



Our Ref: L14136a

10 June 2015

Rahopara Farms Limited  
P O Box 65-191  
Mairangi Bay  
NORTH SHORE CITY 0754

Attention: Jeremy Dillon

Dear Jeremy

**RE: GEOTECHNICAL COMPLETION REPORT  
FOR THE PROPOSED 5 LOT RURAL SUBDIVISION  
AT 1158 (ALLOT 373 SO36931) WERANUI ROAD, WAINUI  
FOR RAHOPARA FARMS LIMITED**

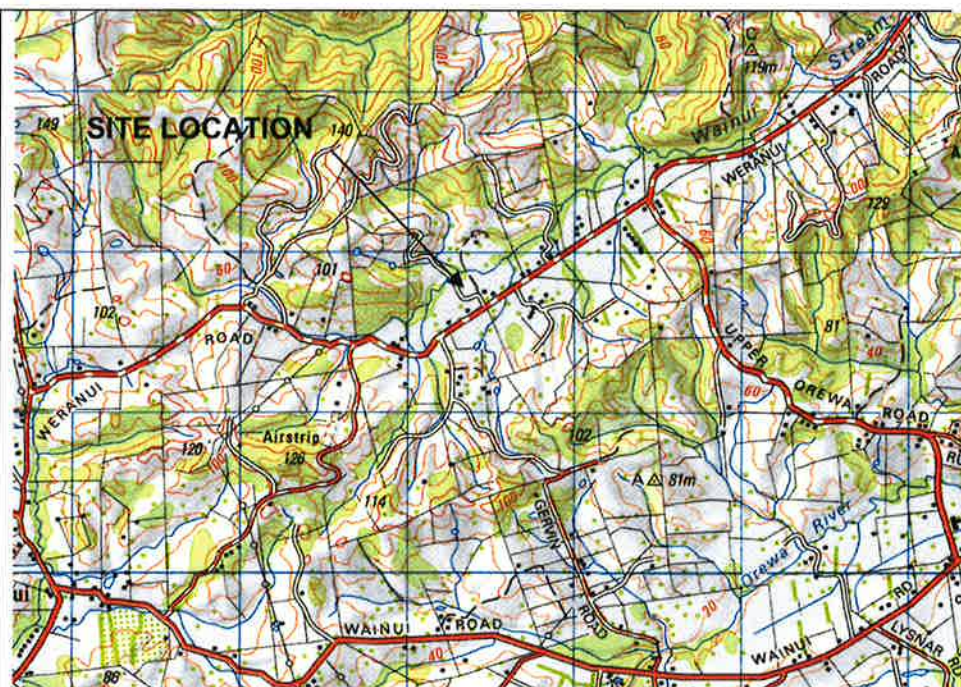
## INTRODUCTION

This office has visited and inspected the above site on Friday 6 June 2014, Friday 13 June 2014 and Thursday 9 April 2015 to investigate the soil conditions associated with the placement and compaction of earthfill to create flood free building platforms on Lots 2, 3 and 4 at 1158 Weranui Road, Wainui.

As per the resource consent R59060 for the above subdivision particularly conditions (u) and (v), we provide this geotechnical completion report for certification of the earthworks for Lots 2, 3 and 4.

## SITE LOCATION

NZMS 260 Series  
Sheet R10  
Whangaparaoa  
Grid Reference:  
555 119



## **SITE DESCRIPTION**

The site consists of a 38.741Ha lot located on the northern side of Weranui Road, Wainui. The above site (Allotment 373) has been subdivided into five lots of 1.1, 2.0, 1.8, 2.0 and 31.7Ha respectively.

The Wainui stream intersects through the western and eastern boundaries of the site and continues adjacent along the boundaries of Lots 2, 3 and 4.

A newly constructed concrete right of way commences from the northern side of Weranui Road and extends adjacent to the south western property boundary. This concrete right of way provides access for Lots 1, 3, 4 and 5.

Access to Lot 2 is gained via a newly constructed vehicle crossing extending from the northern side of Weranui Road.

## **SITE INVESTIGATION**

The fieldwork carried out on the site involved the drilling of four hand auger boreholes to a maximum depth of 2.0 metres. Insitu and remoulded shear strengths were recorded utilising a Pilcon/Geotechnics shear vane apparatus.

## **EARTHWORKS OPERATION**

Earthworks were required to form flood free building platforms on Lots 2, 3 & 4 to a minimum RL of 25.30m.

The earthworks on Lots 2, 3 & 4 were undertaken by Rahopara Farms Limited and commenced around the end of October 2013 and continued through to March 2014.

The plant utilised onsite by Rahopara Farms Limited consisted of the following:

- 22 tonne Komatsu Excavator
- CAT 30 tonne pad foot roller
- 2 x 6 wheel tip trucks

During this time the contractor had imported overburden soil from the limestone quarry above and blended it through the cut material. The fill had been placed at approximate 200mm layers and compacted utilising a 30 tonne pad foot roller.

## **COMPACTION QUALITY CONTROL**

Periodic site visits from this office had been undertaken to confirm the compaction of the fill material. Shear vane testing was conducted during the inspections with an average bearing pressure of 140kPa achieved. All engineered fill batters supporting the raised platforms had been constructed at gradients no steeper than 3H:1V (approximately 18°).

The building platforms on Lots 2, 3 and 4 had been adequately formed to the minimum flood free RL of 25.30m. The earthworks had been constructed in accordance with the

Auckland Council Standards and NZS4431:1989 Code of Practice for Earthfill for Residential Development.

### **Post Construction Borehole Testing**

Following the completion of the earthworks on Lots 2, 3 & 4, this office has visited the site on Friday 6<sup>th</sup> June 2014, Friday 13<sup>th</sup> June 2014 and Thursday 9<sup>th</sup> April 2015 to conduct a series of borehole tests. The boreholes had been located within the approximate centre of each building platform and had been drilled to the natural interface. Our geotechnical investigation encountered shear strengths in excess of 130kPa.

Please note that no testing was required for Lot 1 as it is the residual lot from the subdivision which contains the existing dwelling.

Lot 5, located north from Lot 4 and situated at the end of the right of way had a Geotechnical Investigation Report completed by CMW Geosciences (NZ) Limited ref 2015-1098AB dated 27<sup>th</sup> November 2015.

## **PROJECT EVALUATION**

### **Bearing Capacity for Building Foundations**

Generally all filled and natural ground within the nominated building platforms on Lots 2, 3 and 4 has a geotechnical ultimate bearing capacity of 300kPa. At these bearing pressures differential settlements due to building loads should be within acceptable limits.

Where an ultimate bearing capacity greater than 300kPa is required to support any dwelling constructed outside the scope of NZS 3604:2011 Timber Framed Buildings, we recommend that further specific site investigation and design of the foundations are carried out prior to building consent application.

### **Expansive Soils**

Based on the visual characteristics of the sub soils encountered in the geotechnical investigation the soils encountered beneath the building site are considered Site Classification M (moderately expansive) in terms of AS 2870:2011 Residential slabs and footings-Construction. Please note that no laboratory testing has been carried out to confirm the soil classification in terms of AS2870:2011.

Due to the potential shrink/swell nature of the expansive soils when slab-on-grade construction is carried out during periods of extended dry weather (ie: a hot dry summer season) excavated floor slab areas should be thoroughly wetted and soaked for a minimum of 48 hours prior to final preparation of the impermeable damp proof course and concrete pouring.

This can be achieved with extended fine spraying of the prepared sub-grade with a garden hose sprinkler and/or the like. Alternatively extended heavy wetting of the compacted hardfill under the slab.

Rapid construction following excavation and benching is also considered a suitable option provided the insitu material is sufficiently moist. Careful detailing of control joints in brittle cladding elements is also recommended.

### **Stormwater Disposal**

All stormwater runoff from the roofs; decks; hardstand areas, surface and subsoil drainage should be collected into a sealed stormwater system and discharged through a suitable scour resistant outlet well clear of the building site.

### **Finished floor level**

The nominated building platforms within Lots 2, 3 and 4 have been raised to a minimum RL 25.30 with a minimum finished floor level of RL 25.50 required. This provides a conservative freeboard above the 1% AEP theoretical storm event of 1.0m.


### **IAN HUTCHINSON CONSULTANTS LTD**

Prepared by



H. Norton  
**ENGINEER**

Reviewed by



M. Jones  
**GEOTECHNICAL  
MANAGER**

Approved by



I. Hutchinson  
**MANAGING  
DIRECTOR**

**STATEMENT OF PROFESSIONAL OPINION AS TO SUITABILITY OF LAND FOR  
BUILDING DEVELOPMENT**

**Scheme Plan No: R59060**

**Owner: Rahopara Farms Limited**

**Address: 1158 Weranui Road    Locality: Wainui**

**I, Ian Thomas Hutchinson of IAN HUTCHINSON CONSULTANTS LIMITED 154  
Centreway Road, P O Box 150, OREWA**

Hereby confirm that:

1. I am a Chartered Professional Engineer experienced in the field of geotechnical engineering and was retained by the Owner/Developer as the Geotechnical Engineer for the 5 Lot rural subdivision at 1158 Weranui Road.
2. The extent of my inspections during construction and the results of all tests carried out are described in my report ref: L14136a dated 10 June 2015.
3. In my professional opinion, not to be construed as a guarantee I consider that:
  - (a) The earthfills shown on the attached as-built cut/fill depth contour plan No: 14136 AB/011 has been completed in compliance with NZS 4431:1989 and the Legacy Rodney District Council Standards for Engineering Design and Construction.
  - (b) A geotechnical ultimate bearing capacity of 300kPa within the nominated building platform on Lots 2, 3 and 4 may be used for foundation design.
  - (c) The assessed AS 2870 expansive Site Class for Lots 2, 3 and 4 is M (moderately expansive).
    - (i) All shallow foundations should extend a minimum of 600mm below cleared ground level, following topsoil stripping and benching.
    - (ii) Alternatively foundation design may be undertaken in accordance with AS 2870:2011 sections 3 and 4 for Site Class M.
    - (iii) Where brittle exterior cladding such as brick veneer, stucco plaster, solid plaster, block work, styrofoam type cladding or sprayed plaster over harditex systems, etc is proposed, consideration should be given to detail control joints. Control joint spacing should not exceed 3.0 metres either horizontally or vertically and be positioned around doorways, windows and building envelope returns where cracking is most likely to occur.

- (d) Subject to the geotechnical limitations, expansive soil assessments, restrictions and recommendations contained in clauses 3.(a), 3.(b) and 3.(c) above: The filled and natural ground within the within the nominated building platform is generally suitable for residential buildings constructed in accordance with NZS 3604:2011 Timber Framed Buildings and related documents.

The professional opinion contained in this report is furnished to the Auckland Council and Rahopara Farms Limited for their purposes alone on the express condition that it will not be relied upon by any other person. Prospective purchasers should still satisfy themselves as to any specific conditions pertaining to their particular land interest.

**Signed:**   
I.T. Hutchinson  
**MANAGING DIRECTOR**  
BE (Civil) ME MIPENZ  
CPEng Civil Structural IntPE (NZ)

**Date:** 10 June 2015

**CPEng Reg No:** 63973  
**Member:** ACENZ and IPENZ





# LOG OF BOREHOLE NO: 1

50mm DIAMETER HAND AUGER

JOB No: 14136  
 DATE: 06/06/2014  
 TESTED BY: HN/JC  
 SHEAR VANE No: 4770  
 (SHEAR VANE TESTING BASED ON BS1377)

CLIENT: RAHOPARA FARMS LIMITED  
 LOCATION: 1158 WERANUI ROAD, WAINUI (LOT 3)

GEOLOGICAL UNIT	SOIL DESCRIPTION	GRAPHIC LOG	DEPTH (m)	CONSISTENCY	SHEAR STRENGTH (kPa)	MOISTURE CONDITION	GROUNDWATER	COMMENTS
ENGINEERED EARTHFILL	dark brown, Topsoil, rootlets		0.5	H	V246+	M		
	slightly plastic, dark brown, orange streaks, Silty CLAY mixed with limestone		1.0		UTP			
	non plastic, light brown, light grey streaks, Clayey SILT mixed with limestone		1.5		UTP			
	non plastic, light brown, Sandy SILT		2.0		UTP			
	E.O.B. @ 2.0m		2.5					
			3.0					
			3.5					
			4.0					
			4.5					
			5.0					



# LOG OF BOREHOLE NO: 2

50mm DIAMETER HAND AUGER

JOB No: 14136  
 DATE: 13/06/2014  
 TESTED BY: HN  
 SHEAR VANE No: 712  
 (SHEAR VANE TESTING BASED ON BS1377)

CLIENT: RAHOPARA FARMS LIMITED  
 LOCATION: 1158 WERANUI ROAD, WAINUI (LOT 2)

GEOLOGICAL UNIT	SOIL DESCRIPTION	GRAPHIC LOG	DEPTH (m)	CONSISTENCY	SHEAR STRENGTH (kPa)	MOISTURE CONDITION	GROUNDWATER	COMMENTS
ENGINEERED EARTH-FILL	dark brown, Topsoil, rootlets		0.5	H	V230+	W D/M		
	non plastic, brownish yellow, light grey streaks, orange mottled inclusions, SILT with some clay							
	non plastic, white, LIMESTONE		1.0		UTP			
	E.O.B. @ 1.1m — UTA							
			1.5					
			2.0					
			2.5					
			3.0					
			3.5					
			4.0					
			4.5					
			5.0					









# LOG OF BOREHOLE NO: 4

50mm DIAMETER HAND AUGER

JOB No: 14136  
 DATE: 09/04/2015  
 TESTED BY: HN/RC  
 SHEAR VANE No: 712  
 (SHEAR VANE TESTING BASED ON BS1377)

CLIENT: RAHOPARA FARMS LIMITED  
 LOCATION: 1158 WERANUI ROAD, WAINUI (LOT 4)

GEOLOGICAL UNIT	SOIL DESCRIPTION	GRAPHIC LOG	DEPTH (m)	CONSISTENCY	SHEAR STRENGTH (kPa)	MOISTURE CONDITION	GROUNDWATER	COMMENTS
ENGINEERED EARTHFILL	dark brown, Topsoil, rootlets		0.5	H	V210+		M	
	moderately plastic, orangey brown, Silty CLAY mixed with limestone							
	slightly to moderately plastic, light brown with orangey brown mottles, SILT with some clay mixed with limestone							
	slightly to moderately plastic, light brown with orangey brown mottles and occasional dark grey streaks, Clayey SILT mixed with limestone		1.0		UTP			
	slightly to moderately plastic, light brown with orangey brown mottles and occasional dark grey streaks, Clayey SILT mixed with limestone		1.5		V210+			
	slightly plastic, possible natural ground, light brown with orange mottles and greyish brown streaks, SILT with some clay		2.0		V210+			
	E.O.B. @ 2.0m		2.5					
			3.0					
			3.5					
			4.0					
			4.5					
			5.0					



REFER TO DRAWING A3-14136 AB/10 VIEWPORT 3

LOT 5  
34.4ha

LOT 4  
1.8ha

WAINUI STREAM

PT ALLOTMENT W139  
PSH OF WAIWERA

REFER TO DRAWING A3-14136 AB/08 VIEWPORT 1

LOT 2  
1.8ha

BH2  
BH3

LOT 3  
1.6ha

LOT 3  
DP 329729

UNFORMED LEGAL ROAD

REFER TO DRAWING A3-14136 AB/09 VIEWPORT 2

LOT 1  
1.1ha

WERANUI ROAD

LOT 2  
DP 320657

### LEGEND

WERANUI ROAD - SEAL

AS BUILT CONCRETE

EXISTING METAL

EXISTING CONCRETE FORD

EXISTING STREAM

AS BUILT EASEMENTS

VIEWPORTS

BUILDING PLATFORM

I certify that these As-built plans are an accurate record of the works undertaken and that:

- The **Coordinates** (X, Y) are in terms of NZTM on NZGD(2000).
- The **Levels** (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum)

Signed:

Registered Professional Engineer

Date:

10/06/2015

Name:

IAN T. HUTCHINSON



Design	H. NORTON	JUNE 2015
Drawn	H. NORTON	JUNE 2015
Checked	P. FARLEY	JUNE 2015
Approved	I. HUTCHINSON	JUNE 2015
Scale	1:1500 @ A3	
Scale vert. exag.		

**RAHOPARA  
FARMS LIMITED**

Project  
RAHOPARA FARMS LIMITED  
PROPOSED 5 LOT SUBDIVISION  
AT 1158 WERANUI ROAD  
WAINUI

Title  
AS BUILT EARTHWORKS PLAN -  
OVERVIEW

Job No.

A3-14136

Sheet No.

AB-007

No.	Revision	Drawn	Chk.	Appd.	Date





LOT 4  
1.8ha

WAINUI STREAM

LOT 2  
1.8ha

NOTE: CONTOURS  
AT 0.2m INTERVALS

BUILDING PLATFORM  
HEIGHT FOR LOT 2  
RL 25.60m

BH2

600m<sup>2</sup> BUILDING PLATFORM

BH3

LOT 3  
1.6ha

#### LEGEND

WERANUI ROAD - SEAL

AS BUILT CONCRETE

EXISTING METAL

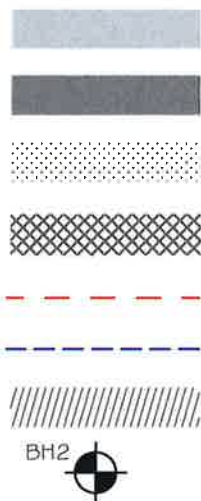
EXISTING CONCRETE FORD

EXISTING STREAM

AS BUILT EASEMENTS

BUILDING PLATFORM

BOREHOLES



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Signed:

Chartered Professional Engineer

Date:

10/06/2015

Name:

IAN T. HUTCHINSON

PT ALLOTMENT W139  
PSH OF WAIWERA



PO Box 150, Orewa 0946  
154 Centreway Road, Orewa 0931  
Ph: 09 426 5702 www.hc.co.nz

Design

H. NORTON

JUNE 2015

Drawn

H. NORTON

JUNE 2015

Checked

P. FARLEY

JUNE 2015

Approved

I. HUTCHINSON

JUNE 2015

Scale

1:500 @ A3

Scale vert. exag.

**RAHOPARA  
FARMS LIMITED**

Project

RAHOPARA FARMS LIMITED  
PROPOSED 5 LOT SUBDIVISION  
AT 1158 WERANUI ROAD  
WAINUI

Title

AS BUILT EARTHWORKS PLAN -  
VIEWPORT 1 - LOT 2

Job No.

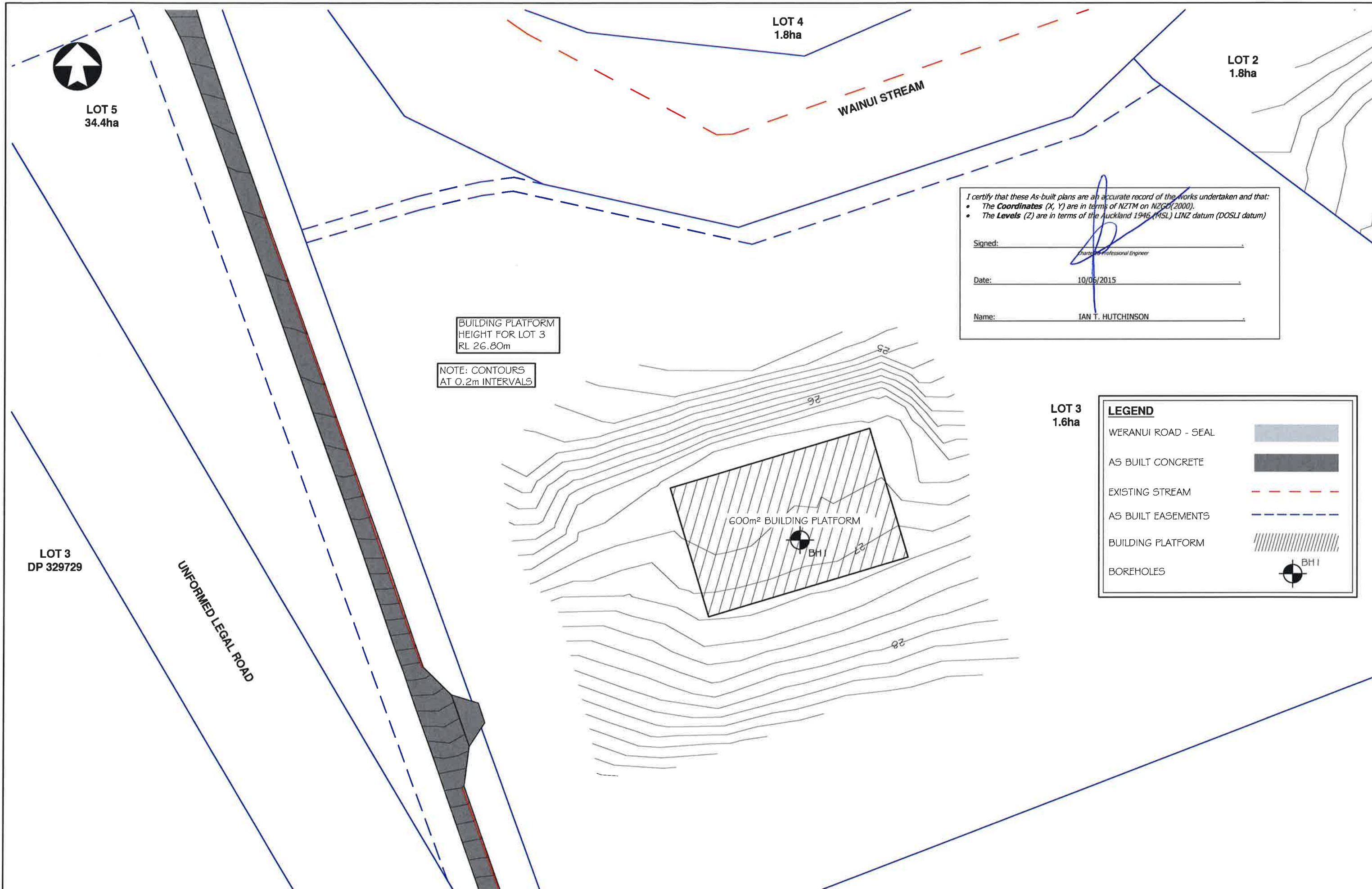
A3-14136

Sheet No.

AB-008

No.	Revision	Drawn	Chk.	Appd.	Date





No.	Revision	Drawn	Chk.	Appd.	Date



PO Box 150, Orewa 0946  
154 Centreway Road, Orewa 0931  
Ph: 09 426 5702 [www.hc.co.nz](http://www.hc.co.nz)

Design	H. NORTON	JUNE 2015
Drawn	H. NORTON	JUNE 2015
Checked	P. FARLEY	JUNE 2015
Approved	I. HUTCHINSON	JUNE 2015
Scale	1:1500 @ A3	
Scale vert. exag.		

**RAHOPARA FARMS LIMITED**

Project  
**RAHOPARA FARMS LIMITED  
PROPOSED 5 LOT SUBDIVISION  
AT 1158 WERANUI ROAD  
WAINUI**

Title  
**AS BUILT EARTHWORKS PLAN -  
VIEWPORT 2 - LOT 3**

Job No.  
**A3-14136**

Sheet No.  
**AB-009**





LOT 5  
34.4ha

I certify that these As-built plans are an accurate record of the works undertaken and that:

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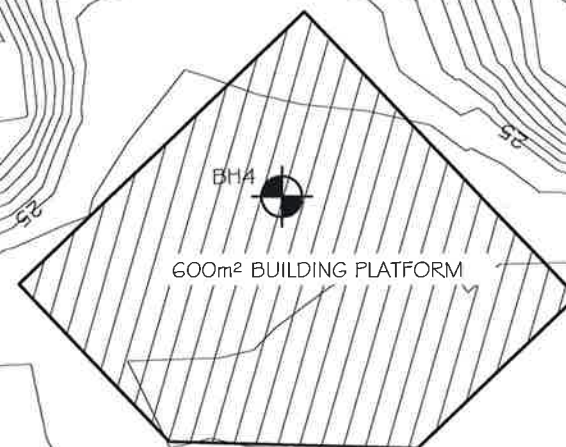
Signed: \_\_\_\_\_  
Chartered Professional Engineer

Date: 10/06/2015

Name: IAN T. HUTCHINSON

NOTE: CONTOURS  
AT 0.2m INTERVALS

BUILDING PLATFORM  
HEIGHT FOR LOT 4  
RL 25.40m



LOT 4  
1.8ha

LEGEND	
WERANUI ROAD - SEAL	
AS BUILT CONCRETE	
EXISTING CONCRETE FORD	
EXISTING STREAM	
AS BUILT EASEMENTS	
BUILDING PLATFORM	
BOREHOLES	

UNFORMED LEGAL ROAD

LOT 3  
1.6ha

WAINUI STREAM

LOT 2  
1.8ha

No.	Revision	Drawn	Chk.	Appd.	Date

**Hutchinson**  
CONSULTING ENGINEERS  
PO Box 150, Orewa 0946  
154 Centreway Road, Orewa 0931  
Ph: 09 426 5702 [www.hc.co.nz](http://www.hc.co.nz)

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Scale	1:1500 @ A3	
Scale vert. exag.		

**RAHOPARA  
FARMS LIMITED**

Project  
**RAHOPARA FARMS LIMITED  
PROPOSED 5 LOT SUBDIVISION  
AT 1158 WERANUI ROAD  
WAINUI**

Title  
**AS BUILT EARTHWORKS PLAN -  
VIEWPORT 2 - LOT 4**

Job No.  
**A3-14136**

Sheet No.  
**AB-010**





LOT 5  
34.4ha

LOT 4  
1.8ha

LOT 2  
1.8ha

LOT 3  
1.6ha

LOT 1  
1.1ha

PT ALLOTMENT W139  
PSH OF WAIWERA

LOT 3  
DP 329729

UNFORMED LEGAL ROAD

WAINUI STREAM

WERANUI ROAD

### EARTHWORK LEGEND

CUT VOLUME - 312m<sup>3</sup>

FILL VOLUME - 6,005m<sup>3</sup>

LOT 2  
DP  
320657

I certify that these As-built plans are an accurate record of the works undertaken and that:

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Signed: \_\_\_\_\_

Date: 10/06/2015

Name: IAN T. HUTCHINSON



PO Box 150, Orewa 0946  
154 Centreway Road, Orewa 0931  
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Scale vert. exag.		

**RAHOPARA  
FARMS LIMITED**

Project  
**RAHOPARA FARMS LIMITED  
PROPOSED 5 LOT SUBDIVISION  
AT 1158 WERANUI ROAD  
WAINUI**

Title  
**AS BUILT CUT TO FILL DEPTH PLAN**

Job No.  
**A3-14136**

Sheet No.  
**AB-011**

No.	Revision	Drawn	Chk.	Appd.	Date