	16/06/2017	**Order No. / Job No. :**	5005880
Date Tested	23/03/2017	**Layer:**	Fill,Finished Level
Sampled by	J. West	**Approved sampling agent Yes**	

Test No M1			**Test No** M2			**Test No**			**Test No**		
Meterage: 120		**Offset 5**	**Meterage:** 120		**Offset 10**	**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	6	13	0.1	4	8	0.1			0.1		
0.2	9	20	0.2	6	13	0.2			0.2		
0.3	11	26	0.3	5	10	0.3			0.3		
0.4	9	20	0.4	5	10	0.4			0.4		
0.5	10	23	0.5	5	10	0.5			0.5		
0.6	11	26	0.6	13	30	0.6			0.6		
0.7	19	46	0.7	14	33	0.7			0.7		
0.8	21	51	0.8	12	28	0.8			0.8		
0.9	12	28	0.9	10	23	0.9			0.9		
1.0	14	33	1.0	9	20	1.0			1.0		
1.1	22	53	1.1	15	36	1.1			1.1		
1.2	19	46	1.2	19	46	1.2			1.2		
1.3	29	72	1.3	16	38	1.3			1.3		
1.4	20	48	1.4	16	38	1.4			1.4		
1.5	20	48	1.5	17	41	1.5			1.5		
1.6	19	46	1.6	22	53	1.6			1.6		
1.7	17	41	1.7	21	51	1.7			1.7		
1.8	22	53	1.8	19	46	1.8			1.8		
1.9	24	58	1.9	18	43	1.9			1.9		
2.0	30	74	2	26	64	2.0			2.0		
2.1	29	72	2.1	20	48	2.1			2.1		
2.2	27	67	2.2	22	53	2.2			2.2		
2.3	30	74	2.3	20	48	2.3			2.3		
2.4	26	64	2.4	27	67	2.4			2.4		
2.5	27	67	2.5	24	58	2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory....

D.Jones

Testing Technician....

J. West

Date 16/06/2017

Checked:

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Client Name	J. West	**Report No.**	**25240**	**Higgins Auckland Laboratory**
Client	Higgins BOP			PO Box 51118, Pakuranga
Address	PO Box 4473			Tel: 09-2737300
Project/Job site	Terrace Views	**Laboratory Sample No.**		20888
Date Received	16/06/2017	**Order No. / Job No. :**		5005880
Date Tested	24/03/2017	**Layer:**		Fill,Finished Level
Sampled by	J. West	**Approved sampling agent**	**Yes**	

Test No N1			**Test No** N2			**Test No**			**Test No**		
Meterage: 150		**Offset 5**	**Meterage:** 150		**Offset 10**	**Meterage:**			**Meterage:**		
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	4	8	0.1	3	6	0.1			0.1		
0.2	7	16	0.2	5	10	0.2			0.2		
0.3	5	10	0.3	6	13	0.3			0.3		
0.4	4	8	0.4	6	13	0.4			0.4		
0.5	7	16	0.5	5	10	0.5			0.5		
0.6	7	16	0.6	7	16	0.6			0.6		
0.7	12	28	0.7	6	13	0.7			0.7		
0.8	10	23	0.8	11	26	0.8			0.8		
0.9	9	20	0.9	8	18	0.9			0.9		
1.0	7	16	1.0	9	20	1.0			1.0		
1.1	10	23	1.1	9	20	1.1			1.1		
1.2	10	23	1.2	9	20	1.2			1.2		
1.3	8	18	1.3	6	13	1.3			1.3		
1.4	7	16	1.4	7	16	1.4			1.4		
1.5	10	23	1.5	6	13	1.5			1.5		
1.6			1.6			1.6			1.6		
1.7			1.7			1.7			1.7		
1.8			1.8			1.8			1.8		
1.9			1.9			1.9			1.9		
2.0			2			2.0			2.0		
2.1			2.1			2.1			2.1		
2.2			2.2			2.2			2.2		
2.3			2.3			2.3			2.3		
2.4			2.4			2.4			2.4		
2.5			2.5			2.5			2.5		
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Retaining wall

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 16/06/2017

Checked:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Form No: AK2.9Vs1

Name	Greg Holland
Client	Higgins Contractors Bay of Plenty
Address	PO Box 4473
	Mount Maunganui

Higgins Contractors Auckland Laboratory
Offenhauser Drive, East Tamaki
PO Box 51118, Pakuranga
Auckland, New Zealand
Tel.: 09-2737300
Fax: 09-2711245

Test Report On Fill

Client Reference 20895

Report No. **25256**

Clients Order No.	5005880	**Sample No.**	20895
Sampled By	E.J.West	**Project**	1
Date Layed	23/03/2017	**Sample Source**	Terrace Views
Sampling Location	Retaining Wall	**Project Name**	Higgins Contractors BOP
Sample Condition	Damp	**Date Received**	19/06/2017
Method	Not known		
	Endorsement does not include sampling		

Target Density	1.26	**Material Type**	Rhyolite	**Probe depth**	NA
				Gauge I D	27732
Target Moisture	30.0	**Source Of Data**	Client Supplied	**Solid Density**	2.51

Test Method Moisture Density Gauge - Backscatter ModeNZS 4007:1991 Test 4.2.2

Test #	Site	Offset CL (M)	Wet Density t/m³	Dry Density t/m³	% Water Content	% MDD
01	Lot 504	0.0	1.61	1.28	26.0	**101%**
02	Lot 503	0.0	1.82	1.58	15.0	**125%**
03	Lot 296	0.0	1.66	1.40	18.5	**111%**
04	Lot 295	0.0	1.58	1.30	21.0	**103%**
					Mean Value	**110%**
					Min Value	**101%**

Date Tested 23/03/2017

Checked By

Monday, 19 June 2017

Tested By E.J.West

Approved Signatory

David Jones

Form: Extrox.00

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Client Name	J. West	**Report No. 25256.1**	**Higgins Auckland Laboratory**	
Client	Higgins BOP		PO Box 51118, Pakuranga	
Address	PO Box 4473		Tel: 09-2737300	
Project/Job site	Terrace Views	**Laboratory Sample No.**	20895	
Date Received	19/06/2017	**Order No. / Job No. :**	5005880	
Date Tested	23/03/2017	**Layer:**	Fill,Finished Level	
Sampled by	J. West	**Approved sampling agent Yes**		

Test No Lot 295			**Test No** Lot 296			**Test No** Lot 503			**Test No** Lot 504		
Meterage:		**Offset 3**	**Meterage:**		**Offset 3**	**Meterage:**		**Offset 3**	**Meterage:**		**Offset 3**
Depth (m)	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**	**Depth (m)**	**Blows**	**Inf. CBR**
0.1	5	10	0.1	7	16	0.1	4	8	0.1	6	13
0.2	9	20	0.2	9	20	0.2	5	10	0.2	7	16
0.3	6	13	0.3	7	16	0.3	7	16	0.3	6	13
0.4	7	16	0.4	7	16	0.4	10	23	0.4	6	13
0.5	8	18	0.5	6	13	0.5	13	30	0.5	5	10
0.6	5	10	0.6	4	8	0.6	18	43	0.6	4	8
0.7	4	8	0.7	5	10	0.7	20	48	0.7	5	10
0.8	5	10	0.8	5	10	0.8	20	48	0.8	9	20
0.9	4	8	0.9	9	20	0.9	25	61	0.9	13	30
1.0	5	10	1.0	12	28	1.0	20	48	1.0	16	38
1.1	9	20	1.1	16	38	1.1	21	51	1.1	19	46
1.2	12	28	1.2	18	43	1.2	21	51	1.2	17	41
1.3	19	46	1.3	26	64	1.3	22	53	1.3	30	74
1.4	19	46	1.4	25	61	1.4	24	58	1.4	28	69
1.5	23	56	1.5	26	64	1.5	30	74	1.5	28	69
1.6	23	56	1.6	19	46	1.6	33	82	1.6	28	69
1.7	21	51	1.7	20	48	1.7			1.7	29	72
1.8	19	46	1.8	20	48	1.8			1.8	24	58
1.9	22	53	1.9	23	56	1.9			1.9	21	51
2.0	17	41	2	22	53	2.0			2.0	24	58
2.1	16	38	2.1	24	58	2.1			2.1	24	58
2.2	15	36	2.2	26	64	2.2			2.2	23	56
2.3	18	43	2.3	25	61	2.3			2.3	24	58
2.4	15	36	2.4	27	67	2.4			2.4	22	53
2.5	14	33	2.5	22	53	2.5			2.5	23	56
2.6			2.6			2.6			2.6		
2.7			2.7			2.7			2.7		
2.8			2.8			2.8			2.8		
2.9			2.9			2.9			2.9		
3.0			3.0			3.0			3.0		

Comments: Retaining Wall Lots 295,296,503,504

Test method: Determination of the penetration resistance of a soil NZS 4402 test 6.5.2 :1988

Endorsement does not apply to the scala penetrometer below 1.5m .

Endorsement does not include sampling.

Approved Signatory.... D.Jones

Testing Technician.... J. West

Date 19/06/2017

Checked:

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

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Appendix D
Lot-by-lot hand auger logs

Appendix D
Lot-by-lot hand auger logs

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www.aurecongroup.com

Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 219**
Project Reference: **247593-210**

HA Lot 219

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Medium dense to dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes moist, fine to medium grained.				
		0.8m:...Becomes dense to very dense.		21 21		
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 220**
Project Reference: **247593-210**

HA Lot 220

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Medium dense to dense, moist, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
1		**0.9m to 1m:**...With minor black silt, slight organic smell. **1m:**...Becomes yellowish grey, dense to very dense, fine to medium grained. **1.1m:**...Becomes dense. **1.2m:**...Becomes yellowish brown.				1
2		**1.7m:**...Becomes light grey.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 221**
Project Reference: **247593-210**

HA Lot 221

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; reddish brown. Medium dense to very dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes light grey, moist.				
		0.8m:...Becomes light brown, fine to medium grained.		24 22		
1		**1m:**...Becomes medium dense to dense.				1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 222**
Project Reference: **247593-210**

HA Lot 222

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense to dense, moist, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
1		**0.8m:**...Becomes yellowish grey, fine to medium grained.				1
		1m:...Becomes loose to dense.				
		1.1m to 1.2m:...With some black silt, slight organic smell.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 223**
Project Reference: **247593-210**

HA Lot 223

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 24/01/2017
Date Completed: 24/01/2017

Logged by: MF
Input by: MF/TS
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Soft', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.4m: SAND; dark orangey brown. Medium dense to dense, dry, fine grained.			**0.4m: ENGINEERED FILL SITE WON SAND**	
		0.6m:...Becomes moist.				
		0.8m:...Becomes dense to very dense.		21, 24, 22		
1		**1.1m:**...Becomes medium dense to dense.				1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 224**
Project Reference: **247593-210**

HA Lot 224

Sheet **1** of **1**

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Soft', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish grey. Medium dense to dense, dry, fine grained. **0.5m:**...Becomes moist.			**0.3m: ENGINEERED FILL SITE WON SAND**	
1		**1m:**...Becomes dark yellowish brown.				1
2		**1.6m to 1.7m:**...Lens of sandy silt, dark brown, organic smell. Becomes dense to very dense. **1.7m:**...Becomes reddish brown, fine to medium grained.		24		2
3		Terminated at 2m (Reached target depth)				3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 225**
Project Reference: **247593-210**

HA Lot 225

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense to dense, moist, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes greyish white.				
		0.7m:...Becomes reddish brown, dense to very dense.		27 25 29 22		
1						1
		1.2m:...Becomes yellowish grey, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 226**
Project Reference: **247593-210**

HA Lot 226

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.35m: SAND; dark orangey brown. Dense, dry, fine grained.			**0.35m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes bright orange and dark orangey brown, moist.				
		0.6m:...Becomes dense to very dense.			21	
		0.7m:...Becomes light greyish yellow, fine to medium grained.			26	
					26	
1		**0.9m:**...Becomes reddish brown, fine grained.			31	1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 227**
Project Reference: **247593-210**

HA Lot 227

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 24/01/2017
Date Completed: 24/01/2017

Logged by: MF
Input by: MF/TS
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; orangey brown and yellowish grey. Dense to very dense, moist, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.6m:...Becomes dark greenish brown.			21 27 25 31 31	
1		**1m:**...Becomes dark orangey brown, dense.				1
		1.2m to 1.5m:...Minor mottled black silt encountered.				
		1.6m:...Beocmes medium dense.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 228**
Project Reference: **247593-210**

HA Lot 228

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Soft', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; yellowish brown. Medium dense to dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes bright yellowish brown, moist.				
1		**1m:**...Becomes greenish brown, fine to medium grained.				1
		1.1m:...Becomes dense to very dense.				
		1.2m:...Becomes reddish brown.				
		1.6m:...Becomes dark yellowish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 229**
Project Reference: **247593-210**

HA Lot 229

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; light brown. Medium dense to dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes light grey, moist.				
		0.6m:...Becomes very dense.		21 23 23		
1		**1m:**...Becomes dense to very dense.				1
		1.3m:...Becomes reddish brown, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 230**
Project Reference: **247593-210**

HA Lot 230

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; light greyish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.7m:...Becomes light reddish brown.				
		0.8m:...Becomes moist.				
1		**1.1m:**...Becomes greyish yellow, fine to medium grained.				1
		1.4m:...Becomes dark reddish brown, fine grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 231**
Project Reference: **247593-210**

HA Lot 231

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.4m: SAND; light greyish brown. Dense to very dense, dry, fine grained.			**0.4m: ENGINEERED FILL SITE WON SAND**	
1		**1m:**...Becomes dark orangey brown, moist.				1
		1.3m:...Becomes light yellowish grey.				
2		**1.6m:**...Becomes reddish brown.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 232**
Project Reference: **247593-210**

HA Lot 232

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.4m: SAND; light greyish brown. Dense to very dense, dry, fine grained.			**0.4m: ENGINEERED FILL SITE WON SAND**	
		0.7m:...Becomes dark orangey brown, moist.				
1		**0.9m to 1m:**...Yellowish grey lens.				1
		1.2m:...Becomes fine to medium grained.				
		1.5m to 1.8m:...With traces of purplish brown silty sand.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 233**
Project Reference: **247593-210**

HA Lot 233

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.35m: SAND; whitish grey. Dense to very dense, dry, fine grained. **0.4m:**...Becomes yellowish brown. **0.6m:**...Becomes dark orangey brown, moist.		■21 □25	**0.35m: ENGINEERED FILL SITE WON SAND**	
1		**0.9m to 1.1m:**...Minor mottled black silt encountered.				1
2		**1.4m:**...Becomes fine to medium grained.				2
3		Terminated at 2m (Reached target depth)				3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 234**
Project Reference: **247593-210**

HA Lot 234

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.35m: SAND; light orangey brown. Dense to very dense, dry, fine grained. **0.5m:**...Becomes dark orangey brown, moist. **0.8m to 1.1m:**...Alternate bands of yellowish grey and light brownish orange. **1.3m:**...Becomes fine to medium grained.			**0.35m: ENGINEERED FILL SITE WON SAND**	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 235**
Project Reference: **247593-210**

HA Lot 235

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; light grey. Medium dense to dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.45m:...Becomes dark orangey brown, dense to very dense moist.			23 26 25	
1		**0.9m to 1.2m:**...Minor mottled black silt encountered.				1
		1.4m:...Becomes reddish brown.				
		1.6m:...Becomes fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 236**
Project Reference: **247593-210**

HA Lot 236

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.7m:...Becomes orangey brown, moist.		28 27		
1		**0.9m to 1m:**...Minor mottled purplish brown silty sand encountered.				1
		1.4m to 1.5m:...Minor mottled black silt encountered.				
		1.6m:...Becomes yellowish grey, fine to medium grained.				
2		**1.75m:**...Becomes orangey brown, fine grained.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 237**
Project Reference: **247593-210**

HA Lot 237

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.55m:...Becomes orangey brown, moist.		31 29 22		
1						1
		1.1m to 1.2m:...With some yellowish grey sand, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 238**
Project Reference: **247593-210**

HA Lot 238

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
1		**0.5m:** SAND; light brown. Medium dense to dense, moist, fine grained. **0.6m:**...Becomes dense to very dense. **1m:**...Becomes yellowish brown, fine to medium grained.		36 26 36	**0.5m: ENGINEERED FILL SITE WON SAND**	1
2						2
3		Terminated at 2m (Reached target depth)				3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 239**
Project Reference: **247593-210**

HA Lot 239

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Dense to very dense, moist, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
1		**1m:**...Becomes reddish brown.				1
2		**1.5m:**...Becomes greenish brown, fine to medium grained.				2
3		Terminated at 2m (Reached target depth)				3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 240**
Project Reference: **247593-210**

HA Lot 240

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.4m: SAND; yellowish brown. Dense to very dense, moist, fine grained.			**0.4m: ENGINEERED FILL SITE WON SAND**	
		0.8m:...Becomes reddish brown.			30 23	
1		**1.1m:**...Becomes fine to medium grained.				1
		1.2m:...Becomes yellowish grey.				
		1.5m:...Becomes greenish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 241**
Project Reference: **247593-210**

HA Lot 241

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.35m: SAND; yellowish brown. Dense to very dense, moist, fine grained.			**0.35m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes greyish yellow.				
1		**0.9m:**...Becomes reddish brown.				1
		1.3m:...Becomes greenish brown.				
2		**1.7m to 1.9m:**...With minor medium gravel.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 242**
Project Reference: **247593-210**

HA Lot 242

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.4m: SAND; yellowish brown. Dense to very dense, moist, fine grained.			**0.4m: ENGINEERED FILL SITE WON SAND**	
1		**1.1m:**...Becomes fine to medium grained.				1
		1.5m:...Becomes greenish brown.				
2		**1.8m to 1.9m:**...With minor medium to coarse grained gravel.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 243**
Project Reference: **247593-210**

HA Lot 243

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.4m: SAND; yellowish brown. Dense to very dense, moist, fine grained.			**0.4m: ENGINEERED FILL SITE WON SAND**	
1		**1m to 1.3m:**...with some medium grained gravel.				1
		1.5m:...Becomes orangey brown.				
2		**1.8m:**...Becomes light grey, fine to medium grained.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 244**
Project Reference: **247593-210**

HA Lot 244

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; orangey brown. Medium dense to dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes moist.				
		0.7m:...Becomes dense to very dense.				
1		**1.1m to 1.3m:**...With minor fine to medium grained gravel.				1
		1.4m:...Becomes light grey.				
		1.6m:...Becomes reddish brown and bright orangey brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 245**
Project Reference: **247593-210**

HA Lot 245

Sheet **1** of **1**

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense to dense, dry, fine grained. **0.4m:**...Becomes dense to very dense.			**0.3m: ENGINEERED FILL SITE WON SAND**	
1		**0.9m:**...With some greyish yellow sand, fine to medium grained. **1.2m:**...Becomes dark orangey brown.				1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 246**
Project Reference: **247593-210**

HA Lot 246

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 24/01/2017
Date Completed: 24/01/2017

Logged by: MF
Input by: MF/TS
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.35m: SAND; yellowish brown. Dense to very dense, dry, fine grained.			**0.35m: ENGINEERED FILL SITE WON SAND**	
		0.7m:...Becomes orangey brown, moist.				
1		**0.9m to 0.95m:**...Lens of purplish brown sand, fine to medium grained.				1
		1.3m to 1.5m:...With some greyish yellow sand, fine to medium grained.				
		1.6m:...Becomes fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 247**
Project Reference: **247593-210**

HA Lot 247

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense to dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes dark orangey brown, dense to very dense moist.			21	
					26	
					22	
		0.8m to 1m:...With minor medium grained gravel.			28	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 248**
Project Reference: **247593-210**

HA Lot 248

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense to dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes dense to very dense.				
		0.6m:...Becomes orangey brown, moist.				
1		**1.1m to 1.2m:**...With some purplish brown sand, fine grained.				1
		1.4m to 1.5m:...Lens of greyish yellow sand, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 249**
Project Reference: **247593-210**

HA Lot 249

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.4m: SAND; yellowish brown. Medium dense to dense, dry, fine grained.			**0.4m: ENGINEERED FILL SITE WON SAND**	
		0.6m:...Becomes dark orangey brown, moist.			21 22 25	
1		**0.9m to 1.2m:**...With minor medium to coarse grained gravel.				1
		1.4m:...Becomes greyish yellow.				
		1.6m:...Becomes reddish brown, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 250**
Project Reference: **247593-210**

HA Lot 250

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.35m: SAND; yellowish brown. Dense to very dense, dry, fine grained. **0.5m:**...Becomes dark orangey brown, moist.			**0.35m: ENGINEERED FILL SITE WON SAND** 27 22	
1		**0.9m to 1m:**...With minor medium grained gravel.				1
		1.7m:...Becomes reddish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 251**
Project Reference: **247593-210**

HA Lot 251

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense to dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.55m:...Becomes dark orangey brown, dense to very dense, moist.			24 23 23 22 22	
1		**1.1m to 1.3m:**...With minor fine to medium grained gravel.				1
		1.6m to 1.8m:...Orangey brown lens			23 30	
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 253**
Project Reference: **247593-210**

HA Lot 253

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; yellowish brown. Medium dense to dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...With minor medium grained gravel, medium dense to very dense, moist. **0.6m:**...Becomes dense to very dense.		21 24		
1						1
				24 29		
		1.5m:...Becomes greenish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 254**
Project Reference: **247593-210**

HA Lot 254

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; reddish brown. Medium dense to dense, moist, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
1		**0.7m:**...Becomes yellowish brown, dense to very dense.		22 25 26 34 29 36		1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 255**
Project Reference: **247593-210**

HA Lot 255

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	0
		0.2m: SAND; reddish brown. Dense to very dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes yellowish brown, moist.				
1		**1.2m:**...Becomes greenish brown.				1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 256**
Project Reference: **247593-210**

HA Lot 256

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; reddish brown. Dense, moist, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes dense to very dense.			22 28 32 22 18	
1						1
		1.3m:...Becomes light yellowish grey, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 257**
Project Reference: **247593-210**

HA Lot 257

Sheet **1** of **1**

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes moist.			25 35 26 27 39	
1		**1m:**...Becomes orangey brown.				1
		1.3m:...Becomes yellowish grey, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 258**
Project Reference: **247593-210**

HA Lot 258

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Dense to very dense, dry, fine grained. **0.4m:**...Becomes orangey brown, moist. **0.5m:**...Becomes greyish yellow and light brown. **0.7m:**...Becomes greenish brown, fine to medium grained. **1.2m to 1.6m:**...Alternating bands of reddish brown, greyish yellow and brownish orange.			**0.3m: ENGINEERED FILL** **SITE WON SAND** 27	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 259**
Project Reference: **247593-210**

HA Lot 259

Sheet **1** of **1**

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Dense to very dense, dry, fine grained. **0.35m:**...Becomes yellowish brown. **0.6m:**...Becomes greyish yellow, moist. **0.7m:**...Becomes dark orangey brown. **0.9m to 1.2m:**...With some greyish yellow sand, fine to medium grained. **1.2m to 1.4m:**...Becomes greyish brown and reddish brown.			**0.3m: ENGINEERED FILL** **[illegible]E WON SAND**	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 260**
Project Reference: **247593-210**

HA Lot 260

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.6m:...Becomes yellowish grey, moist.		28 31 21 21		
1						1
		1.5m:...Becomes light brown.		21 22		
		1.7m:...Becomes greenish brown, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 261**
Project Reference: **247593-210**

HA Lot 261

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Dense to very dense, dry, fine grained. **0.35m:**...Becomes yellowish brown. **0.45m:**...Becomes greyish brown, moist. **0.6m:**...Becomes orangey brown. **0.9m to 1.2m:**...Alternating bands of yellowish grey, reddish brown and orangey brown. **1.2m:**...Becomes greenish brown. **1.4m:**...Becomes yellowish grey and reddish brown.		22 31 26 25	**0.3m: ENGINEERED FILL SITE WON SAND**	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 262**
Project Reference: **247593-210**

HA Lot 262

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; reddish brown. Dense to very dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes yellowish grey, moist.				
		0.8m:...Becomes greenish brown.				
1						1
		1.2m:...Becomes greyish brown, fine to medium grained.				
		1.4m:...Becomes bright yellowish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 263**
Project Reference: **247593-210**

HA Lot 263

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.25m: SAND; reddish brown. Medium dense to very dense, dry, fine grained.			**0.25m: ENGINEERED FILL SITE WON SAND**	
		0.5m to 0.7m:...alternating bands of yellowish brown and greyish yellow.				
		0.8m:...Becomes bright reddish brown.				
1				23 31 39 27 28		1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 264**
Project Reference: **247593-210**

HA Lot 264

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Medium dense to dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes yellowish brown, moist.				
		0.6m:...Becomes medium dense to very dense		21 26		
1						1
		1.1m:...Becomes dark greenish brown.		29		
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 265**
Project Reference: **247593-210**

HA Lot 265

Sheet **1** of **1**

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.6m:...Becomes yellowish brown and reddish brown, moist.				
		0.7m:...Becomes bright orangey brown.		22		
1				23		1
		1.2m to 1.4m:...With some greyish yellow sand, fine to medium grained.		26		
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 266**
Project Reference: **247593-210**

HA Lot 266

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 27/01/2017
Date Completed: 27/01/2017

Logged by: MF
Input by: MF/TS
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes moist.				
1		**0.9m to 1.1m:**...With some greyish yellow sand, fine to medium grained.		27		1
		1.3m:...With some greenish brown.		21 29		
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 267**
Project Reference: **247593-210**

HA Lot 267

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.35m: SAND; brownish yellow. Dense to very dense, dry, fine grained. **0.4m:**...Becomes reddish brown, moist.		27	**0.35m: ENGINEERED FILL SITE WON SAND**	
1		**0.8m:**...Becomes greenish brown with some reddish brown. **1m to 1.2m:**...With some medium grained gravel.		26		1
2		**1.5m:**...Becomes bright reddish brown.				2
3		Terminated at 2m (Reached target depth)				3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 268**
Project Reference: **247593-210**

HA Lot 268

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.6m:...Becomes dark yellowish brown, moist.				
1						1
		1.5m:...Becomes bright reddish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 269**
Project Reference: **247593-210**

HA Lot 269

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes moist.				
1						1
		1.3m:...Becomes yellowish brown, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 270**
Project Reference: **247593-210**

HA Lot 270

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 27/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 27/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; brownish yellow. Dense to very dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes dark greenish brown, moist.				
1				24 26 28		1
		1m:...Becomes yellowish grey and light brown.				
		1.4m to 1.6m:...With traces of black silt.				
		1.6m:...Becomes greyish brown, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 271**
Project Reference: **247593-210**

HA Lot 271

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes orangey brown.				
		0.7m to 0.8m:...Reddish brown lens encountered.				
1		**0.9m to 1m:**...Yellowish grey lens encountered.				1
		1.3m:...Becomes dark orangey brown.				
2		**1.9m:**...Becomes dark reddish brown.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 272**
Project Reference: **247593-210**

HA Lot 272

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.35m: SAND; reddish brown. Dense to very dense, dry, fine grained. **0.5m to 0.55m:**...Greyish yellow lens encountered. **0.7m:**...Becomes dark orangey brown.		22 25	**0.35m: ENGINEERED FILL SITE WON SAND**	
1		**1m:**...Becomes dark reddish brown.				1
		1.5m:...Becomes yellowish brown. **1.7m:**...Becomes greyish yellow.				
2		Terminated at 2m (Reached target depth)				2
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 273**
Project Reference: **247593-210**

HA Lot 273

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.35m: SAND; yellowish brown. Dense to very dense, dry, fine grained.			**0.35m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes dark orangey brown, moist.		22 27 25 23		
1						1
		1.2m to 1.4m:...With minor black silt, faint organic smell.				
		1.6m:...Becomes greenish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 274**
Project Reference: **247593-210**

HA Lot 274

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.6m:...Becomes yellowish brown.				
1		**0.9m:**...Becomes dark orangey brown, fine to medium grained.				1
		1m to 1.1m:...With minor fine to medium grained gravel.		26 27		
		1.5m:...Becomes greenish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 275**
Project Reference: **247593-210**

HA Lot 275

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense to dense, moist, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.7m:...Becomes dense to very dense.		21, 22, 24		
1		**1m:**...Becomes reddish brown.				1
		1.5m to 1.7m:...With traces of black silt, slight organic smell.		25		
2		**1.8m:**...Becomes greenish brown.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 276**
Project Reference: **247593-210**

HA Lot 276

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 26/01/2017
Date Completed: 26/01/2017

Logged by: AC
Input by: MF/TS
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense to dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes moist.				
		0.8m:...Becomes dense to very dense.				
1		**0.9m:**...Becomes greenish brown.		24		1
		1.1m:...Becomes greyish brown.		21		
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 277**
Project Reference: **247593-210**

HA Lot 277

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; light brown. Medium to dense to dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes yellowish brown, dense to very dense, moist.		21 25 22 31 22 28		
1		**1m:**...Becomes greyish brown.				1
		1.3m:...Becomes greenish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 278**
Project Reference: **247593-210**

HA Lot 278

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; light brown. Dense to very dense, dry, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes yellowish brown, moist.				
		0.7m:...Becomes greenish brown.				
1		**1.1m:**...Becomes light brown, fine to medium grained.				1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 279**
Project Reference: **247593-210**

HA Lot 279

Sheet **1** of **1**

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; yellowish brown. Loose to medium dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes greenish brown, dense to very dense, moist.				
1						1
		1.5m:...Becomes light grey, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 280**
Project Reference: **247593-210**

HA Lot 280

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.4m: SAND; yellowish brown. Dense to very dense, moist, fine grained.			**0.4m: ENGINEERED FILL SITE WON SAND**	
1		**1.2m:**...Becomes light greyish brown, fine to medium grained.				1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 281**
Project Reference: **247593-210**

HA Lot 281

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; orangey brown. Medium dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes yellowish brown, dense to very dense, moist.				
1						1
		1.5m:...Becomes greyish yellow.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 282**
Project Reference: **247593-210**

HA Lot 282

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 26/01/2017
Date Completed: 26/01/2017

Logged by: MF
Input by: MF/TS
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.15m: SAND; reddish brown and orangey brown. Very loose to medium dense, dry, fine grained.			**0.15m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes, medium dense to dense, moist.				
		0.7m:...Becomes greenish brown, dense to very dense, fine to medium grained.				
1						1
		1.2m:...Becomes dark orangey brown.				
		1.4m:...Becomes medium dense to dense.				
		1.6m:...With some reddish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 283**
Project Reference: **247593-210**

HA Lot 283

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 26/01/2017
Date Completed: 26/01/2017

Logged by: MF
Input by: MF/TS
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.25m: SAND; reddish brown and orangey brown. Dense to very dense, dry, fine grained.			**0.25m: ENGINEERED FILL SITE WON SAND**	
		0.5m:...Becomes greenish brown, moist.				
1		**1m:**...Becomes dark orangey brown.		28		1
		1.2m:...With some medium grained gravel.		21		
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 284**
Project Reference: **247593-210**

HA Lot 284

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; reddish brown. Medium dense to dense, dry, fine grained. **0.4m:**...Becomes moist. **0.5m:**...Becomes dark orangey brown. **0.6m:**...Becomes dense to very dense. **0.8m to 0.9m:**...Greyish yellow lens. **1m to 1.3m:**...Minor mottled black silt encountered. **1.4m:**...Becomes reddish brown, fine to medium grained.		25 28 26	**0.3m: ENGINEERED FILL SITE WON SAND**	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 285**
Project Reference: **247593-210**

HA Lot 285

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense to dense, dry, fine grained. **0.4m:**...Becomes reddish brown and orangey brown, moist. **0.5m:**...Becomes dense to very dense. **0.6m:**...Becomes reddish brown. **0.8m to 1m:**...Minor mottled black silt encountered. **1.2m:**...Becomes dark yellowish brown. **1.4m:**...Becomes reddish brown. **1.7m:**...Becomes orangey brown.		22 27	**0.3m: ENGINEERED FILL SITE WON SAND**	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 286**
Project Reference: **247593-210**

HA Lot 286

Sheet **1** of **1**

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; orangey brown. Medium dense to dense, dry, fine grained. **0.4m:**...Becomes reddish brown, moist. **0.6m:**...Becomes dense to very dense. **0.7m:**...Becomes yellowish brown. **0.8m to 1m:**...Minor mottled black silt encountered. **1.2m:**...Becomes dark orangey brown. **1.4m:**...Becomes greenish brown. **1.5m to 1.7m:**...With minor black silt, faint organic smell.		22 25 31	**0.3m: ENGINEERED FILL SITE WON SAND**	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 287**
Project Reference: **247593-210**

HA Lot 287

Sheet **1** of **1**

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: MF
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense to dense, dry, fine grained. **0.4m:**...Becomes reddish brown, moist.			**0.3m: ENGINEERED FILL SITE WON SAND**	
1		**0.8m:**...Becomes dark yellowish brown, dense to very dense. **0.9m to 1m:**...Minor mottled black silt encountered.		24 25 32		1
2		**1.3m:**...Becomes greenish brown. **1.4m to 1.6m:**...With minor medium grained gravel.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 288**
Project Reference: **247593-210**

HA Lot 288

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; orangey brown. Medium dense to dense, moist, fine grained.			**0.3m: ENGINEERED FILL SITE WON SAND**	
1		**0.8m:**...Becomes dense to very dense.		22		1
		1m:...Becomes greenish brown.		25		
		1.1m to 1.3m:...With minor medium grained gravel.		26		
2				35		2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 289**
Project Reference: **247593-210**

HA Lot 289

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 26/01/2017
Date Completed: 26/01/2017

Logged by: AC
Input by: MF/TS
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.2m: SAND; yellowish brown. Medium dense, dry, fine grained.			**0.2m: ENGINEERED FILL SITE WON SAND**	
		0.4m:...Becomes moist.				
		0.5m:...Becomes dense to very dense.				
1		**0.9m:**...Becomes orangey brown.		23		1
		1.1m:...Becomes greenish brown.		34 26 29		
		1.5m:...Minor mottled black silt encountered.				
		1.6m:...Becomes light brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 290**
Project Reference: **247593-210**

HA Lot 290

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 26/01/2017	Logged by: AC
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 26/01/2017	Input by: MF/TS
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor fine grained sand; dark brown. 'Firm', dry, low plasticity, rootlets.			**0m: TOPSOIL**	
		0.3m: SAND; yellowish brown. Medium dense, dry, fine grained. **0.4m:**...Becomes moist. **0.5m:**...Becomes dense to very dense.			**0.3m: ENGINEERED FILL SITE WON SAND**	
1		**1m:**...Becomes greenish brown, fine to medium grained.		22 28 30		1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2A HA LOGS.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 31/05/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 200**
Project Reference: **247593-210**

HA Lot 200

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 7/02/2017
Date Completed: 7/02/2017

Logged by: TTK
Input by: TTK
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** Coarse grained SAND with some medium gravel; light brown. Moist, low plasticity.		2	**0m: TAURANGA GROUP**	0
		0.2m: SAND with some silt; dark brown. Very dense, moist, low plasticity, medium grain.		21	**0.2m: FILL**	
				29		
				33		
				21		
1						1
2		Terminated at 2m (Reached target depth)				2
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/09/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 201**
Project Reference: **247593-210**

HA Lot 201

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** Coarse grained SAND with some medium gravel; light brown. Moist, low plasticity.			**0m: TAURANGA GROUP**	0
		0.2m: SAND with some silt; dark brown. Moist, low plasticity, medium grain.			**0.2m: FILL**	
		0.25m: SAND; reddish brown. Dense, moist, low plastcity, medium grain.				
1				27 28 22 21		1
2				21		2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 202**
Project Reference: **247593-210**

HA Lot 202

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with minor silt; dark brown. Moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.1m: SAND; reddish brown. Dense, moist, low plasticity, medium grained.			**0.1m: FILL**	
		0.4m: Becomes brown and very dense.			21 24 31 28 22 24	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/09/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 203**
Project Reference: **247593-210**

HA Lot 203

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with minor silt; dark brown. Moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.2m: SAND; dark brown with streaks of yellow. Medium dense, moist, low plasticity, medium grained.			**0.2m: FILL**	
		0.3m: Becomes yellowish grey and dense.				
1						1
					21	
					22	
		1.2m: Becomes yellowish orange.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 204**
Project Reference: **247593-210**

HA Lot 204

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with minor silt; dark brown. Moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.3m: SAND; yellowish grey. Dense, moist, low plasticity, medium grained.			**0.3m: FILL**	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/09/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 205**
Project Reference: **247593-210**

HA Lot 205

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TS
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with minor silt; dark brown. Moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.3m: SAND; reddish brown. Dense, moist, low plasticity, medium grained.			**0.3m: FILL**	
1						1
2		Terminated at 2m (Reached target depth)				2
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 206**
Project Reference: **247593-210**

HA Lot 206

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SAND with minor silt; dark brown. Moist, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.3m: SAND; dark redish brown. Dense to very dense, moist, low plasticity, fine to medium grained.			**0.3m: FILL**	
1		**0.7m:** SAND; Medium brown. Dense to very dense, dry to moist, low plasticity, medium grained.				1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 207**
Project Reference: **247593-210**

HA Lot 207

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SAND with some silt; dark brown. Dry to moist, low plasticity, medium grained.				
		0.2m: SAND; orangish brown. Dense, moist, low plasticity, fine to medium grained.				
		0.4m: Becomes redish brown and very dense.		23 24		
1		**0.8m:** Becomes bright orangish brown and dense.				1
		1.5m: Becomes light brown and very dense.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 208**
Project Reference: **247593-210**

HA Lot 208

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 7/02/2017
Date Completed: 7/02/2017

Logged by: TTK
Input by: TTK
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with some silt; dark brown. Moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.1m: SAND with minor silt; redish brown. Moist, low plasticity, fine grained.			**0.1m: FILL**	
		0.2m: SAND; light brown. Dense to very dense, moist, low plasticity, fine grained.				
1				21		1
				25		
				24		
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 209**
Project Reference: **247593-210**

HA Lot 209

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TS
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with some silt; dark brown. Moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.3m: SAND with traces of fine to medium pumiceous gravel; light pinkish grey. Dense, dry to moist, low plasticity, fine grained.			**0.3m: FILL**	
1						1
2		Terminated at 2m (Reached target depth)				2
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 210**
Project Reference: **247593-210**

HA Lot 210

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 7/02/2017
Date Completed: 7/02/2017

Logged by: TTK
Input by: TTK
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with minor silt; dark brown. Moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.2m: SAND; dark brown. Dense, moist, low plasticity, fine to medium grained.			**0.2m: FILL**	
		0.4m: Becomes yellowish golden.			24 23 24	
1						1
					23 28	
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 211**
Project Reference: **247593-210**

HA Lot 211

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SAND with some silt; dark brown. Medium dense, Dry to moist, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.1m: SAND with minor silt; dark redish brown. Medium dense, moist, low plasticity, fine to medium grained.			**0.1m: FILL**	
		0.2m: SAND; brown. Medium dense, moist, low plasticity, medium grained.				
		0.3m: Becomes dark redish brown.				
		0.35m: SAND; greyish white. Dense to very dense, moist, low plasticity, fine to medium grained.			22	
1						1
		1.2m: Becomes light greyish brown.			22	
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 212**
Project Reference: **247593-210**

HA Lot 212

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SAND with minor silt; dark brown. Medium dense, dry to moist, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.3m: SAND; redish dark brown. Dense, dry, low plasticity, fine to medium grained.			**0.3m: FILL**	
		0.5m: Becomes brown, very dense, moist.		22		
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 213**
Project Reference: **247593-210**

HA Lot 213

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 7/02/2017
Date Completed: 7/02/2017

Logged by: TTK
Input by: TTK
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with minor silt; dark brown. Medium dense, dry to moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.3m: SAND; redish dark brown. Dense, dry, low plasticity, fine to medium grained.			**0.3m: FILL**	
		0.5m: Becomes brown, very dense, moist.			22 24 29 21 25	
1						1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 214**
Project Reference: **247593-210**

HA Lot 214

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with minor silt; dark brown. Dense, dry to moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.3m: SAND; brown with some grey. Dense, moist, low plasticity, medium grained.			**0.3m: FILL**	
		0.4m: SAND; yellowish grey. Very dense, dry to moist, low plasticity, medium grained.			23 30	
1						1
					21	
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/09/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 215**
Project Reference: **247593-210**

HA Lot 215

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 7/02/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 7/02/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SAND with some silt; dark brown. Loose, dry to moist, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.1m: SAND; orangish brown. Dense to very dense, moist, low plasticity, fine grained.			**0.1m: FILL**	
					23	
		0.5m: Becomes brown.			22	
1						1
		1.2m: Becomes light brown.			21	
					24	
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 216**
Project Reference: **247593-210**

HA Lot 216

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/04/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/04/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor sand; dark brown. Loose to medium dense, dry to moist, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.4m: SAND; redish brown. Dense, moist, low plasticity, medium grain.			**0.4m: FILL**	
		0.65m: Becomes light brown.				
1		**0.9m:** Becomes brown.				1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 217**
Project Reference: **247593-210**

HA Lot 217

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/04/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/04/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SILT with minor sand; dark brown. Loose to medium dense, moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.3m: SAND; light brown. Dense to very dense, moist, low plasticity, fine grained.			**0.3m: FILL**	
1						1
2		Terminated at 2m (Reached target depth)				2
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/09/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 218**
Project Reference: **247593-210**

HA Lot 218

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/04/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/04/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SILT with minor sand; dark brown. Loose to medium dense, moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.2m: SAND; redish brown. Dense to very dense, moist, low plasticity, medium grained.			**0.2m: FILL**	
1						1
2		Terminated at 2m (Reached target depth)				2
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 291 (Retest)**
Project Reference: **247593-210**

HA Lot 291

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 17/05/2017
Date Completed: 17/05/2017

Logged by: TTK
Input by: TTK
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SAND; medium dark brown. Loose to dense, moist, low plasticity, fine to medium grained.			**0m: TOPSOIL**	
1		**0.8m:** Becomes light brown.			**0.8m: FILL**	1
2		**1.5m:** Becomes medium light brown.				2
3		Terminated at 2m (Reached target depth)				3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 292 (Retest)**
Project Reference: **247593-210**

HA Lot 292

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 17/05/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 17/05/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
1		**0m:** SAND; dark redish brown. Dense to very dense, moist, low plasticity, fine to medium grained.		28 24 22 24 24	**0m: FILL**	1
2		Terminated at 2m (Reached target depth)				2
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 293**
Project Reference: **247593-210**

HA Lot 293

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 17/05/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 17/05/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SAND; medium dark brown. Loose to dense, moist, low plasticity, medium grained.			**0m: FILL**	
		0.6m: Becomes light brown and very dense.				
1				21 21		1
		1m: Becomes dark brown.		22 22		
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 294 (Retest)**
Project Reference: **247593-210**

HA Lot 294

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 24/04/2017
Date Completed: 24/04/2017

Logged by: TTK
Input by: TTK
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** ORGANIC SILT with trace sand; dark brown. Medium dense, moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.2m: SAND with some medium sized gravel; light creamy brown. Dense to very dense, moist, low plasticity, coarse grained.			**0.2m: FILL**	
1		**1.1m:** SAND; dark redish brown. dense to very dense, moist, low plasticity, medium grained.				1
		1.5m: SAND; light brown. Dense, moist, low plasticity, fine to medium grained.				
2		**1.65m:** SAND; dark redish brown. Dense, moist, low plasticity, fine grained.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 295 (Retest)**
Project Reference: **247593-210**

HA Lot 295

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 17/05/2017
Date Completed: 17/05/2017

Logged by: TS
Input by: TTK
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SILT with minor sand; dark brown. Loose to medium dense, moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.2m: SAND with traces of fine to medium pumiceous gravel; light pinkish grey. Dense, dry to moist, low plasticity, fine grained.			**0.2m: FILL**	
1		**1m:** SAND; reddish brown. Dense, moist, low plasticity, medium grained.		29 32 26 27 25		1
2		Terminated at 2m (Reached target depth)				2
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 296 (Retest)**
Project Reference: **247593-210**

HA Lot 296

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 17/05/2017	Logged by: TS
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 17/05/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: SILT with minor sand; dark brown. Loose to medium dense, moist, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.2m: SAND with traces of fine to medium pumiceous gravel; light pinkish grey. Dense, dry to moist, low plasticity, fine grained.			**0.2m: FILL**	
1		**0.9m:** Becomes moist to wet.		27 38		1
		1.5m: SAND; reddish brown. Dense, moist, low plasticity, medium grained.		24 24	**1.5m: FILL**	
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 297 (Retest)**
Project Reference: **247593-210**

HA Lot 297

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 17/05/2017
Date Completed: 17/05/2017

Logged by: TTK
Input by: TTK
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with some silt; dark brown. Medium dense, dry to moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.2m: SAND with some medium sized gravel; greyish white. Dense to very dense, moist, low plasticity, medium to coarse grained.			**0.2m: FILL**	
1						1
		1.5m: SAND; dark brown. Very dense, dry to moist, low plasticity, medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 298 (Retest)**
Project Reference: **247593-210**

HA Lot 298

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 17/05/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 17/05/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** ORGANIC SILT; dark brown. Dense, wet, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.2m: SAND with some medium sized gravel; light brown. Dense to very dense, moist, low plasticity, coarse grained.		22	**0.2m: FILL**	
1				31		1
				26		
		1.5m: SAND; redish brown. Very dense, moist, low plasticity, medium grained.		25		
2				25		2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 299**
Project Reference: **247593-210**

HA Lot 299

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 6/03/2017	Logged by: TS
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 6/03/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: ORGANIC SILT; dark brown. Medium dense, wet, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.2m: SAND with traces of fine to medium pumiceous gravel; light pinkish grey. Dense, dry to moist, low plasticity, fine grained.			**0.2m: FILL**	
		0.3m: Becomes dark brown, moist to wet (not organic)				
		0.4m: Becomes yellowish brown.				
		0.6m: Becomes reddish brown.				
1						1
		1m: Becomes brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 500**
Project Reference: **247593-210**

HA Lot 500

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 6/03/2017	Logged by: TS
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 6/03/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: ORGANIC SILT; dark brown. Medium dense, wet, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.2m: SAND with traces of fine to medium pumiceous gravel; light pinkish grey. Dense, dry to moist, low plasticity, fine grained.			**0.2m: FILL**	
		0.3m: SAND; reddish brown. Dense, moist, low plasticity, fine to medium grained.				
		0.6m: Becomes yellowish brown.				
		0.7m: Becomes light yellowish brown.				
1						1
		1.4m: Becomes light reddish brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 501 (Retest)**
Project Reference: **247593-210**

HA Lot 501

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 24/04/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 24/04/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SILT with trace sand; dark brown. Medium dense, moist, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.3m: SAND with some medium sized gravel; greyish white. Dense, moist, low plasticity, coarse grained.			**0.3m: FILL**	
1						1
				25		
				25		
				29		
				29		
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 502 (Retest)**
Project Reference: **247593-210**

HA Lot 502

DRILLING INFORMATION
Method: Hand Auger
Equipment: 50mm Hand Auger
Contractor: Aurecon

CO-ORDINATES: **Bay of Plenty 2000**
Easting: N/A
Northing: N/A
Ground Level: N/A

Date Started: 24/04/2017
Date Completed: 24/04/2017

Logged by: TTK
Input by: TTK
Checked by: AF
Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SILT with trace sand; dark brown. Dense, moist, low plasticity, fine grained.			**0m: FILL**	0
		0.4m: SAND with some medium sized gravel; greyish white. Dense to very dense, moist, low plasticity, coarse grained.				
1				21		1
2				22		2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 503**
Project Reference: **247593-210**

HA Lot 503

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 17/05/2017	Logged by: TS
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 17/05/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: ORGANIC SILT; dark brown. Medium dense, wet, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.35m: SAND with traces of fine to medium pumiceous gravel; light pinkish grey. Dense, dry to moist, low plasticity, fine grained.			**0.35m: FILL**	
		0.4m: SAND; dark reddish brown. Dense, moist, low plasticity, fine to medium grained.				
		0.6m: Becomes reddish brown.				
1				28 32 33		1
		1m: Becomes yellowish brown.				
				22 22		
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 504 (Retest)**
Project Reference: **247593-210**

HA Lot 504

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 6/03/2017	Logged by: TS
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 6/03/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: ORGANIC SILT; dark brown. Medium dense, wet, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.3m: SAND with traces of fine pumiceous gravel; light creamy grey. Dense, moist, low plasticity, fine grained.			**0.3m: FILL**	
1		**0.9m:** SAND; dark reddish brown. Dense, moist, low plasticity, fine to medium grained.				1
		1m: Becomes light brown.			25 32	
2		**1.7m:** Becomes dark reddish brown.				2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 505 (Retest)**
Project Reference: **247593-210**

HA Lot 505

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 17/05/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 17/05/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** ORGANIC SILT; dark brown. Medium dense, wet, low plasticity, fine grained.			**0m: TOPSOIL**	0
		0.2m: Very fine SAND with some medium sized gravel; greyish white. Dense, moist, low plasticity, coarse grained.			**0.2m: FILL**	
1						1
		1.6m: Becomes wet.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 506 (Retest)**
Project Reference: **247593-210**

HA Lot 506

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 17/05/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 17/05/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: ORGANIC SILT; dark brown. Loose to medium dense, wet, low plasticity, fine grained.			**0m: TOPSOIL**	
1		**0.5m:** SAND with some medium sized gravel; greyish white. Dense, moist, low plasticity, coarse grained.			**0.5m: FILL**	1
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 507**
Project Reference: **247593-210**

HA Lot 507

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 6/03/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 6/03/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: ORGANIC SILT; dark brown. Medium dense, wet, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.3m: SAND with traces of fine pumiceous gravel; light creamy grey. Dense, moist, low plasticity, fine grained.			**0.3m: FILL**	
1						1
		1.4m: SAND; reddish brown. Dense, moist, low plasticity, fine to medium grained.				
		1.5m: Becomes brown.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

aurecon
Ground Floor, 247 Cameron Road
PO Box 2292, Tauranga
New Zealand
Tel: +64 7 578 6183
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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 508**
Project Reference: **247593-210**

HA Lot 508

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 6/03/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 6/03/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
		0m: ORGANIC SILT; dark brown. Medium dense, wet, low plasticity, fine grained.			**0m: TOPSOIL**	
		0.3m: SAND with traces of fine pumiceous gravel; light creamy grey. Dense, moist, low plasticity, fine grained.			**0.3m: FILL**	
1						1
		1.5m: Traces of medium pumiceous gravel encountered.				
		1.7m: SAND; reddish brown. Dense, moist, low plasticity, fine to medium grained.				
2						2
		Terminated at 2m (Reached target depth)				
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/06/2017

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Client: **Zariba Properties Limited**
Project: **Terrace Views Subdivision**
Location: **Lot 509 (Retest)**
Project Reference: **247593-210**

HA Lot 509

DRILLING INFORMATION	**CO-ORDINATES:** **Bay of Plenty 2000**		
Method: Hand Auger	Easting: N/A	Date Started: 17/05/2017	Logged by: TTK
Equipment: 50mm Hand Auger	Northing: N/A	Date Completed: 17/05/2017	Input by: TTK
Contractor: Aurecon	Ground Level: N/A		Checked by: AF
			Verified by: BOL

Depth (m)	Graphic Log	Soil Description	Undrained Shear Strength	DCP Test (Blows/100mm) DCP-A ● DCP-B □ 2 4 6 8 10 12 14 16 18	Additional Observations	Depth (m)
0		**0m:** SAND with some fine to medium sized gravel; light brown. Dense to very dense, moist, low plasticity, coarse grained.			**0m: FILL**	0
1						1
2		Terminated at 2m (Reached target depth)		22		2
3						3
4						4

REMARKS:
Soil consistency terms in parenthesis are inferred.

Water Level Readings:
Date Time | Hole Depth | Water Level
No water level recorded

Database File: 247593 STAGE 2B HA LOGS - AF.GPJ **Library file:** AURECON_AKL_20130627V1.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH TWO SCALAS 1.0 **Date Generated:** 6/08/2017

Aurecon New Zealand Limited
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Aurecon offices are located in:
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Ghana, Hong Kong, Indonesia, Kenya,
Lesotho, Macau, Mozambique,
Namibia, New Zealand, Nigeria,
Philippines, Qatar, Singapore, South Africa,
Swaziland, Tanzania, Thailand, Uganda,
United Arab Emirates, Vietnam.

Our Ref: 152870

12 July 2017

Tauranga City Council
Private Bag 12022
Tauranga 3143

Attention: TCC Development Engineer

RE: Soakage Assessment for Proposed Residential Dwellings in Stages 2A & 2C at Terrace Views, Te Okuroa Drive, Papamoa

REVISION 1: Stage 2 Soakage Areas Plan added to attachments

Lysaght Consultants Ltd (LCL) was engaged by Zariba Properties Ltd to provide typical soakage system design details for Stage 2A & 2C of the Terrace Views residential development. This report provides a standardised soakage design which can be incorporated into Building Consent applications without the need for site specific engineering design (where the soakage system complies with the requirements of this report and attached drawings). Proposals outside of these report parameters will require specific design by a Chartered Professional Engineer.

No stormwater connections are provided to lots within the Terrace Views development. All stormwater runoff from roofs and hardstand areas is to be collected and discharged to stormwater soakage within each lot boundary in accordance with the following;

1.1 Storm water Soakage Disposal Design

- Aurecon's Soakage Memorandum *'Terrace Views Subdivision – Stage 2 Soakage Testing and Assessment'* dated 6 June 2017, recommends a design soakage rate of 0.70 L/min/m² (42mm/hr) for Stage 2A & 2C of the Terrace Views development.
- LCL calculations confirm the use of either
    - 1x 1.8m deep 900mmø (ID) soak ring per 21m² of roof area. Note; where calculations indicate part systems (e.g 2.4 soak ring systems) the number of soak rings shall be rounded up to the next whole number.
    - A gravel trench with a base area of 7.44m² (1.2m width x 6.2m length x 1.8m depth) per 100m² of roof/hardstand
    - Proprietary cell System with a base area of 3.35m² (1.22m width x 2.74m length x 1.72 m depth) per 100m² of roof/hardstand (based on Atlantis Matrix Cell or approved equivalent). Note; where calculations indicate part systems (e.g 2.4 cells long) the number of cells shall be rounded up to the next whole cell number.

- All cesspit connections shall be directed through a filter (ie. Littatrap or Flofast filter) or approved equivalent to ensure that leaves, debris and sediment are prevented from entering the soakage system. It is recommended that downpipes are also directed through the filter or first flush diverter wherever possible to maintain longevity of the soakage system. The filtration device shall be regularly maintained to ensure effective system operation.
- A system overflow point shall be located at a low point on the roadside boundary to ensure surcharge is directed to the road. Overland flow is to be directed toward the road without crossing neighbouring boundaries or causing inundation of buildings. Building floor levels shall comply with the NZBC and TCC IDC requirements.
- Design is based on a groundwater level no higher than +2.8mRL below finished lot levels for Stage 2, as confirmed by Aurecon. The system design shall be reviewed by a Chartered Professional Engineer where this is found not to be the case on individual sites.
- A Chartered professional Engineer shall be engaged to review the design where setbacks, groundwater depths or systems do not comply with the generic design requirements, or where any future design changes increase the hydraulic load on the soakage system.

1.2 Construction and Maintenance Requirements

Typical construction details are provided below for the selected soakage options.

- **Soakage Chamber/Well Liners**

Soakage chambers/well liners should be obtained from a reputable manufacturer and be designed for proposed soil loads. A suitable lid should be installed with adequate strength for the expected surcharge loads. Typical details are provided in the Building Codes E1/VM1. Accessible covers are required on all soak holes. Geofabric is only required where sand ingress will occur into the soak well. Soak holes shall be linked together with a 100ø minimum uPVC pipe. Refer to typical drawing 152870-055-SKT – Typical Soakage Sections for further details.

- **Gravel Soakage Pit**

Gravel must be clean, free of fines and of a uniform size between 20 - 100 mm with a minimum void ratio of 0.38. The excavation must be lined with a non-woven geotextile fabric to prevent ingress of soil material into pit. Slotted pipes should be laid 1/3 from the top of the trench. There shall be no less than 1 pipe per metre width of trench. The number and diameter of pipes and slots is dependent on required flow and pit configuration, and shall be laid to ensure even distribution of flows.

- **Storage cells**

Storage cell systems shall be installed in accordance with the manufacturer's specifications. All cells shall be wrapped in geofabric. A number of suitable proprietary systems are available. LCL has undertaken calculations using typical cell dimensions for the Atlantis Modular Cell system.

Alternative products may require slight alteration of the design. The manufacturers of alternative products shall confirm their system complies with LCL's generic design.

- **General Requirements**

A reputable drain layer experienced in the installation of soakage systems should be engaged for the construction of the site drainage network. System maintenance shall include regular filter cleaning and replacing as necessary. Maintenance frequency should be at least quarterly and after heavy rainfall events. The system has been sized for the selected design storm events. Larger or more intense events may exceed the system's capacity. All construction shall be to TCC's Infrastructure Development Code (IDC) and NZ Building Code requirements.

- **Setback Requirements**

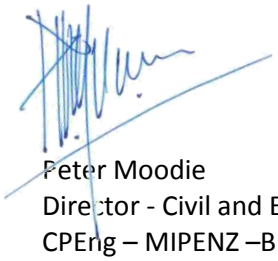
All soak systems shall be setback at least 0.5m from road boundaries, 1.0m from boundaries adjacent to neighbouring lots and 2.3m from all proposed buildings. This assumes a 1.8m deep system with 500mm of cover. All setbacks shall be such that there is no influence from surcharges or structures based on a 45^{o} angle from the load to the underside of the soakage system. Refer to typical drawing 152870-055-SKT – Typical Soakage Arrangement - Stage 2A & 2C for further details. A Chartered Professional Engineer shall be engaged to review the design where a reduced setback from buildings or boundaries is proposed

1.3 Limitations

It is assumed that the soakage recommendations provided in Aurecon's memo are representative of Stage 2A, & 2C soils. There may be special conditions pertaining to specific sites which have not been disclosed by the investigation nor taken into account in this report. This office should be contacted immediately in the event that soils and/or site conditions are found to differ from the observations and assumptions presented in this report. The typical design details are intended for the specific situations described in this report and no responsibility or liability is accepted by LCL to any third party that may use or rely on any part of the content of this document where used in contradiction to the intent of the design. A suitably experienced Chartered Professional Engineer should be engaged to review any designs outside of the scope of this report or where there are any doubts about compliance with the report specifications.

Please contact the undersigned if you have any questions about the above.
Kind Regards

LYSAGHT



Peter Moodie
Director - Civil and Environmental Engineer -
CPEng – MIPENZ –BE Hons Nat Res

Attachments:
152870 – Lysaght soakage system calculations
152870-055-SKT – Typical Soakage Arrangement - Stage 2A & 2C
152870-028-SKT – Typical Soakage Sections
152870-057-STK – Stage 2 Soakage Areas

Infiltration Calculation - Modular Tank

Project: 152870
Site Address: Terrace Views, Stages 2A & 2C
Date: 1/05/2017

System Calcs		
Catchment Area	100	m^2
Volumetric Runoff Coefficient	0.9	
Soil K_h	42	mm/hr
Width of Infiltration Area	1.224	m
Length of Infiltration Area	2.74	m
Depth of Storage	1.72	m
Porosity	0.96	
Base Area	3.35	m^2

Area Calculation	Include		
Base Infiltration Area	Yes	3.35	m^2
Effective Side Infiltration Area	Yes	4.7128	m^2

Infiltration Requirements		
Total Effective Infiltration Area	8.07	m^2
Effective Volume	5.54	m^3

Atlantis Matrix Quad System		
w	3	0.408
l	4	0.685
h	1	1.72

Storm Duration	Storm Mean Intensity (10yr)	Volume in	Volume out (during storm duration period)	Storage Volume Required	Percentage of Storage provided	Test	Actual Depth	Emptying Time (hrs)	Check
(minutes)	(mm/hr)	(m^3)	(m^3)	(m^3)	%				
6		0.000	0.000	0.000		OK	0.00		
10	126	1.890	0.056	1.834	302%	OK	0.57	5.58	OK
20	99	2.970	0.113	2.857	194%	OK	0.89	8.77	OK
30	88	3.960	0.169	3.791	146%	OK	1.18	11.69	OK
45		0.000	0.000	0.000		OK	0.00		
60	65	5.850	0.339	5.511	100%	OK	1.71	17.27	OK
90		0.000	0.000	0.000		OK	0.00		
120	45	8.100	0.678	7.422	75%	Inadequate	2.31	23.91	OK
180		0.000	0.000	0.000		OK	0.00		
240		0.000	0.000	0.000		OK	0.00		
300		0.000	0.000	0.000		OK	0.00		
360	22	11.880	2.033	9.847	56%	Inadequate	3.06	35.07	OK
480		0.000	0.000	0.000		OK	0.00		
600		0.000	0.000	0.000		OK	0.00		
720	13.2	14.256	4.066	10.190	54%	Inadequate	3.17	42.08	OK
840		0.000	0.000	0.000		OK	0.00		
960		0.000	0.000	0.000		OK	0.00		
1080		0.000	0.000	0.000		OK	0.00		
1200		0.000	0.000	0.000		OK	0.00		
1320		0.000	0.000	0.000		OK	0.00		
1440	7.63	16.481	8.131	8.350	66%	Inadequate	2.59	48.65	Increase Area
2160		0.000	0.000	0.000		OK	0.00		
2880	4.41	19.051	16.262	2.789	199%	OK	0.87	56.23	Increase Area
3600		0.000	0.000	0.000		OK	0.00		
4320		0.000	0.000	0.000		OK	0.00		

Max Volume 10 m^3

Infiltration Calculation - Soakage Hole 900Ø

Project 152870
Address Terrace Views, Stages 2A & 2C
Date 1/05/2017

System Calcs		
Catchment Area	21	m^2
Volumetric Runoff Coefficient	0.9	
Soil K_h	42	mm/hr
No. of Wells	1	
Well Diameter	0.9	m
Depth of Storage	1.80	m
Porosity	1	
Base Area	0.64	m^2

Area Calculation	Include		
Base Infiltration Area	Yes	0.64	m^2
Effective Side Infiltration Area	Yes	2.54	m^2

Infiltration Requirements		
Effective Side Area Factor	100%	
Total Effective Infiltration Area	3.18	m^2
Effective Volume	1.15	m^3

Soakage rate	0.7	L/min/m²
	42	L/hr/m²
	42	mm/hr

Storm Duration	Storm Mean Intensity (10yr)	Volume in	Volume out (during storm duration period)	Storage Volume Required	Percentage of Storage provided	Test	Actual Depth	Emptying Time (hrs)	Check
(minutes)	(mm/hr)	(m^3)	(m^3)	(m^3)	%				
6		0.000	0.000	0.0		OK	0.00		
10	126	0.397	0.022	0.4	306%	OK	0.59	2.97	OK
20	99	0.624	0.045	0.6	198%	OK	0.91	4.67	OK
30	88	0.832	0.067	0.8	150%	OK	1.20	6.22	OK
45		0.000	0.000	0.0		OK	0.00		
60	65	1.229	0.134	1.1	105%	OK	1.72	9.20	OK
90		0.000	0.000	0.0		OK	0.00		
120	45	1.701	0.267	1.4	80%	Inadequate	2.25	12.73	OK
180		0.000	0.000	0.0		OK	0.00		
240		0.000	0.000	0.0		OK	0.00		
300		0.000	0.000	0.0		OK	0.00		
360	22	2.495	0.802	1.7	68%	Inadequate	2.66	18.67	OK
480		0.000	0.000	0.0		OK	0.00		
600		0.000	0.000	0.0		OK	0.00		
720	13.2	2.994	1.603	1.4	82%	Inadequate	2.19	22.41	OK
840		0.000	0.000	0.0		OK	0.00		
960		0.000	0.000	0.0		OK	0.00		
1080		0.000	0.000	0.0		OK	0.00		
1200		0.000	0.000	0.0		OK	0.00		
1320		0.000	0.000	0.0		OK	0.00		
1440	7.63	3.461	3.206	0.3	450%	OK	0.40	25.91	OK
2160		0.000	0.000	0.0		OK	0.00		
2880	4.41	4.001	4.001	0.0		OK	0.00		
3600		0.000	0.000	0.0		OK	0.00		
4320		0.000	0.000	0.0		OK	0.00		

Max Volume 1.7 m^3

Infiltration Calculation - Gravel Trench

Project: 152870
Site Address: Terrace Views, Stages 2A & 2C
Date: 1/05/2017

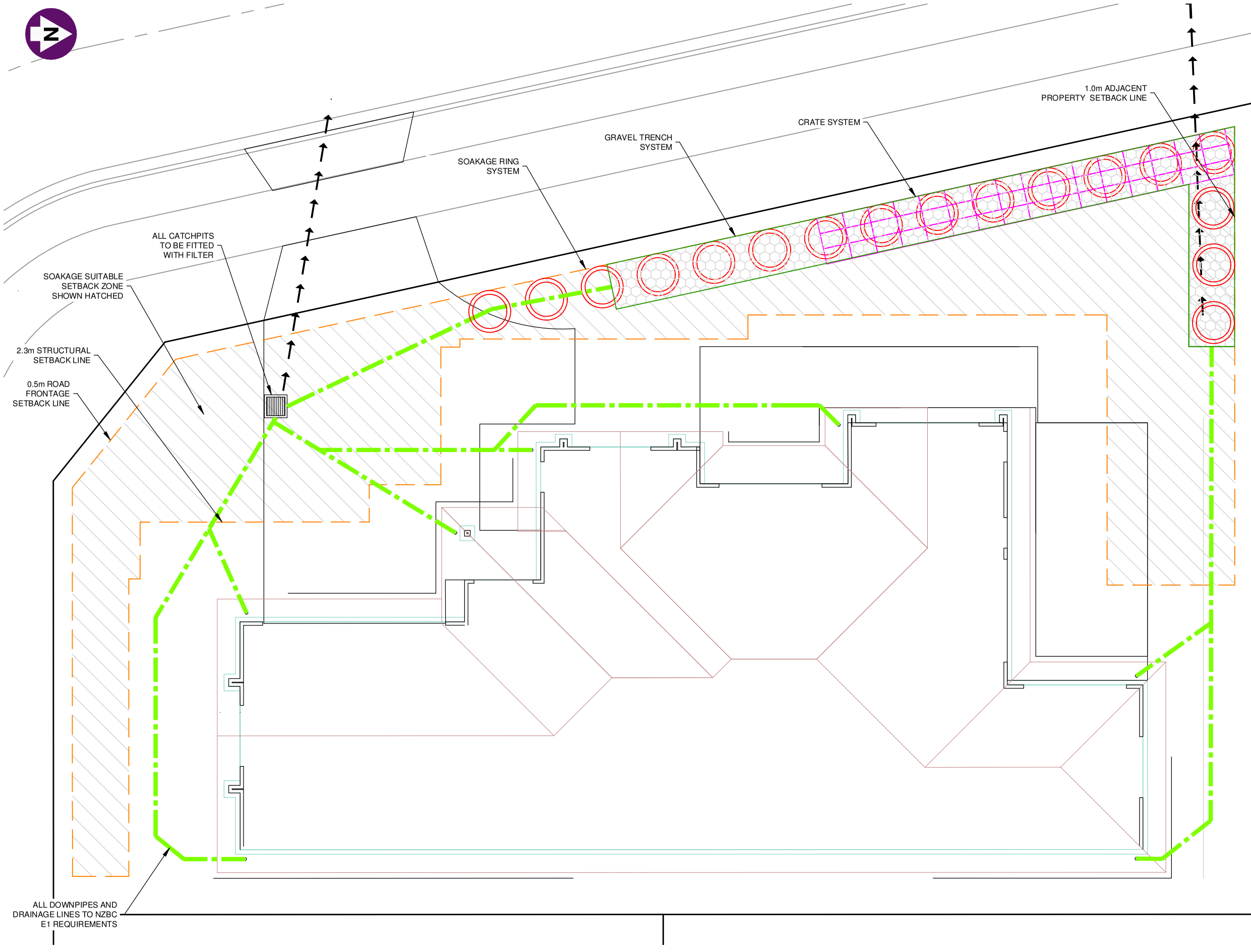
System Calcs		
Catchment Area	100	m^2
Volumetric Runoff Coefficient	0.9	
Soil K_h	42	mm/hr
Width of Infiltration Area	1.2	m
Length of Infiltration Area	6.2	m
Depth of Storage	1.8	m
Porosity	0.38	
Base Area	7.44	m^2

Area Calculation	Include		
Base Infiltration Area	Yes	7.44	m^2
Effective Side Infiltration Area	Yes	11.16	m^2

Infiltration Requirements		
Total Effective Infiltration Area	18.60	m^2
Effective Volume	5.09	m^3

Storm Duration	Storm Mean Intensity (10yr)	Volume in	Volume out (during storm duration period)	Storage Volume Required	Percentage of Storage provided	Test	Actual Depth	Emptying Time (hrs)	Check
(minutes)	(mm/hr)	(m^3)	(m^3)	(m^3)	%				
6		0.000	0.000	0.000		OK	0.00		
10	126	1.890	0.130	1.760	289%	OK	0.62	2.42	OK
20	99	2.970	0.260	2.710	188%	OK	0.96	3.80	OK
30	88	3.960	0.391	3.569	143%	OK	1.26	5.07	OK
45		0.000	0.000	0.000		OK	0.00		
60	65	5.850	0.781	5.069	100%	OK	1.79	7.49	OK
90		0.000	0.000	0.000		OK	0.00		
120	45	8.100	1.562	6.538	78%	Inadequate	2.31	10.37	OK
180		0.000	0.000	0.000		OK	0.00		
240		0.000	0.000	0.000		OK	0.00		
300		0.000	0.000	0.000		OK	0.00		
360	22	11.880	4.687	7.193	71%	Inadequate	2.54	15.21	OK
480		0.000	0.000	0.000		OK	0.00		
600		0.000	0.000	0.000		OK	0.00		
720	13.2	14.256	9.374	4.882	104%	OK	1.73	18.25	OK
840		0.000	0.000	0.000		OK	0.00		
960		0.000	0.000	0.000		OK	0.00		
1080		0.000	0.000	0.000		OK	0.00		
1200		0.000	0.000	0.000		OK	0.00		
1320		0.000	0.000	0.000		OK	0.00		
1440	7.63	16.481	16.481	0.000		OK	0.00		
2160		0.000	0.000	0.000		OK	0.00		
2880	4.41	19.051	19.051	0.000		OK	0.00		
3600		0.000	0.000	0.000		OK	0.00		
4320		0.000	0.000	0.000		OK	0.00		

Max Volume 7 m^3



NOTES

1. THIS PLAN IS FOR CONCEPTUAL PURPOSES AND TO BE USED AS A GUIDE ONLY FOR TYPICAL SOAKAGE REQUIREMENTS.
2. ALL WORKS AND MATERIALS ARE TO COMPLY WITH TAURANGA CITY COUNCIL INFRASTRUCTURE DEVELOPMENT CODE AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING CODE.
3. DESIGN SOAKAGE RATE OF 0.7l/min/m² HAS BEEN UTILISED FOR THE SYSTEM SIZING AS SPECIFIED IN AURECONS *RECCOMMENDED DESIGN SOAKAGE RATES FOR STAGE 2.*
4. MINIMUM CENTRE TO CENTRE SPACING BETWEEN SOAK-HOLES SHALL BE 1.5m FOR 900mmØ (ID). MULTIPLE TRENCH SYSTEMS SHALL BE NO CLOSER THAN 1.5m EDGE TO EDGE. ALL SYSTEMS SHALL BE SET BACK 0.5m FROM ROAD FRONTAGES, 1.0m FROM SIDE BOUNDARIES TO THE EDGE OF SOAKHOLE RING AND 2.3m TO STRUCTURES.
5. CONTRACTOR TO LOCATE / MARK AND CONFIRM ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK ON SITE AND PROTECTION OF SAME.
6. CONTRACTOR TO CHECK ALL PIPE INVERTS AGAINST PIPE CLASHES BEFORE LAYING.
7. PIPE BEDDING AND INSTALLATION TO COMPLY WITH RELEVANT COUNCIL DETAILS AND CPAA TECHNICAL NOTES.
8. SPECIFIC DESIGN BY A CHARTERED ENGINEER WILL BE REQUIRED WHERE THE HOUSE LAYOUT DOES NOT SUIT THE TYPICAL SYSTEM REQUIREMENTS PROPOSED ON THIS DRAWING OR AN ALTERNATIVE SOAKAGE SYSTEM OR ARRANGEMENT IS PROPOSED.

DESIGN

1 SOAK HOLES/RINGS/WELLS:
1x 900ø x 1.8m DEEP SOAK HOLE PER 21m² OF ROOF/HARD STAND

2. GRAVEL TRENCH:
7.44m² BASE AREA GRAVEL TRENCH (6.2 (L) X 1.2m (W) x 1.8m (D) PER 100m² OF ROOF/HARD STAND

3. CRATE TRENCH:
3.35m² BASE AREA CRATE SYSTEM (2.74m (L) X 1.22m (W) x 1.72m (D) CRATE TRENCH PER 100m² OF ROOF/HARD STAND

EXAMPLE

THE CALCULATIONS FOR THE DWELLING SHOWN ON THIS DRAWING ARE :

HOUSE + HARDSTAND = 339m²
900ø SOAK RINGS = 17
GRAVEL TRENCH BASE AREA= 25.22m²
CRATE TRENCH BASE AREA = 11.26m²

SOAKAGE IS LOCATED 0.5m FROM ROAD FRONTAGE, 1.0m FROM SIDE BOUNDARIES, 2.5m FROM BUILDINGS

LEGEND

- LEGAL BOUNDARY
- PROPOSED STORMWATER PIPE
- SOAKAGE SYSTEM RESTRICTION LINE
- PROPOSED OVERLAND FLOWPATH
- PROPOSED SOAKAGE RING 900ø
- PROPOSED GRAVEL TRENCH
- PROPOSED MATRIX CELL SYSTEM
- PROPOSED CATCHPIT

FOR INFORMATION

No.	Date	Revision Details	By	Ver.	App.
A	31.05.17	FOR INFORMATION	JG		

Drawn	JG	Signed / Date 31.05.17
Designed	JG	Signed / Date 31.05.17
Verified	PM	Signed / Date 31.05.17
Approved	PM	Signed / Date 31.05.17

LYSAGHT

SURVEYING, ENGINEERING & LAND DEVELOPMENT
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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
TYPICAL SOAKAGE ARRANGEMENT
STAGE 2A & 2C

Project No. 152870

Scale (A3) NOT TO SCALE

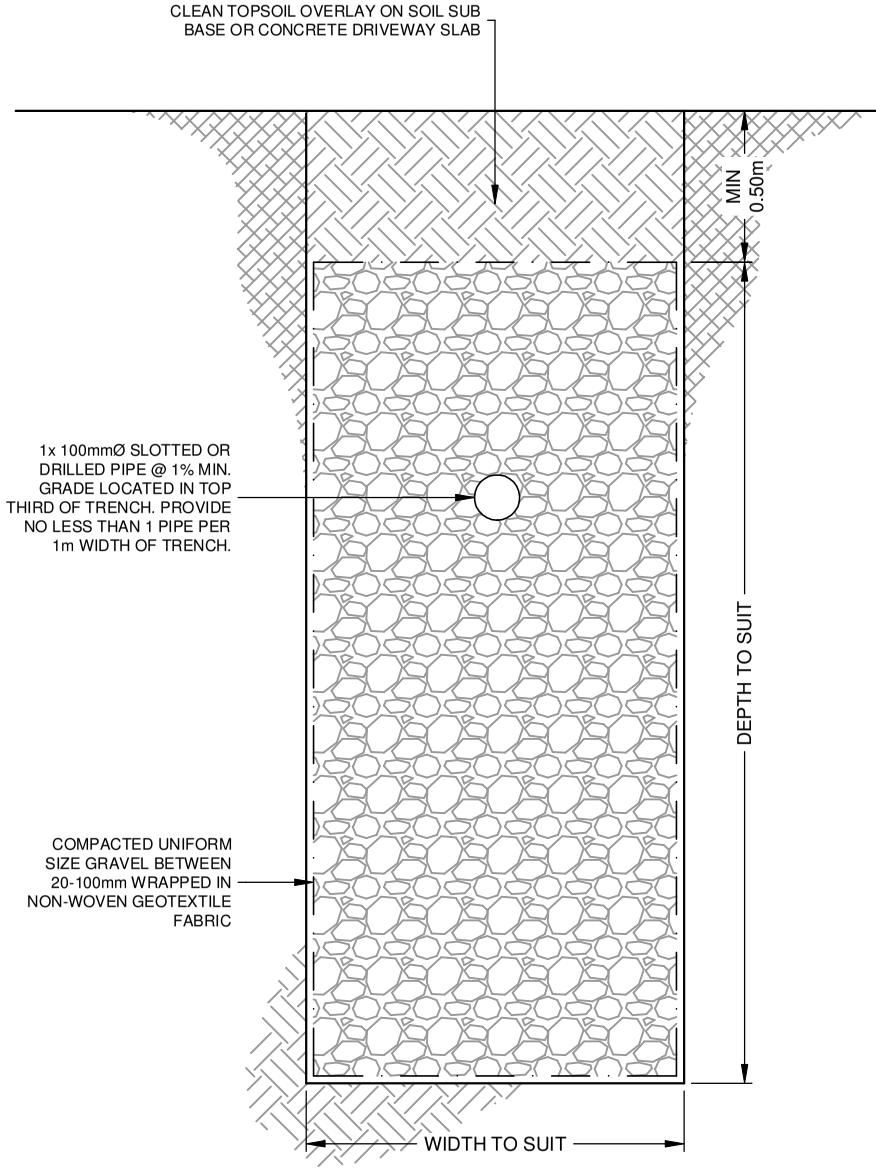
Drawing No. 152870-055-SKT

Rev. A

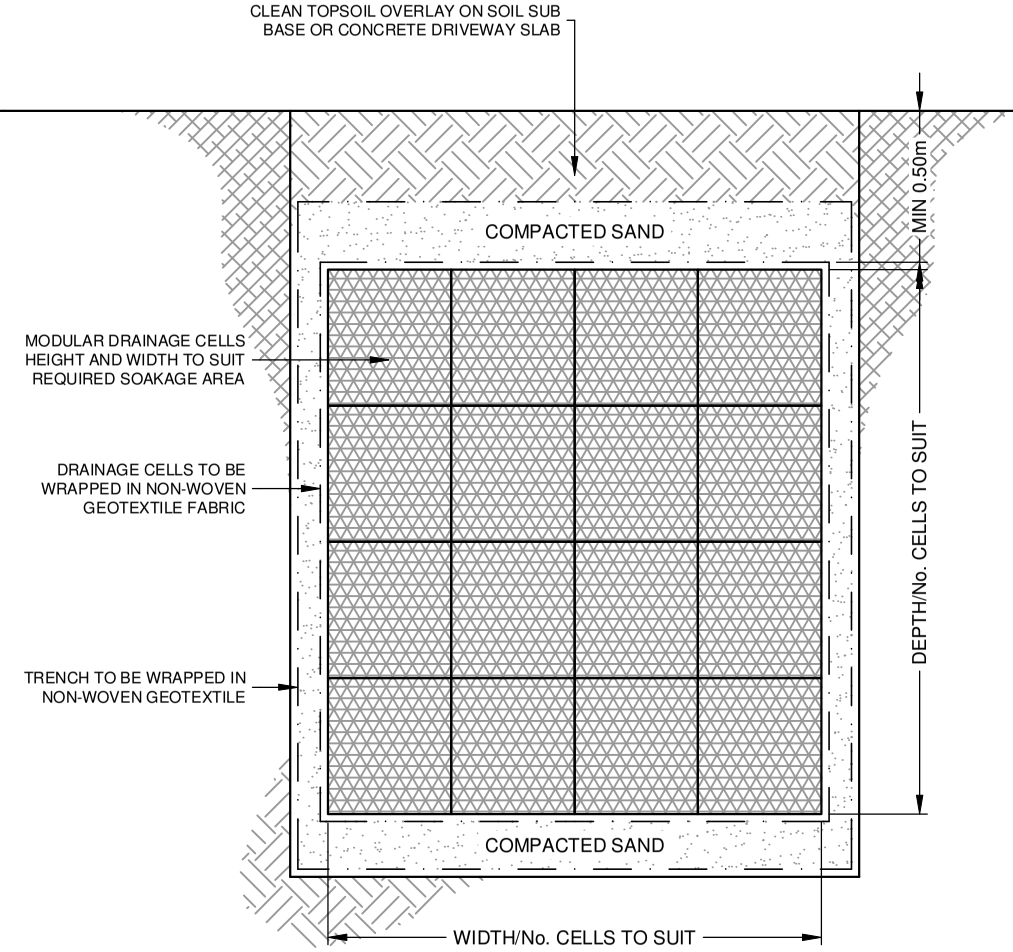
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NOTES

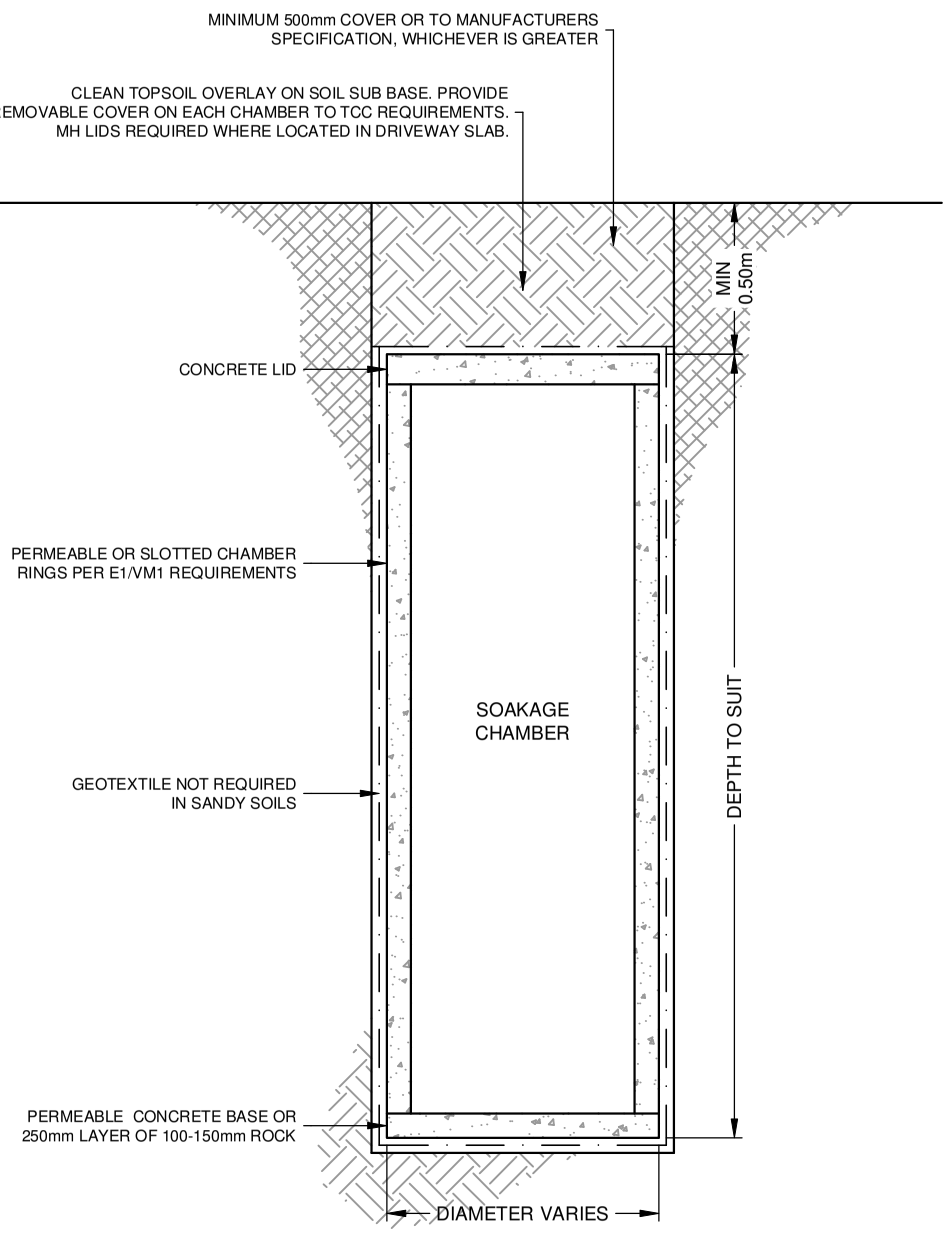
1. ALL DIMENSIONS IN METERS UNLESS NOTED OTHERWISE.
2. ALL WORKS TO COMPLY WITH TCC INFRASTRUCTURE DEVELOPMENT CODE, BOPRC REQUIREMENTS, THE NZ BUILDING CODE AND GOOD CONSTRUCTION PRACTICES.



GRAVEL TRENCH
NOT TO SCALE



MATRIX CELL SYSTEM
NOT TO SCALE



SOAKAGE RING
NOT TO SCALE

FOR INFORMATION

No.	Date	Revision Details	By	Ver.	App.
B	30.11.16	GRAVEL AND MATRIX SYSTEM OPTIONS ADDED	JC		
A	12.09.16	FOR INFORMATION	JC		

Drawn	Signed	Date
JC		12.09.16
Designed	Signed	Date
JC		12.09.16
Verified	Signed	Date
PM		12.09.16
Approved	Signed	Date
PM		12.09.16

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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
TYPICAL SOAKAGE SECTION

Project No.: 152870
Scale: NOT TO SCALE
Drawing No.: 152870-028-SKT
Rev.: B

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AS BUILT

No.	Date	Revision Details	By	Ver.	App.

Drawn	CD	Signed	Date 12/07/17
Designed		Signed	Date
Verified		Signed	Date
Approved		Signed	Date

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Project:
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PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
STAGE 2 SOAKAGE AREAS

Project No. 152870

Scale (A3) 1:2000

Drawing No. 152870-057-STK

Rev. A

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Our Ref: 152870

12 July 2017

Tauranga City Council
Private Bag 12022
Tauranga 3143

Attention: TCC Development Engineer

RE: Soakage Assessment for Proposed Residential Dwellings in Stages 2B at Terrace Views, Te Okuroa Drive, Papamoa

REVISION 1: Stage 2 Soakage Areas Plan added to attachments

Lysaght Consultants Ltd (LCL) was engaged by Zariba Properties Ltd to provide typical soakage system design details for Stage 2B of the Terrace Views residential development. This report provides a standardised soakage design which can be incorporated into Building Consent applications without the need for site specific engineering design (where the soakage system complies with the requirements of this report and attached drawings). Proposals outside of these report parameters will require specific design by a Chartered Professional Engineer.

No stormwater connections are provided to lots within the Terrace Views development. All stormwater runoff from roofs and hardstand areas is to be collected and discharged to stormwater soakage within each lot boundary in accordance with the following;

1.1 Storm water Soakage Disposal Design

- Aurecon's Soakage Memorandum *'Terrace Views Subdivision – Stage 2 Soakage Testing and Assessment'* dated 6 June 2017, recommends a design soakage rate of 2.7 L/min/m² (162mm/hr) for Stage 2B of the Terrace Views development.
- For stage 2B, LCL's calculations confirm the use of either
    - 1x 1.8m deep 900mmø (ID) soak ring per 28m² of roof area. Note; where calculations indicate part systems (e.g 2.4 soak ring systems) the number of soak rings shall be rounded up to the next whole number.
    - A gravel trench with a base area of 5.40m² (1.2m width x 4.5m length x 1.8m depth) per 100m² of roof/hardstand
    - Proprietary cell System with a base area of 4.19 m² (1.22m width x 3.43m length x 1.31 m depth) per 100m² of roof/hardstand (based on Atlantis Matrix Cell or approved equivalent). Note; where calculations indicate part systems (e.g 2.4 cells long) the number of cells shall be rounded up to the next whole cell number.
- All cesspit connections shall be directed through a filter (ie. Littatrap or Flofast filter) or approved equivalent to ensure that leaves, debris and sediment are prevented from

entering the soakage system. It is recommended that downpipes are also directed through the filter or first flush diverter wherever possible to maintain longevity of the soakage system. The filtration device shall be regularly maintained to ensure effective system operation.

- A system overflow point shall be located at a low point on the roadside boundary to ensure surcharge is directed to the road. Overland flow is to be directed toward the road without crossing neighbouring boundaries or causing inundation of buildings. Building floor levels shall comply with the NZBC and TCC IDC requirements.
- Design is based on a groundwater level no higher than +2.8mRL below finished lot levels for Stage 2, as confirmed by Aurecon. The system design shall be reviewed by a Chartered Professional Engineer where this is found not to be the case on individual sites.
- A Chartered professional Engineer shall be engaged to review the design where setbacks, groundwater depths or systems do not comply with the generic design requirements, or where any future design changes increase the hydraulic load on the soakage system.

1.2 Construction and Maintenance Requirements

Typical construction details are provided below for the selected soakage options.

- **Soakage Chamber/Well Liners**

Soakage chambers/well liners should be obtained from a reputable manufacturer and be designed for proposed soil loads. A suitable lid should be installed with adequate strength for the expected surcharge loads. Typical details are provided in the Building Codes E1/VM1. Accessible covers are required on all soak holes. Geofabric is only required where sand ingress will occur into the soak well. Soak holes shall be linked together with a 100ø minimum uPVC pipe. Refer to typical drawing 152870-056-SKT – Typical Soakage Sections for further details.

- **Gravel Soakage Pit**

Gravel must be clean, free of fines and of a uniform size between 20 - 100 mm with a minimum void ratio of 0.38. The excavation must be lined with a non-woven geotextile fabric to prevent ingress of soil material into pit. Slotted pipes should be laid 1/3 from the top of the trench. There shall be no less than 1 pipe per metre width of trench. The number and diameter of pipes and slots is dependent on required flow and pit configuration, and shall be laid to ensure even distribution of flows.

- **Storage cells**

Storage cell systems shall be installed in accordance with the manufacturer's specifications. All cells shall be wrapped in geofabric. A number of suitable proprietary systems are available. LCL has undertaken calculations using typical cell dimensions for the Atlantis Modular Cell system. Alternative products may require slight alteration of the design. The manufacturers of alternative products shall confirm their system complies with LCL's generic design.

- **General Requirements**

A reputable drain layer experienced in the installation of soakage systems should be engaged for the construction of the site drainage network. System maintenance shall include regular filter cleaning and replacing as necessary. Maintenance frequency should be at least quarterly and after heavy rainfall events. The system has been sized for the selected design storm events. Larger or more intense events may exceed the system's capacity. All construction shall be to TCC's Infrastructure Development Code (IDC) and NZ Building Code requirements.

- **Setback Requirements**

All soak systems shall be setback at least 0.5m from road boundaries, 1.0m from boundaries adjacent to neighbouring lots and 2.3m from all proposed buildings. This assumes a 1.8m deep system with 500mm of cover. All setbacks shall be such that there is no influence from surcharges or structures based on a 45^{o} angle from the load to the underside of the soakage system. Refer to typical drawing 152870-056-SKT – Typical Soakage Arrangement - Stage 2B for further details. A Chartered Professional Engineer shall be engaged to review the design where a reduced setback from buildings or boundaries is proposed

1.3 Limitations

It is assumed that the soakage recommendations provided in Aurecon's memo are representative of Stage 2B soils. There may be special conditions pertaining to specific sites which have not been disclosed by the investigation nor taken into account in this report. This office should be contacted immediately in the event that soils and/or site conditions are found to differ from the observations and assumptions presented in this report. The typical design details are intended for the specific situations described in this report and no responsibility or liability is accepted by LCL to any third party that may use or rely on any part of the content of this document where used in contradiction to the intent of the design. A suitably experienced Chartered Professional Engineer should be engaged to review any designs outside of the scope of this report or where there are any doubts about compliance with the report specifications.

Please contact the undersigned if you have any questions about the above.
Kind Regards

LYSAGHT

Peter Moodie
Director - Civil and Environmental Engineer -
CPEng – MIPENZ –BE Hons Nat Res

Attachments:
152870 – Lysaght soakage system calculations
152870-056-SKT – Typical Soakage Arrangement - Stage 2B
152870-028-SKT – Typical Soakage Sections
152870-057-STK – Stage 2 Soakage Areas

Infiltration Calculation - Modular Tank

Project: 152870
Site Address: Terrace Views, Stage 2B
Date: 1/05/2017

System Calcs		
Catchment Area	100	m^2
Volumetric Runoff Coefficient	0.9	
Soil K_h	162	mm/hr
Width of Infiltration Area	1.224	m
Length of Infiltration Area	3.425	m
Depth of Storage	1.31	m
Porosity	0.96	
Base Area	4.19	m^2

Area Calculation	Include		
Base Infiltration Area	Yes	4.19	m^2
Effective Side Infiltration Area	Yes	4.48675	m^2

Infiltration Requirements		
Total Effective Infiltration Area	8.68	m^2
Effective Volume	5.27	m^3

Atlantis Matrix Triple System		
w	3	0.408
l	5	0.685
h	1	1.31

Storm Duration	Storm Mean Intensity (10yr)	Volume in	Volume out (during storm duration period)	Storage Volume Required	Percentage of Storage provided	Test	Actual Depth	Emptying Time (hrs)	Check
(minutes)	(mm/hr)	(m^3)	(m^3)	(m^3)	%				
6		0.000	0.000	0.000		OK	0.00		
10	126	1.890	0.234	1.656	318%	OK	0.41	1.34	OK
20	99	2.970	0.469	2.501	211%	OK	0.62	2.11	OK
30	88	3.960	0.703	3.257	162%	OK	0.81	2.82	OK
45		0.000	0.000	0.000		OK	0.00		
60	65	5.850	1.406	4.444	119%	OK	1.10	4.16	OK
90		0.000	0.000	0.000		OK	0.00		
120	45	8.100	2.812	5.288	100%	Inadequate	1.31	5.76	OK
180		0.000	0.000	0.000		OK	0.00		
240		0.000	0.000	0.000		OK	0.00		
300		0.000	0.000	0.000		OK	0.00		
360	22	11.880	8.436	3.444	153%	OK	0.86	8.45	OK
480		0.000	0.000	0.000		OK	0.00		
600		0.000	0.000	0.000		OK	0.00		
720	13.2	14.256	14.256	0.000		OK	0.00		
840		0.000	0.000	0.000		OK	0.00		
960		0.000	0.000	0.000		OK	0.00		
1080		0.000	0.000	0.000		OK	0.00		
1200		0.000	0.000	0.000		OK	0.00		
1320		0.000	0.000	0.000		OK	0.00		
1440	7.63	16.481	16.481	0.000		OK	0.00		
2160		0.000	0.000	0.000		OK	0.00		
2880	4.41	19.051	19.051	0.000		OK	0.00		
3600		0.000	0.000	0.000		OK	0.00		
4320		0.000	0.000	0.000		OK	0.00		

Max Volume 5 m^3

Infiltration Calculation - Soakage Hole 900ø

Project 152870
Address Terrace Views, Stage 2B
Date 1/05/2017

System Calcs		
Catchment Area	28	m^2
Volumetric Runoff Coefficient	0.9	
Soil K_h	162	mm/hr
No. of Wells	1	
Well Diameter	0.9	m
Depth of Storage	1.80	m
Porosity	1	
Base Area	0.64	m^2

Area Calculation	Include		
Base Infiltration Area	Yes	0.64	m^2
Effective Side Infiltration Area	Yes	2.54	m^2

Infiltration Requirements		
Effective Side Area Factor	100%	
Total Effective Infiltration Area	3.18	m^2
Effective Volume	1.15	m^3

Soakage rate	2.7	L/min/m²
	162	L/hr/m²
	162	mm/hr

Storm Duration	Storm Mean Intensity (10yr)	Volume in	Volume out (during storm duration period)	Storage Volume Required	Percentage of Storage provided	Test	Actual Depth	Emptying Time (hrs)	Check
(minutes)	(mm/hr)	(m^3)	(m^3)	(m^3)	%				
6		0.000	0.000	0.0		OK	0.00		
10	126	0.529	0.086	0.4	258%	OK	0.70	1.03	OK
20	99	0.832	0.172	0.7	174%	OK	1.04	1.61	OK
30	88	1.109	0.258	0.9	135%	OK	1.34	2.15	OK
45		0.000	0.000	0.0		OK	0.00		
60	65	1.638	0.515	1.1	102%	OK	1.76	3.18	OK
90		0.000	0.000	0.0		OK	0.00		
120	45	2.268	1.031	1.2	93%	Inadequate	1.95	4.40	OK
180		0.000	0.000	0.0		OK	0.00		
240		0.000	0.000	0.0		OK	0.00		
300		0.000	0.000	0.0		OK	0.00		
360	22	3.326	3.092	0.2	488%	OK	0.37	6.46	OK
480		0.000	0.000	0.0		OK	0.00		
600		0.000	0.000	0.0		OK	0.00		
720	13.2	3.992	3.992	0.0		OK	0.00		
840		0.000	0.000	0.0		OK	0.00		
960		0.000	0.000	0.0		OK	0.00		
1080		0.000	0.000	0.0		OK	0.00		
1200		0.000	0.000	0.0		OK	0.00		
1320		0.000	0.000	0.0		OK	0.00		
1440	7.63	4.615	4.615	0.0		OK	0.00		
2160		0.000	0.000	0.0		OK	0.00		
2880	4.41	5.334	5.334	0.0		OK	0.00		
3600		0.000	0.000	0.0		OK	0.00		
4320		0.000	0.000	0.0		OK	0.00		

Max Volume 1.2 m^3

Infiltration Calculation - Gravel Trench

Project: 152870
Site Address: Terrace Views, Stage 2B
Date: 1/05/2017

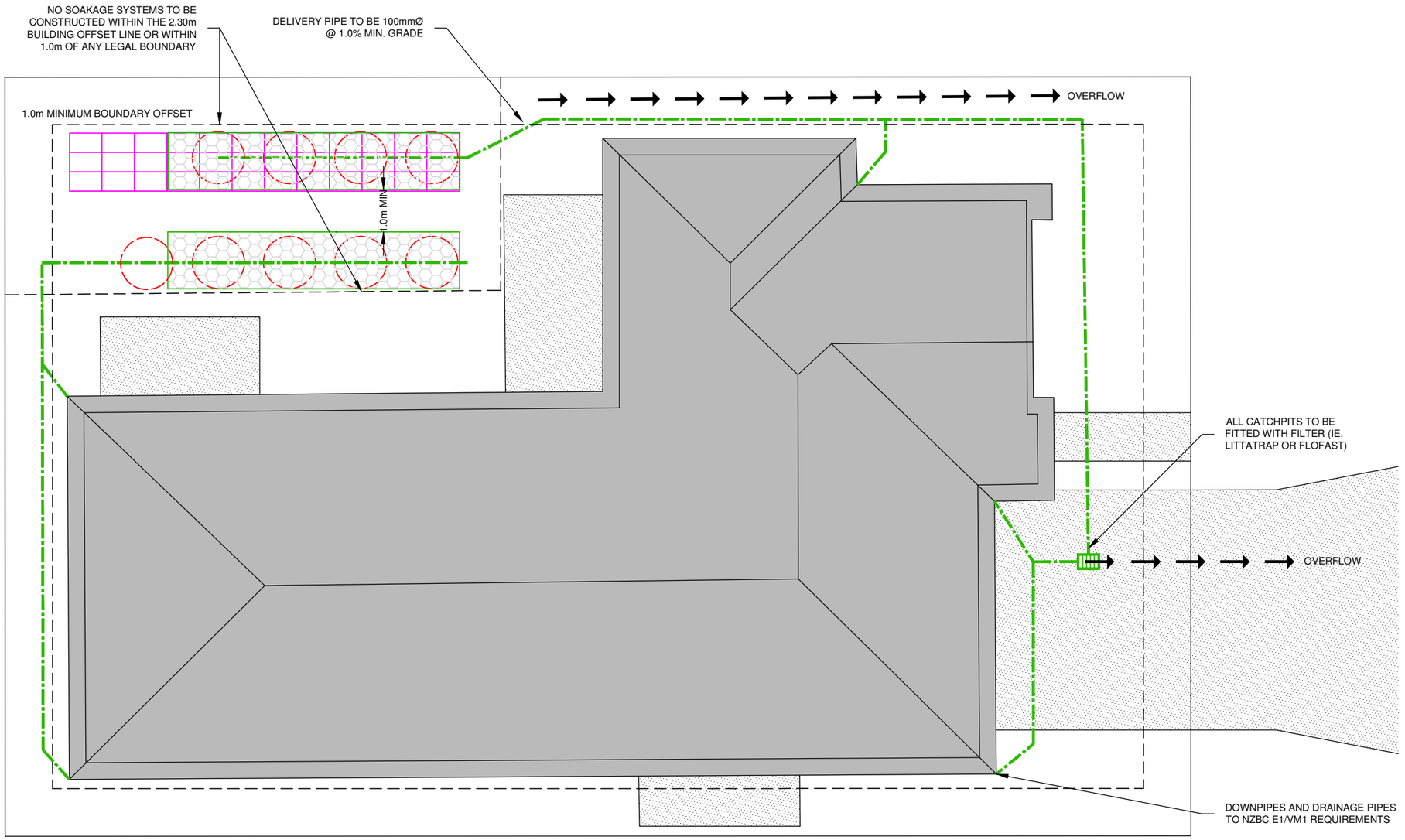
System Calcs		
Catchment Area	100	m^2
Volumetric Runoff Coefficient	0.9	
Soil K_h	162	mm/hr
Width of Infiltration Area	1.2	m
Length of Infiltration Area	4.5	m
Depth of Storage	1.8	m
Porosity	0.38	
Base Area	5.40	m^2

Area Calculation	Include		
Base Infiltration Area	Yes	5.40	m^2
Effective Side Infiltration Area	Yes	8.1	m^2

Infiltration Requirements		
Total Effective Infiltration Area	13.50	m^2
Effective Volume	3.69	m^3

Storm Duration	Storm Mean Intensity (10yr)	Volume in	Volume out (during storm duration period)	Storage Volume Required	Percentage of Storage provided	Test	Actual Depth	Emptying Time (hrs)	Check
(minutes)	(mm/hr)	(m^3)	(m^3)	(m^3)	%				
6		0.000	0.000	0.000		OK	0.00		
10	126	1.890	0.365	1.526	242%	OK	0.74	0.86	OK
20	99	2.970	0.729	2.241	165%	OK	1.09	1.36	OK
30	88	3.960	1.094	2.867	129%	OK	1.40	1.81	OK
45		0.000	0.000	0.000		OK	0.00		
60	65	5.850	2.187	3.663	101%	OK	1.79	2.67	OK
90		0.000	0.000	0.000		OK	0.00		
120	45	8.100	4.374	3.726	99%	Inadequate	1.82	3.70	OK
180		0.000	0.000	0.000		OK	0.00		
240		0.000	0.000	0.000		OK	0.00		
300		0.000	0.000	0.000		OK	0.00		
360	22	11.880	11.880	0.000		OK	0.00		
480		0.000	0.000	0.000		OK	0.00		
600		0.000	0.000	0.000		OK	0.00		
720	13.2	14.256	14.256	0.000		OK	0.00		
840		0.000	0.000	0.000		OK	0.00		
960		0.000	0.000	0.000		OK	0.00		
1080		0.000	0.000	0.000		OK	0.00		
1200		0.000	0.000	0.000		OK	0.00		
1320		0.000	0.000	0.000		OK	0.00		
1440	7.63	16.481	16.481	0.000		OK	0.00		
2160		0.000	0.000	0.000		OK	0.00		
2880	4.41	19.051	19.051	0.000		OK	0.00		
3600		0.000	0.000	0.000		OK	0.00		
4320		0.000	0.000	0.000		OK	0.00		

Max Volume 4 m^3



LEGEND

- LEGAL BOUNDARY
- PROPOSED STORMWATER PIPE
- SOAKAGE SYSTEM RESTRICTION LINE
- PROPOSED OVERLAND FLOWPATH
- PROPOSED SOAKAGE RING 900ø
- PROPOSED GRAVEL TRENCH
- PROPOSED MATRIX CELL SYSTEM
- PROPOSED CATCHPIT

NOTES

1. THIS PLAN IS FOR CONCEPTUAL PURPOSES AND TO BE USED AS A GUIDE ONLY FOR TYPICAL SOAKAGE REQUIREMENTS.
2. ALL WORKS AND MATERIALS ARE TO COMPLY WITH TAURANGA CITY COUNCIL INFRASTRUCTURE DEVELOPMENT CODE AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING CODE.
3. DESIGN SOAKAGE RATE OF 2.7L/min/m² HAS BEEN UTILISED FOR THE SYSTEM SIZING AS SPECIFIED IN AURECONS *RECCOMMENDED DESIGN SOAKAGE RATES FOR STAGE 2*
4. MINIMUM CENTRE TO CENTRE SPACING BETWEEN SOAK-HOLES SHALL BE 1.5m FOR 900mmØ (ID). SYSTEMS SHALL BE SET BACK 1.0m FROM THE BOUNDARY TO THE EDGE OF SOAKHOLE RING AND 2.3m TO STRUCTURES.
5. CONTRACTOR TO LOCATE / MARK AND CONFIRM ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK ON SITE AND PROTECTION OF SAME.
6. CONTRACTOR TO CHECK ALL PIPE INVERTS AGAINST PIPE CLASHES BEFORE LAYING.
7. PIPE BEDDING AND INSTALLATION TO COMPLY WITH RELEVANT COUNCIL DETAILS AND CPAA TECHNICAL NOTES.
8. SPECIFIC DESIGN BY A CHARTERED ENGINEER WILL BE REQUIRED WHERE THE HOUSE LAYOUT DOES NOT SUIT THE TYPICAL SYSTEM REQUIREMENTS PROPOSED ON THIS DRAWING OR AN ALTERNATIVE SOAKAGE SYSTEM OR ARRANGEMENT IS PROPOSED.

DESIGN

1 SOAK HOLES/RINGS/WELLS:
1x 900ø x 1.8m DEEP SOAK HOLE PER 28m² OF ROOF/HARD STAND

2. GRAVEL TRENCH:
5.40m² BASE AREA GRAVEL TRENCH (4.5m (L) X 1.2m (W) x 1.8m (D) PER 100m² OF ROOF/HARD STAND

3. CRATE TRENCH:
4.19m² BASE AREA CRATE SYSTEM (3.43m (L) X 1.22m (W) x 1.31m (D) CRATE TRENCH PER 100m² OF ROOF/HARD STAND

EXAMPLE

THE CALCULATIONS FOR THE DWELLING SHOWN ON THIS DRAWING ARE :

HOUSE + HARDSTAND = 249m²
900ø SOAK RINGS = 9
GRAVEL TRENCH BASE AREA= 13.45m²
CRATE TRENCH BASE AREA = 10.43m²

SOAKAGE IS LOCATED 0.5m FROM ROAD FRONTAGE, 1.0m FROM SIDE BOUNDARIES, 2.3m FROM BUILDINGS

FOR INFORMATION

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A	31.05.17	FOR INFORMATION	JG		

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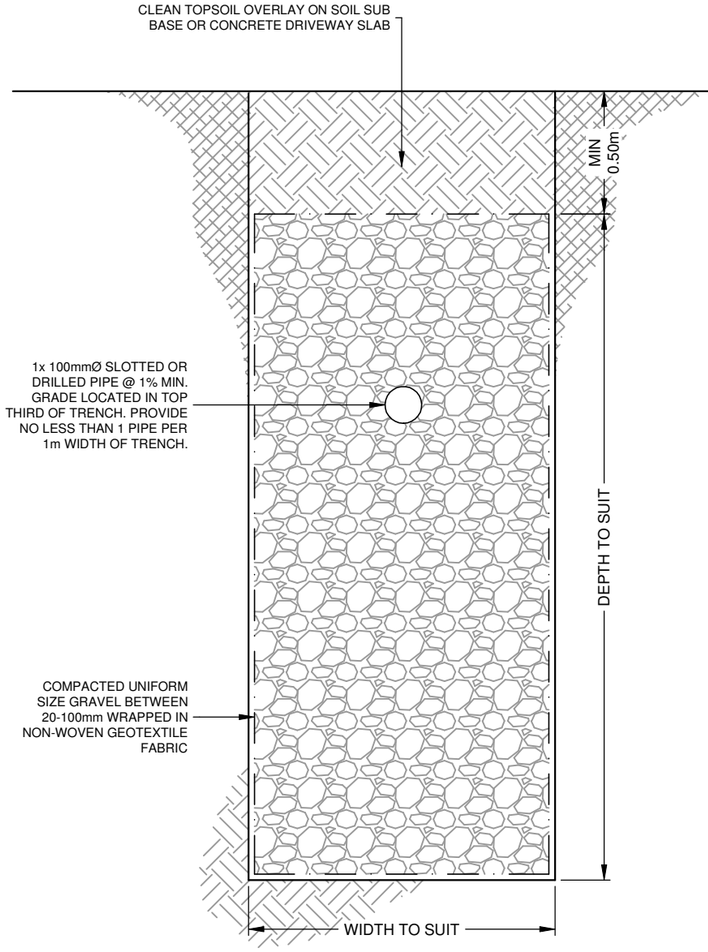
Drawing Title:
TYPICAL SOAKAGE ARRANGEMENT
STAGE 2B

Project No. 152870
Scale (A3) NOT TO SCALE
Drawing No. 152870-056-SKT
Rev. A

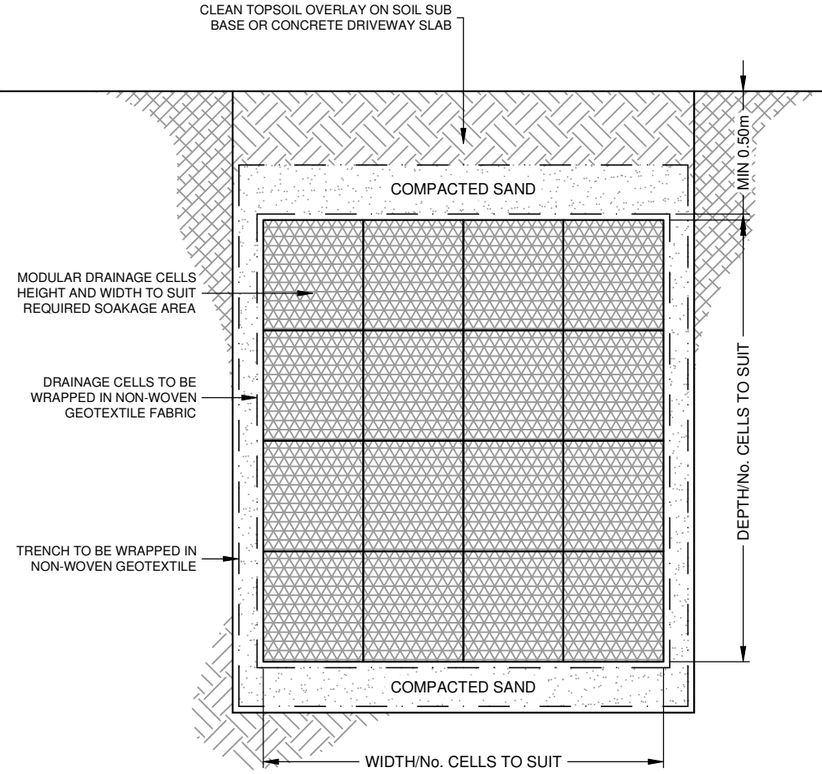
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NOTES

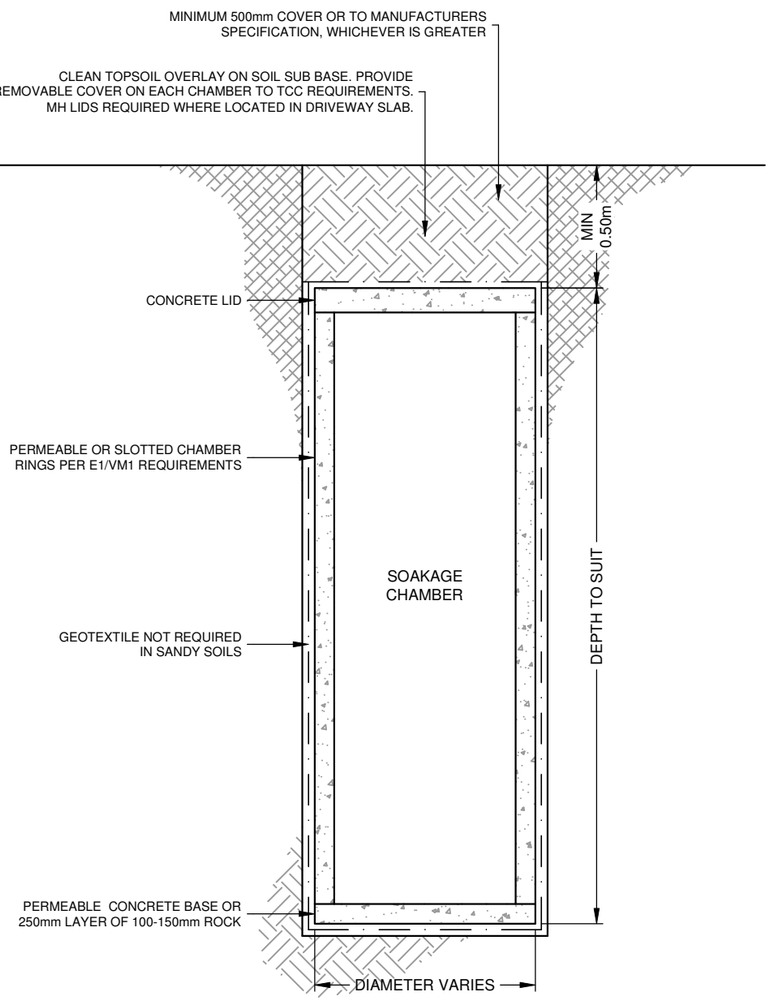
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PAPAMOA

Drawing Title:
TYPICAL SOAKAGE SECTION

Project No. 152870
Scale NOT TO SCALE
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Approved	Signed	Date

LYSAGHT

SURVEYING, ENGINEERING & LAND DEVELOPMENT
19 Totara St, Mount Maunganui 3116 Ph 07 578 8798 www.lysaght.net.nz

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Project:
TERRACE VIEWS
PROPOSED RESIDENTIAL SUBDIVISION
TE OKUROA DRIVE
PAPAMOA

Drawing Title:
STAGE 2 SOAKAGE AREAS

Project No.
152870

Scale (A3)
1:2000

Drawing No.
152870-057-STK

Rev.
A

X:\Projects 1\15 Jobs\152870 Zariba Holdings, Parton Rd, Development\CAD\Drawings\SKETCH\152870-057-SKT-Stage 2 Soakage Areas.dwg

SED Consultants Ltd

Specialist Engineering Design
Chartered Professional Engineers
20 Park Street, Tauranga 3110
07 578 8071
admin@sed.nz

Site Inspection Report

Client	Tauranga Homes	Project No	19/215
Location	35 Dunkeld Drive Papamoa	Date	24/10/19
Contractor	TGA Homes	Time	8:30am
Inspector	P. McOnie	BC No	191756

Prompts: Purpose of inspection, Observations, Progress, Discussion, Decisions Made, Action Required.

Inspection of stripped subgrade and ground bearing capacity check

Progress on site

- All vegetation and organic material has been excavated and removed from site

Inspected Items

- Stripped subgrade

Observations

- Excavation extends to approx. 1.0m outside building lines and to a depth of approx. 0.3m below existing ground level
- Subgrade consists of natural sands.

Ground bearing Capacity

Two x Scala Penetrometer tests were completed, one to each end of the proposed building location. Results confirmed a geotech ultimate bearing capacity of more than 300kPa which exceeds the requirements of the building design and is deemed to be “good ground” under the requirements of the building code.

Hand auger holes were also bored to a depth of 1.0m in four corners of the proposed building location. No organic material was encountered

We are therefore satisfied that the subgrade has adequate bearing capacity for the proposed building

Scala results and locations attached.

OK to fill site

Result of Inspection **Pass ✓** **Ongoing ☐** **Fail ☐**

Report Issued To Tony Hawker Issue Date 24/10/19

Photographs



Pic. 1



Pic. 2



Pic. 3



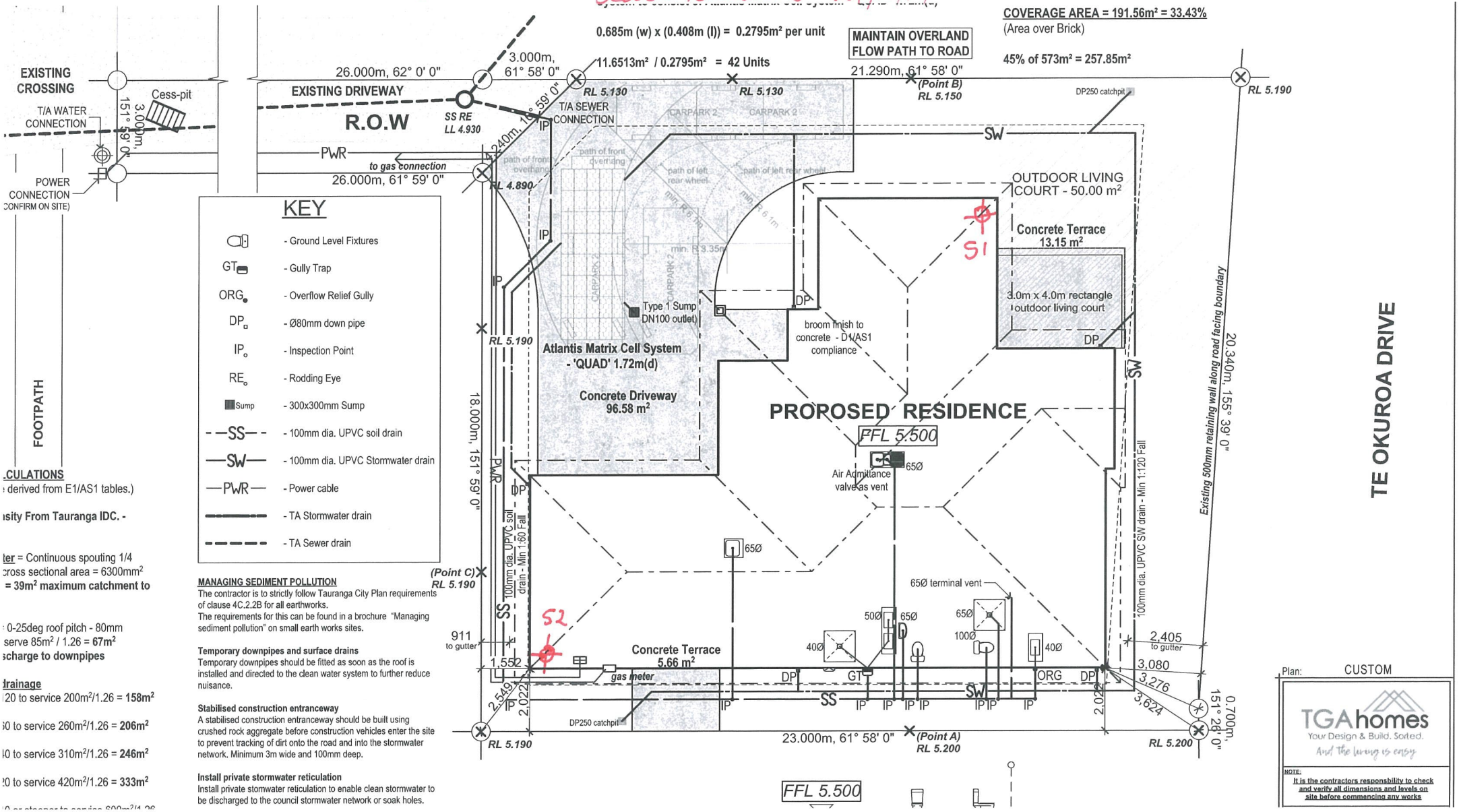
Pic. 4



Pic. 5

19/215

Scala locations 24/10/19



KEY

- Ground Level Fixtures
- GT - Gully Trap
- ORG - Overflow Relief Gully
- DP - Ø80mm down pipe
- IP - Inspection Point
- RE - Rodding Eye
- Sump - 300x300mm Sump
- SS - 100mm dia. UPVC soil drain
- SW - 100mm dia. UPVC Stormwater drain
- PWR - Power cable
- TA Stormwater drain
- TA Sewer drain

MANAGING SEDIMENT POLLUTION

The contractor is to strictly follow Tauranga City Plan requirements of clause 4C.2.2B for all earthworks.
The requirements for this can be found in a brochure "Managing sediment pollution" on small earth works sites.

Temporary downpipes and surface drains

Temporary downpipes should be fitted as soon as the roof is installed and directed to the clean water system to further reduce nuisance.

Stabilised construction entranceway

A stabilised construction entranceway should be built using crushed rock aggregate before construction vehicles enter the site to prevent tracking of dirt onto the road and into the stormwater network. Minimum 3m wide and 100mm deep.

Install private stormwater reticulation

Install private stormwater reticulation to enable clean stormwater to be discharged to the council stormwater network or soak holes.

.CULATIONS

derived from E1/AS1 tables.)

ısity From Tauranga IDC. -

ter = Continuous spouting 1/4
cross sectional area = 6300mm²
= 39m² maximum catchment to

0-25deg roof pitch - 80mm
serve 85m² / 1.26 = **67m²**
scharge to downpipes

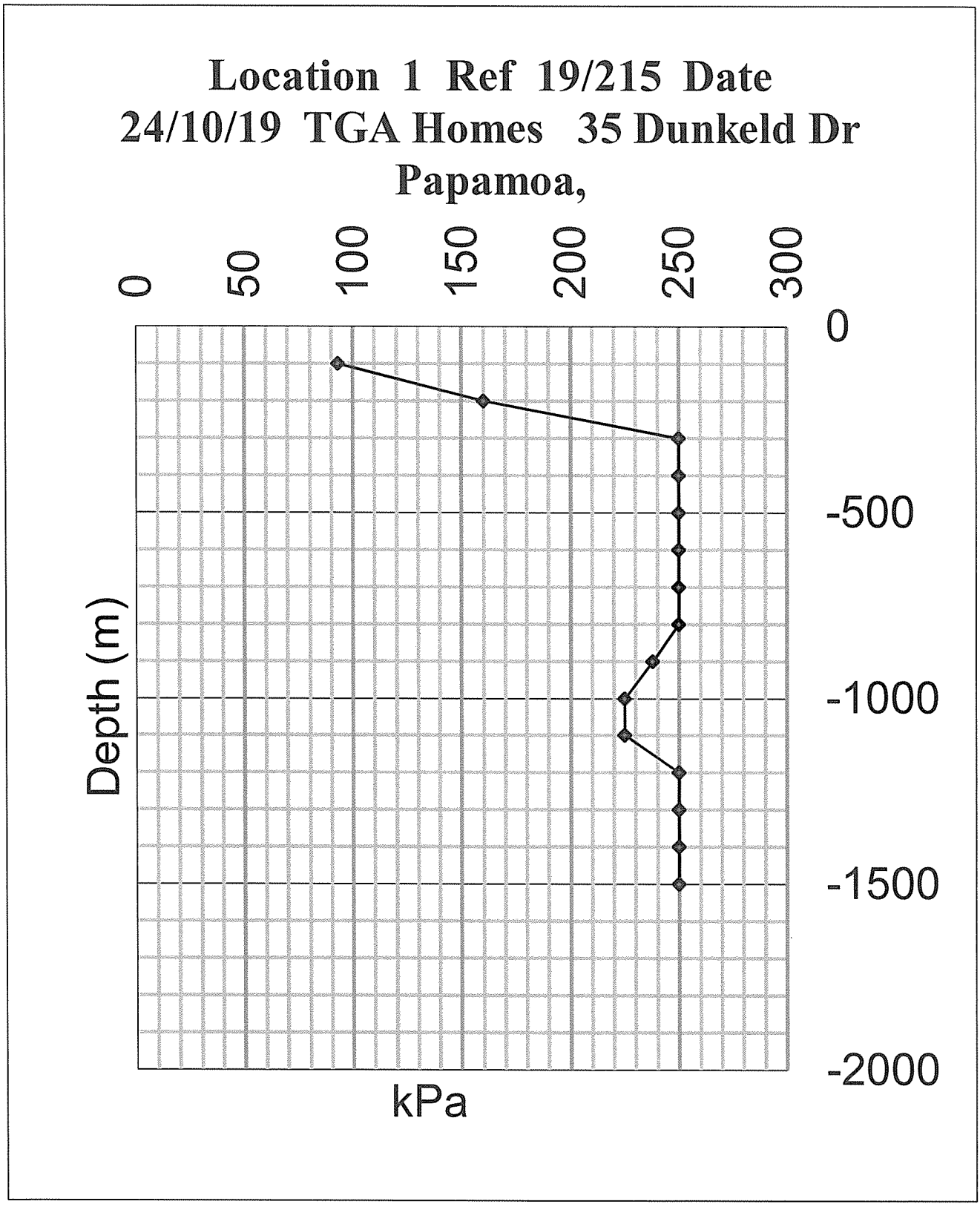
drainage

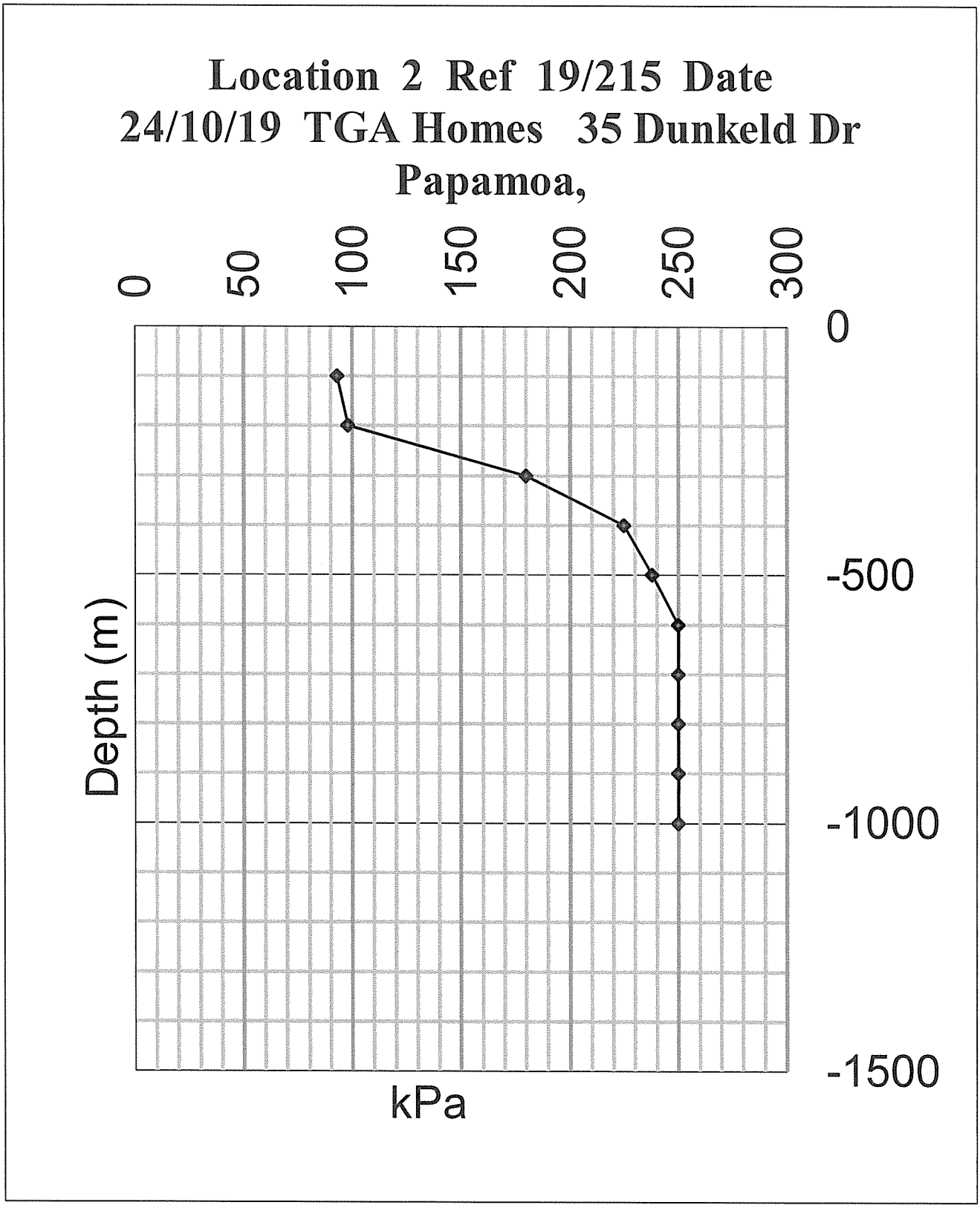
20 to service 200m²/1.26 = **158m²**
30 to service 260m²/1.26 = **206m²**
10 to service 310m²/1.26 = **246m²**
20 to service 420m²/1.26 = **333m²**

Plan: CUSTOM

TGAhomes
Your Design & Build. Sorted.
And the living is easy.

NOTE:
It is the contractors responsibility to check and verify all dimensions and levels on site before commencing any works


Location 1 Ref 19/215 Date
24/10/19 TGA Homes 35 Dunkeld Dr
Papamoa,
0
50
100
150
200
250
300
0
-500
-1000
-1500
-2000
Depth (m)
kPa


Location 2 Ref 19/215 Date 24/10/19 TGA Homes 35 Dunkeld Dr Papamoa,
0
50
100
150
200
250
300
0
-500
-1000
-1500
Depth (m)
kPa

30697 - TGA Homes.

Building Location Certificate

Tauranga City

TCC Reference: (BC / RC)	BC191756		
Applicant/Owner:	K. & R. Berridge.		
Property Address:	35 Dunkeld Drive, Papamoa.		
Legal Description: (Lot / DP)	Lot 226 DP508065	**CT / CFR**	

A. Floor Level survey required by TCC? ☑ Yes ☐ No (go to Section B)

1. The following was surveyed: ☐ Completed Floor ☑ Other (specify) Ground water table.
2. Do the approved Building Consent plans have a specified minimum floor level? ☐ Yes ☐ No
   (If 'Yes' then complete Option A and Option B below)
3. Survey Date: 28/11/19.

4. **Option A**	**Option B**
The Surveyed floor level is RL = ☐ Moturiki Datum ☐ Other (E.g. assumed Datum) Origin of Levels:	The surveyed floor level complies with: (E.g. consent notice requirement, approved BC plans, etc.)

5. Comments:

B. Building Location survey required by TCC? ☐ Yes ☐ No (go to Section C)

1. The following was surveyed: ☐ Completed Floor ☐ Other (please comment below)
2. Survey Date:
3. The surveyed building footprint is in accordance with the setbacks shown on the approved Building Consent Plans. ☐ Yes ☐ No ☐ See attached plan/photos (if required)
   NB: where necessary the 'footprint' will factor in the exterior cladding projecting past the foundation. Walls and eaves must comply with C/AS1/5.1.1(a), 5.2. & Fig. 5.1. Attach drawings or photos with comments if you think there is an issue.
4. Comments:

C. Overshadowing survey required by TCC? ☐ Yes ☐ No (go to Section D)

1. The building was surveyed and complies with the City Plan rules for overshadowing or relevant Resource Consent. ☐ Yes ☐ No ☐ See attached plan/photos (as/if required)
   NB: Where overshadowing is allowed by permitted intrusions, written approval, or Resource Consent, illustrations are required.
2. Survey Date:
3. Comments (including boundaries specified):

D. Survey Firm Declaration

1. We have been engaged by the applicant stated above and have carried out the necessary field survey(s) to confirm the items detailed above and believe on reasonable grounds that the information provided is true and accurate within acceptable survey tolerances.

2.	**Survey Firm:**	S&L Consultants Ltd	
3.	**Survey Firm Contact Details:**	Postal Address: PO Box 231, Tauranga Email: Phone: 577 6069	
4.	**Licensed Cadastral Surveyor** (delete as appropriate) **Registered Professional Surveyor** (signed on behalf of Survey Firm)	Print Name: Cameron Martin Signature:	License No: 500531 RPSurv No: 455 Date: 28-11-2019

→ The ground water table was measured at RL 2.57 which is 0.23m lower than the 2.80m referred to in the BC. The base of the soakage system was measured at RL 2.93. The source of heights was TCC BM1138, RL 4.44.

Land Use Site Details

Site ID :	LUR-TGA-00848	Printed :	28/08/2024

Site Address(es) :
1 Apostle Mews, Papamoa, Tauranga City
10 Apostle Mews, Papamoa, Tauranga City
11 Apostle Mews, Papamoa, Tauranga City
15 Apostle Mews, Papamoa, Tauranga City
3 Apostle Mews, Papamoa, Tauranga City
4 Apostle Mews, Papamoa, Tauranga City
5 Apostle Mews, Papamoa, Tauranga City
6 Apostle Mews, Papamoa, Tauranga City
7 Apostle Mews, Papamoa, Tauranga City
8 Apostle Mews, Papamoa, Tauranga City
9 Apostle Mews, Papamoa, Tauranga City
1 Coolgardie Close, Papamoa, Tauranga City
10 Coolgardie Close, Papamoa, Tauranga City
12 Coolgardie Close, Papamoa, Tauranga City
2 Coolgardie Close, Papamoa, Tauranga City
3 Coolgardie Close, Papamoa, Tauranga City
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6 Coolgardie Close, Papamoa, Tauranga City
7 Coolgardie Close, Papamoa, Tauranga City
8 Coolgardie Close, Papamoa, Tauranga City
1 Dunkeld Drive, Papamoa, Tauranga City
10 Dunkeld Drive, Papamoa, Tauranga City
11 Dunkeld Drive, Papamoa, Tauranga City
12 Dunkeld Drive, Papamoa, Tauranga City
14 Dunkeld Drive, Papamoa, Tauranga City
16 Dunkeld Drive, Papamoa, Tauranga City
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93 Hills View Drive, Papamoa, Tauranga City
95 Hills View Drive, Papamoa, Tauranga City
97 Hills View Drive, Papamoa, Tauranga City
99 Hills View Drive, Papamoa, Tauranga City
2 Flaxmill Way, Papamoa, Tauranga City
2 Hoiho Place, Papamoa, Tauranga City
3 Hoiho Place, Papamoa, Tauranga City
4 Hoiho Place, Papamoa, Tauranga City
5 Hoiho Place, Papamoa, Tauranga City
6 Hoiho Place, Papamoa, Tauranga City

Parcel(s)/Lot(s) :	7633125 : Section 16 SO 489379
	7651031 : Section 2 SO 493250
	7689465 : Section 9 SO 493592
	7689466 : Section 10 SO 493592
	7738234 : Lot 100 DP 500395
	7738235 : Lot 101 DP 500395
	7738236 : Lot 102 DP 500395
	7738237 : Lot 103 DP 500395
	7738238 : Lot 104 DP 500395
	7738239 : Lot 105 DP 500395
	7738240 : Lot 106 DP 500395
	7738241 : Lot 107 DP 500395
	7738242 : Lot 108 DP 500395
	7738243 : Lot 109 DP 500395
	7738244 : Lot 110 DP 500395
	7738245 : Lot 111 DP 500395
	7738246 : Lot 112 DP 500395
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7738278 : Lot 144 DP 500395
7738279 : Lot 145 DP 500395
7738280 : Lot 146 DP 500395
7738281 : Lot 147 DP 500395
7738325 : Lot 2001 DP 500395
7738326 : Lot 3000 DP 500395
7747430 : Section 4 SO 503280
7747432 : Section 2 SO 503280
7747434 : Section 13 SO 481279
7747436 : Section 14 SO 481279
7747437 : Section 14 SO 481279
7749936 :
7801068 : Lot 200 DP 508065
7801069 : Lot 201 DP 508065
7801070 : Lot 202 DP 508065
7801071 : Lot 203 DP 508065
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Site Classification :	Suitable for Land Use - Residential

Description
The land use history has been confirmed. The site has been confirmed as one that appears on the Hazardous Activities and Industries List (https://www.mfe.govt.nz/land/hazardous-activities-and-industries-list-hail). The information used in making this classification of the site contamination status is available in file held by Tauranga City and file held by Bay of Plenty Regional Council.

Land Use
Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
Storage tanks or drums for fuel, chemicals or liquid waste
Waste disposal to land (excluding where biosolids have been used as soil conditioners)

Site Information

2 September 2019: Site Validation Report (SVR) submitted by consent holder for review under RM16-0071. The SVR was prepared by Lysaght Consultants (5 May 2016) and the SVR confirms the process undertaken meets the requirement of the DSI, RAP and consents RM16-0071 and TCC RC24935. A total of 200 m3 (loose volume) of impacted soil was removed from the identified areas to Green Park Landfill waste disposal facility. Validation sampling confirms that contaminants in these areas are now present at no more than background levels, suitable for a residential land use. BOPRC agrees that the SVR has been prepared by a suitably qualified and experienced practitioner and in general accordance with MfE CLMG No. 1 and No. 5. The SVR concludes that the site is now acceptable for the proposed land use. BOPRC agrees with this conclusion and approves the SVR. Therefore, this site will be updated to “Suitable for Land Use – Residential”.

4 March 2016: Application RM15-0056 granted by Bay of Plenty Regional Council. As the site has been identified as a Special Housing Area under the HASHA Act 2013, TCC will be processing both the TCC consent and the required regional consent.

19 February 2016: Application RM16-0071 granted by Bay of Plenty Regional Council. A condition of consent requires the remediation works to be undertaken in accordance with approved Remediation Action Plan and Contaminated Site Management Plan and a Site Validation Report (SVR) is required to be submitted for approval within three months of completion of remediation works.

19 February 2016: Application RM16-0071 to Bay of Plenty Regional Council for proposes to remediate discrete areas of contaminated soil on the Site that have been identified through a Detailed Site Investigation carried out by Lysaght Consultants Limited. A Detailed Site Investigation (DSI) prepared by Lysaght Consultants (17 December 2015) was an updated DSI from consent application RC24853 & RC24854 which included additional sampling. A Remediation Action Plan and Contaminated Site Management Plan (RAPCSMP) prepared by Lysaght Consultants (3 February 2016) was provided with the application. Approximately 95m³ (Solid Measure) of contaminated material is to be excavated and transported offsite to a licensed facility. This RAPCSMP identifies the measures required during the excavation, stockpiling and removal of contaminated material to a licensed landfill facility. The intention of the RAP is to minimise risks to human health and the environment during soil disturbance/remediation. The RAP provides indicative validation sampling locations and Site Validation Report (SVR) recommendations.

9 December 2015: Application RM15-0056 to Bay of Plenty Regional Council to authorise large scale earthworks, the associated temporary discharge of sediment contaminated stormwater to ground soakage; and, the discharge of chemical dust suppressant to land, in association with the development of part of a residential subdivision at Te Okuroa Drive, Papamoa. As the site has been identified as a Special Housing Area under the HASHA Act 2013, TCC will be processing both the TCC consent and the required regional consent. This has been agreed with the applicant, the TCC and the BOPRC. A Detailed Site Investigation (DSI) prepared by Lysaght Consultants (5 November 2015) was provided with the application. The DSI was discussed below for consent RC24853 & RC24854 and there are no further comments.

24 November 2015: Application RC24853 & RC24854 to Tauranga City Council for subdivision and land use consent (233 residential lots, stormwater reserves, roading and associated infrastructure) at R144 & 1428L Parton Road, Papamoa East. The subdivision relates to a qualifying development under the Housing Accord and Special Housing Areas Act 2013. A Preliminary Site Investigation (PSI) prepared by Gwilym Environmental Services (January 2015) and a Detailed Site Investigation (DSI) prepared by Lysaght Consultants (5 November 2015) were provided with the application. The PSI confirmed that the site has been utilised in the recent past (at least 1960s – Present) for dairy farming, stock grazing, horse breeding, cow shed/yards and silage/hay production purposes. During this time, an above ground diesel tank and farm dump were present on the site. The DSI included soil sampling and XRF analysis and confirmed that the paddock areas, central stables and residential garage/shed were suitable for the intended land use. Within the farm dump area and hay barn, arsenic was identified above the residential land use guideline values and will require remediation. The diesel storage tank area sampling also confirmed elevated levels of TPH.

10 June 2013: Application 67431 granted by Bay of Plenty Regional Council.

21 February 2013: Application 67431 to Bay of Plenty Regional Council for a land use consent to undertake earthworks activities to develop the 18.372 ha site to be suitable for long term use as set out in the Tauranga City Council Structure Plan at Parton Road, Papamoa, Tauranga. No assessment was undertaken in regard to the NESCS.

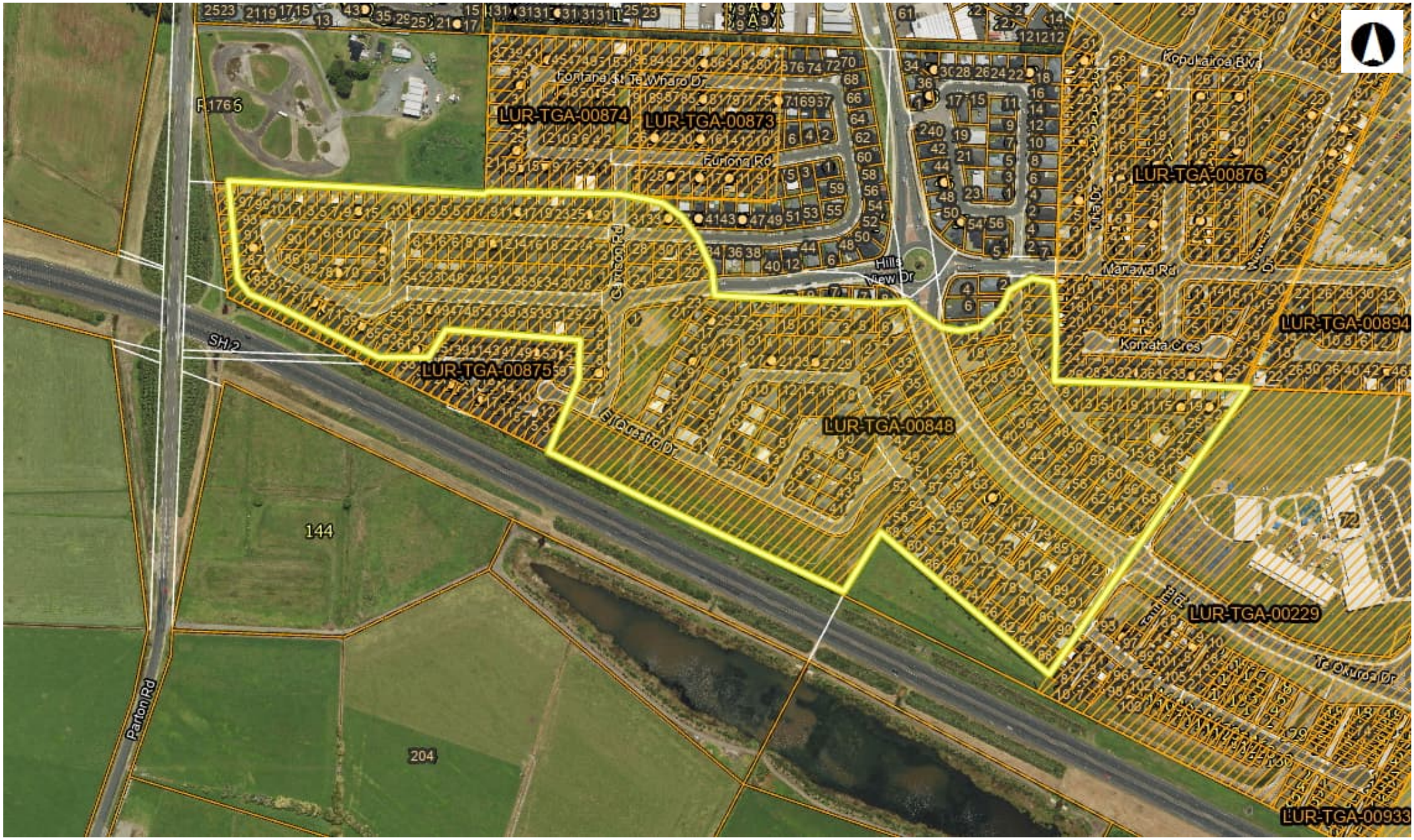
Other Information

The enclosed information is derived from the Tauranga City Council and Bay of Plenty Regional Council's Selected Land Use register and is made available to you under the Local Government Official and Information Meetings Act 1987 (LGOIMA), Building Act 1991 or Privacy Act 2020.

The database has been established by the Tauranga City Council and Bay of Plenty Regional Council for the purpose of performing its functions under the Resource Management Act 1991.

It has been compiled in accordance with national Site Classification and Information Management Protocols for Land Contamination.

This information reflects the Tauranga City Council and Bay of Plenty Regional Council's current understanding of this site. The Tauranga City Council, the Bay of Plenty Regional Council and their officers, employees and agents accept no liability for any inaccuracy in, or omission from, this information; or liability for any loss of damage suffered by any person which may directly or indirectly result from any person acting or refraining from acting on this information. This information has been prepared for the recipient to whom it is addressed and is intended for the recipient's use only. This is not intended to be relied on by any other party.



BAY OF PLENTY REGIONAL COUNCIL TOI MOANA

HORIZONTAL DATUM: New Zealand Geodetic Datum 2000 For practical purposes, NZGD2000 equates to WGS84 VERTICAL DATUM: Mean Sea Level PROJECTION: New Zealand Transverse Mercator 2000 © Bay of Plenty Regional Council, 2013 © Sourced from Land Information New Zealand data. CROWN COPYRIGHT RESERVED

LUR-TGA-00848 Polygon Map

Projection: NZGD_2000_New_Zealand_Transverse_Mercator

SCALE 1: 4,514

Date Printed:
28 August 2024

Land Use Site Details

Site ID :	LUR-TGA-00848	Printed :	6/05/2021
Site Address(es) :	1 Apostle Mews, Papamoa, Tauranga City		
	10 Apostle Mews, Papamoa, Tauranga City		
	11 Apostle Mews, Papamoa, Tauranga City		
	15 Apostle Mews, Papamoa, Tauranga City		
	3 Apostle Mews, Papamoa, Tauranga City		
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	7 Apostle Mews, Papamoa, Tauranga City		
	8 Apostle Mews, Papamoa, Tauranga City		
	9 Apostle Mews, Papamoa, Tauranga City		
	1 Coolgardie Close, Papamoa, Tauranga City		
	10 Coolgardie Close, Papamoa, Tauranga City		
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	8 Coolgardie Close, Papamoa, Tauranga City		
	1 Dunkeld Drive, Papamoa, Tauranga City		
	10 Dunkeld Drive, Papamoa, Tauranga City		
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1 El Questro Drive, Papamoa, Tauranga City

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12 El Questro Drive, Papamoa, Tauranga City

35 El Questro Drive, Papamoa, Tauranga City

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8 El Questro Drive, Papamoa, Tauranga City

1 Farrier Street, Papamoa, Tauranga City

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12 Farrier Street, Papamoa, Tauranga City

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1 Fetlock Way, Papamoa, Tauranga City

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7 Fetlock Way, Papamoa, Tauranga City

1 Garrison Road, Papamoa, Tauranga City

3 Garrison Road, Papamoa, Tauranga City

1 Parkside Mews, Papamoa, Tauranga City

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9 Parkside Mews, Papamoa, Tauranga City

1 Saddlers Way, Papamoa, Tauranga City

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17 Saddlers Way, Papamoa, Tauranga City

19 Saddlers Way, Papamoa, Tauranga City

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7 Saddlers Way, Papamoa, Tauranga City

8 Saddlers Way, Papamoa, Tauranga City

9 Saddlers Way, Papamoa, Tauranga City

1 Te Wharo Drive, Papamoa, Tauranga City

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30 Te Wharo Drive, Papamoa, Tauranga City

31 Te Wharo Drive, Papamoa, Tauranga City

32 Te Wharo Drive, Papamoa, Tauranga City

33 Te Wharo Drive, Papamoa, Tauranga City

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4 Te Wharo Drive, Papamoa, Tauranga City

5A Te Wharo Drive, Papamoa, Tauranga City

5B Te Wharo Drive, Papamoa, Tauranga City

6A Te Wharo Drive, Papamoa, Tauranga City

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7A Te Wharo Drive, Papamoa, Tauranga City

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8A Te Wharo Drive, Papamoa, Tauranga City

8B Te Wharo Drive, Papamoa, Tauranga City

9 Te Wharo Drive, Papamoa, Tauranga City

1 Waikiwi Way, Papamoa, Tauranga City

101 Hills View Drive, Papamoa, Tauranga City

103 Hills View Drive, Papamoa, Tauranga City

11 Hills View Drive, Papamoa, Tauranga City

15 Hills View Drive, Papamoa, Tauranga City

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	90 Hills View Drive, Papamoa, Tauranga City
	91 Hills View Drive, Papamoa, Tauranga City
	93 Hills View Drive, Papamoa, Tauranga City
	95 Hills View Drive, Papamoa, Tauranga City
	97 Hills View Drive, Papamoa, Tauranga City
	99 Hills View Drive, Papamoa, Tauranga City
	2 Flaxmill Way, Papamoa, Tauranga City
	2 Hoiho Place, Papamoa, Tauranga City
	3 Hoiho Place, Papamoa, Tauranga City
	4 Hoiho Place, Papamoa, Tauranga City
	5 Hoiho Place, Papamoa, Tauranga City
	6 Hoiho Place, Papamoa, Tauranga City
Parcel(s)/Lot(s) :	7633125 : Section 16 SO 489379
	7651031 : Section 2 SO 493250

7689465 : Section 9 SO 493592

7689466 : Section 10 SO 493592

7738234 : Lot 100 DP 500395

7738235 : Lot 101 DP 500395

7738236 : Lot 102 DP 500395

7738237 : Lot 103 DP 500395

7738238 : Lot 104 DP 500395

7738239 : Lot 105 DP 500395

7738240 : Lot 106 DP 500395

7738241 : Lot 107 DP 500395

7738242 : Lot 108 DP 500395

7738243 : Lot 109 DP 500395

7738244 : Lot 110 DP 500395

7738245 : Lot 111 DP 500395

7738246 : Lot 112 DP 500395

7738247 : Lot 113 DP 500395

7738249 : Lot 115 DP 500395

7738250 : Lot 116 DP 500395

7738251 : Lot 117 DP 500395

7738252 : Lot 118 DP 500395

7738253 : Lot 119 DP 500395

7738254 : Lot 120 DP 500395

7738255 : Lot 121 DP 500395

7738256 : Lot 122 DP 500395

7738257 : Lot 123 DP 500395

7738258 : Lot 124 DP 500395

7738259 : Lot 125 DP 500395

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7738261 : Lot 127 DP 500395

7738262 : Lot 128 DP 500395

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7738264 : Lot 130 DP 500395

7738265 : Lot 131 DP 500395

7738266 : Lot 132 DP 500395

7738267 : Lot 133 DP 500395

7738268 : Lot 134 DP 500395

7738269 : Lot 135 DP 500395

7738270 : Lot 136 DP 500395

7738271 : Lot 137 DP 500395

7738272 : Lot 138 DP 500395

7738273 : Lot 139 DP 500395

7738274 : Lot 140 DP 500395

7738275 : Lot 141 DP 500395

7738276 : Lot 142 DP 500395

7738277 : Lot 143 DP 500395

7738278 : Lot 144 DP 500395

7738279 : Lot 145 DP 500395

7738280 : Lot 146 DP 500395

7738281 : Lot 147 DP 500395

7738325 : Lot 2001 DP 500395

7738326 : Lot 3000 DP 500395

7747430 : Section 4 SO 503280

7747432 : Section 2 SO 503280

7747434 : Section 13 SO 481279

7747436 : Section 14 SO 481279

7747437 : Section 14 SO 481279

7749936 :

7801068 : Lot 200 DP 508065

7801069 : Lot 201 DP 508065

7801070 : Lot 202 DP 508065

7801071 : Lot 203 DP 508065

7801072 : Lot 204 DP 508065

7801073 : Lot 205 DP 508065

7801074 : Lot 206 DP 508065

7801075 : Lot 207 DP 508065

7801076 : Lot 208 DP 508065

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7801167 : Lot 299 DP 508065

7801168 : Lot 500 DP 508065

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7801170 : Lot 502 DP 508065

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7801173 : Lot 505 DP 508065

7801174 : Lot 506 DP 508065

7801175 : Lot 507 DP 508065

7801176 : Lot 508 DP 508065

7801177 : Lot 509 DP 508065

7801178 : Lot 2002 DP 508065

7801179 : Lot 2003 DP 508065

7801180 : Lot 2004 DP 508065

7801181 : Lot 2005 DP 508065

7801182 : Lot 2006 DP 508065

7801184 : Lot 3001 DP 508065

7801185 : Lot 3002 DP 508065

7801186 : Lot 3003 DP 508065

7801229 : Lot 3019 DP 508065

7801233 : Lot 2008 DP 508065

7851033 : Lot 300 DP 515754

7851034 : Lot 301 DP 515754

7851035 : Lot 302 DP 515754

7851036 : Lot 303 DP 515754

7851037 : Lot 304 DP 515754

7851038 : Lot 305 DP 515754

7851039 : Lot 306 DP 515754

7851120 : Lot 387 DP 515754

7851121 : Lot 388 DP 515754

7851122 : Lot 389 DP 515754

7851123 : Lot 390 DP 515754

7851126 : Lot 4003 DP 515754

7851127 : Lot 4004 DP 515754

7897966 : Lot 3 DP 523633

7905512 : Lot 4 DP 520209

7905513 : Lot 5 DP 520209

7905514 : Lot 6 DP 520209

7905515 : Lot 7 DP 520209

7905516 : Lot 8 DP 520209

7905517 : Lot 9 DP 520209

7905518 : Lot 10 DP 520209

7905519 : Lot 1006 DP 520209

7905520 : Lot 11 DP 520209

7905521 : Lot 12 DP 520209

7905522 : Lot 13 DP 520209

7905523 : Lot 14 DP 520209

7905524 : Lot 15 DP 520209

7905525 : Lot 16 DP 520209

7908979 : Lot 1 DP 518190

7908981 : Lot 3 DP 518190

7941106 : Lot 409 DP 528656

7941107 : Lot 410 DP 528656

7961334 : Lot 391 DP 530967

7961335 : Lot 392 DP 530967

7961336 : Lot 393 DP 530967

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7961397 : Lot 492 DP 530967

7961398 : Lot 800 DP 530967

7961399 : Lot 801 DP 530967

8065835 : Lot 493 DP 536664

8065836 : Lot 494 DP 536664

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8065841 : Lot 499 DP 536664

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8065879 : Lot 547 DP 536664

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8065881 : Lot 549 DP 536664

8065882 : Lot 550 DP 536664

8065883 : Lot 3017 DP 536664

	8065884 : Lot 3018 DP 536664 8132963 : Lot 3 DP 549027 8132964 : Lot 4 DP 549027 8132965 : Lot 5 DP 549027 8132966 : Lot 6 DP 549027
Site Classification :	Suitable for Land Use - Residential

Description

The land use history has been confirmed. The site has been confirmed as one that appears on the Hazardous Activities and Industries List (https://www.mfe.govt.nz/land/hazardous-activities-and-industries-list-hail). The information used in making this classification of the site contamination status is available in file held by Tauranga City and file held by Bay of Plenty Regional Council.

Land Use

Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition

Storage tanks or drums for fuel, chemicals or liquid waste

Waste disposal to land (excluding where biosolids have been used as soil conditioners)

Site Information

5 May 2016: Remediation of Contaminated Soil at Parton Road Residential Development, Papamoa (RM16-0071). Bay of Plenty Regional Council (BOPRC) has reviewed the Site Validation Report (SVR) prepared by Lysaght for consent conditions in consent RM16-0071. BOPRC agrees that the SVR has been prepared by a suitably qualified and experienced practitioner and in general accordance with MfE CLMG No. 1 and No. 5. The SVR concludes that the site is now acceptable for the proposed land use. BOPRC agrees with this conclusion and approves the SVR. Therefore this site will be updated to “Suitable for Land Use – Residential”.

16 February 2016: Bay of Plenty Regional Council granted consent RM16-0071 to remediate contaminated soil in discrete locations on the site. A condition of consent requires the remediation works to be undertaken in accordance with approved Remediation Action Plan/ Site Management Plan.

3 February 2016: Remedial Action Plan & Contaminated Site Management Plan, Lysaght
Lysaght Consultants Ltd (LCL) was engaged to prepare a contaminated site Remediation Action Plan (RAP) and Site Management Plan (SMP) for the residential subdivision at 1602L, 1608L, 1612L and 1428L Parton Road, Tauranga (the site) to support a resource consent application to Tauranga City Council (TCC) and the Bay of Plenty Regional Council (BOPRC) for the subdivision, change of use and disturbance of contaminated land.
The contaminated areas and estimate volumes are identified as follows;
• Hay Shed – Arsenic (Estimated volume = 40m³)
• Diesel storage tank –TPH (Estimated volume = 5m³)
• Farm Dump – Arsenic (Estimated volume = 50m³)
It is estimated, based on current soil sampling, that approximately 95m³ of contaminated material is located in the areas of identified contamination. This RAP identifies the measures required during the excavation, stockpiling and removal of contaminated material to a licenced landfill facility. The intention of the RAP is to minimise risks to human health and the environment during soil disturbance/remediation. The RAP provides indicative validation sampling locations and Site Validation Report (SVR) recommendations.

17 December 2015: Detailed Contaminated Site Investigation, Lysaght Lysaght Consultants Ltd (LCL) was engaged to undertake a Detailed Contamination Site Investigation (DSI) at 1608L, 1612L and 1428L Parton Road, Papamoa as part of a subdivision consent application to the Tauranga City Council (TCC).
A Preliminary Site Investigation (PSI) was carried out on the property in January 2015 by Gwylim Environmental Services (GES) Ltd. Their desktop study confirmed that the site has been utilised in the recent past (at least 1960s - Present) for dairy farming, stock grazing, horse breeding and silage/hay production purposes. During this time, an above ground diesel tank and farm dump were present on the site. The PSI determined that the use of agrichemicals including pesticides an herbicides is likely to be associated with these land uses. The DSI included soil sampling and analysis, the results being:
Paddock Areas: Systematic laboratory sampling was undertaken across surface soils of paddock areas for heavy metals and pesticides, in particular Arsenic, Cadmium, and organochlorine pesticides which are commonly associated with agrichemicals such as fertiliser and pesticides/herbicides. Contaminant levels were found to be at, or below typical background levels and no remediation or site management is considered necessary for these areas.
Farm Dump: Judgemental sampling of the surface and deeper soils in the location of the former farm dump confirms that the original dump has been excavated and infilled with topsoil. The topsoil exhibited arsenic exceedances at a maximum level of 58 mg/kg (laboratory result). Deeper sampling indicates that the contamination is limited to the topsoil infill to a maximum depth of 1.1m (contaminants in underlying sands were at typical background levels). It is proposed to remediate approximately 50m³ of material from this area based on the measured extents of the dump. It is proposed that the material be disposed of at a licenced landfill facility.
Structures: Judgemental laboratory sampling of surface soils around structures (barns, sheds, yards), including heavy metals, pesticides and asbestos (around cow shed). Contaminants were found at background levels for all buildings and yards except for an area of arsenic contamination to the south of the hay barn, and a positive test for asbestos at the western end of the cow shed. Further laboratory sampling in this area confirmed the presence of arsenic at levels exceeding allowable residential and environmental SCS's and above background levels in a circa 130m³ area. The volume of impacted material is expected to be in the order of 40m³ to a depth of 0.3m. The source of arsenic in this hotspot is not clear, however TCLP testing confirms that it complies with the maximum leachate requirements of both Class A & B landfills. It is proposed that this hotspot is excavated and removed to landfill. Additional inspections by a SQEP under the cow shed slab and in the location of the long drop privy are recommended during demolition/earthworks to ascertain whether there has been any discharge of contaminants to soils in these locations. Asbestos was detected in sample S256 (0-150mm depth) on the western end of the cow shed. Chrysotile (white asbestos) was detected in both loose fibre and asbestos containing material (ACM) form. Further judgemental sampling/laboratory testing will be required to determine asbestos contamination on a weight for weight (w/w) basis and to delineate the contamination extents. It is proposed that this testing is included in the Remediation Action Plan (RAP) sampling. A proposed sampling strategy and layout are provided in this report.
Sampling under the diesel storage tank confirmed the presence of TPH C15-C36 at elevated levels but below human health and environmental guidelines levels. Rule 34 of the RLWP allows removal of up to 400m³ of diesel impacted soils as a permitted activity. This will be significantly higher than would likely occur in this location and therefore no consenting is required for the remediation of this area.
Sand Stockpile: A large stockpile of sand was deposited on the site during the construction of the Tauranga Eastern Link (TEL). The material was imported to the site as cleanfill, however no confirmation testing has been undertaken. It is proposed to adopt the cautious approach and test this stockpile as part of the RAP to verify it's cleanfill status.
Summary: Contaminated soils are present in numerous locations on site and will require to be remediated prior to the site is used for residential use.

Other Information

The enclosed information is derived from the Tauranga City Council and Bay of Plenty Regional Council's Selected Land Use register and is made available to you under the Local Government Official and Information Meetings Act 1987 (LGOIMA), Building Act 1991 or Privacy Act 1993.

The database has been established by the Tauranga City Council and Bay of Plenty Regional Council for the purpose of performing its functions under the Resource Management Act 1991.

It has been compiled in accordance with national Site Classification and Information Management Protocols for Land Contamination.

This information reflects the Tauranga City Council and Bay of Plenty Regional Council's current understanding of this site. The Tauranga City Council, the Bay of Plenty Regional Council and their officers, employees and agents accept no liability for any inaccuracy in, or omission from, this information; or liability for any loss of damage suffered by any person which may directly or indirectly result from any person acting or refraining from acting on this information. This information has been prepared for the recipient to whom it is addressed and is intended for the recipient's use only. This is not intended to be relied on by any other party. The provisions of the Privacy Act 1993 bind the recipient of this information.



BAY OF PLENTY REGIONAL COUNCIL TOI MOANA

HORIZONTAL DATUM: New Zealand Geodetic Datum 2000 For practical purposes, NZGD2000 equates to WGS84 VERTICAL DATUM: Mean Sea Level PROJECTION: New Zealand Transverse Mercator 2000 © Bay of Plenty Regional Council, 2013 © Sourced from Land Information New Zealand data. CROWN COPYRIGHT RESERVED

LUR-TGA-00848 Polygon Map

Projection: NZGD_2000_New_Zealand_Transverse_Mercator

Date Printed: 6 May 2021

SCALE 1: 4,514

Natural Hazards

TSUNAMI EVACUATION ZONE: Pāpāmoa East *(Wairakei)*



Tsunami Evacuation Zone

Tsunami Safe Area is anywhere beyond the Tsunami Evacuation zone

Tsunami Safe Locations are possible evacuation points

Evacuation Route

Waterway

Scale: 1:20,000

BAY OF PLENTY EMERGENCY MANAGEMENT GROUP

Tauranga City

IMPORTANT

Parts of this area are at risk of tsunami

A **LONG** or **STRONG** earthquake could be your only warning.

Long or Strong GET GONE

LONG or STRONG: GET GONE

DO NOT ignore these natural warning signs:

- Strong earthquake where it is hard to stand up.
- Weak, rolling earthquake shaking for longer than a minute.
- Unusual sea behaviour, like sudden sea level changes.
- The sea making loud and unusual sounds, especially roaring noises.

WHAT TO DO?

1. **Leave immediately, don't wait for an official warning.**
2. **Walk or bike quickly if possible. Only drive if you have to.**
3. **Move quickly to higher ground, or as far from the coastline as possible.**

STAY OUT OF THE TSUNAMI EVACUATION ZONE AND LOW-LYING AREAS UNTIL YOU GET THE ALL CLEAR FROM OFFICIAL CHANNELS

For more information visit:
www.bopcivildefence.govt.nz

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