



**EARTHWORKS COMPLETION REPORT
FOR
HARRIS STREET
RESIDENTIAL SUBDIVISION
AT HARRIS STREET, NGONGOTAHA
FOR
GENERATION DEVELOPMENTS LTD**

30 APRIL 2007

192725-R-E-C115

GENERATION DEVELOPMENTS LTD
HARRIS STREET - NGONGOTAHA

EARTHWORKS COMPLETION REPORT

1. INTRODUCTION

The Generation Developments subdivision comprises the development of 48 new residential lots over an area of approximately 3.6 hectares.

The site is located at the end of Harris Street, Ngongotaha.

The earthworks operation was carried out from August 2006 to April 2007. The weather conditions were highly variable during this period.

2. TOPOGRAPHY AND SOILS

The property had been used as a grazing block with no houses or other farm buildings present on the site. The site, prior to having earthworks gently sloped towards Ariki Street.

The site is adjoined by existing residential properties on Ngongotaha Road, Wikaraka Street, Ariki Street and industrial properties to the south

The initial geotechnical investigation confirmed that the site is covered in various silt and sand layers. The upper one to two metres consisted generally of medium fine, sands and the underlying layers consisted of silt with pockets of coarse granular pumice gravels. These soils are the predominant soils in the Rotorua region.

Earthworks were undertaken to form the new roads and house platforms. The houses have fixed minimum floor levels and the building platforms have been formed. The final section levels outside the building platforms will be finalised progressively as the houses are completed and topsoil is shaped around them.

3. EXTENT OF WORKS AND METHODOLOGY

The majority of the site was earth worked and as such this resulted in approximately 3.6ha being reworked during earthworks.

The area was cleared of all trees, stumps, logs, abandoned services uplifted and other rubbish cleared prior to any excavations. The operation involved stripping the topsoil to stockpiles and then carrying out filling and cut to fill operations to allow for recontouring of the site. Imported fill made up 80% of the earthworks and was placed in 200mm layers and compacted by vibrating roller.

At the completion of the earthworks topsoil was respread over the building platforms, driveways and berms to a minimum depth of 100mm and elsewhere up to 500mm and grassed.

4. BUILDING PLATFORM - SUPERVISION AND TESTING

Earthworks were supervised on a regular, but not continuous, basis by a representative of MTEC Consultants Ltd to ensure topsoil and any unsuitable material was completely removed and clean fill placed in an appropriate manner. We can confirm that fill material consisted of both cut to fill sand from on site and imported Rhyolite hardfill which was placed in thin layers and compacted satisfactorily.

The depth of earthworks varied from 0.4m cut to 0.8m fill with an average 0.6 metres. Each completed building platform had five scala penetrometer tests including a 2m penetrometer test taken in the middle to show the underlying soil strength.

The target Scala Penetrometer Test values used as a benchmark in assessing the compaction densities achieved was 200mm per 5 blows for building sites (Factored Ultimate Bearing Capacity of 150kPa or Allowable Bearing Capacity of 100kPa)

The typical penetration values on the building platforms were 50 to 200mm per 5 blows, indicating that a minimum Factored Ultimate Bearing Capacity over the depth of testing was 150kPa. These tests were taken on the underside of the foundation and on top of the hardfill.

5. ROAD - SUPERVISION AND TESTING

Earthworks were supervised on a regular, but not continuous, basis by a representative of MTEC Consultants Ltd to ensure topsoil and any unsuitable material was completely removed and clean fill placed in an appropriate manner. We can confirm that fill material consisted of both cut to fill sand from on site and imported Rhyolite hardfill which was placed in thin layers and compacted satisfactorily.

Scala Penetrometer tests were undertaken typically every 20 metres on the subgrade prior to metal placing. The test results indicated that the subgrade was hard with typical CBR values in excess of 10 (100mm per 5 blows). Refer to attached graphs.

The sewer and stormwater trenches within the road carriageway were tested randomly to confirm that the required compaction was obtained. (refer attached penetrometer test results SW1 – SW 5 and SS 1 – SS 5)

Prior to the basecourse construction the subgrade was proof rolled after the soil had dried. The subgrade showed no signs of weaving due to high moisture content which confirmed that the original basecourse design metal depth of 200mm was adequate.

Benklemann Beam testing was undertaken on the road basecourse prior to the application of the first coat chipseal. Testing was undertaken on the 9th and 10th of May 2007 and the results indicated the basecourse strength was acceptable for hotmixing with deflections between 1.0mm and 2.2mm, typically 1.6mm to 1.8mm. These results were forwarded to the Rotorua District Council Resource Engineering section for confirmation. (refer attached).

6. GROUND WATER

Three shallow piezometers have been installed and monitored since February 2007. They indicate that the clearance between the ground level and the ground water table is in excess of 1m as required by the District Plan.

7. CONCLUSION

In our professional opinion, ground conditions on all completed lots (lots 1-48) of Harris Street subdivision are suitable for construction of residential buildings in accordance with the requirements of clause B1 of the Building Regulations 1992.

8. LIMITATIONS

The recommendations given in this report are based on limited site data from discrete test locations. Variations in ground conditions could exist across the site. The nature and continuity of subsoil conditions away from the test sites are inferred and it must be appreciated that actual conditions could vary from the assumed model.

This report has been prepared only for the Rotorua District Council and for the initial purchaser of each property for their purposes. It is not to be relied upon or used out of context by any other person without reference to MTEC Consultants Ltd. The reliance by other parties on the information or opinions contained in the report shall, without prior review and agreement in writing, be at such parties sole risk.

MTEC Consultants Ltd



Steve Pittman
BE, MIPENZ (Civil, Struct), CPEng, IntPE

Date 24 May 2007

Attachments: - RDC Forms
Plan showing Test Locations
Cut and Fill Plan
Scala Penetrometer
Benklemann Beam test results

To: **The District Engineer**
Rotorua District Council
Private Bag
ROTORUA

**1B - STATEMENT OF PROFESSIONAL OPINION AS TO SUITABILITY OF LAND
FOR BUILDING DEVELOPMENT**

Subdivision: **HARRIS STREET**

Owner/Developer: **GENERATION DEVELOPMENTS LTD**

Location: **HARRIS STREET, NGONGOTAHA**

I, Stephen Michael Pittman of MTEC Consultants Ltd, PO Box 878, Rotorua
(Full Name) (Name and Address of Firm)

hereby confirm that:

1. I am a Certified Professional Engineer experienced in the field of soils engineering and was retained by the owner/developer as the Soils Engineer on the above subdivision.

2. The extent of my inspections during construction, and the results of all tests carried out are described in my report dated 30 APRIL 2007

3. In my professional opinion, not be construed as a guarantee, I certify that:

*a) That earth fills shown on the attached Plan No. 192725-R-E-0004 ^{SMT 13} have been placed in compliance with the Code of Practice of the Rotorua District Council.

*b) The completed works give due regard to land slope and foundation stability considerations.

*c) The filled ground is suitable for the erection thereon of residential buildings not requiring specific design in terms of NZ Building Act 2004 and NZ Building Regulations 2004, and related documents, providing that:

i)

ii)

iii)

~~*d) The original ground not affected by filling is suitable for the erection thereon of residential buildings not requiring specific design in terms of NZ Building Act 2004 and NZ Building Regulations 2004, and related documents, providing that:~~

i)

ii)

iii)

4. This professional opinion is furnished to the Council and the owner/developer for their purposes alone on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any dwelling.

Signed: _____

Date: _____


24/5/2007

*Delete items not applicable.

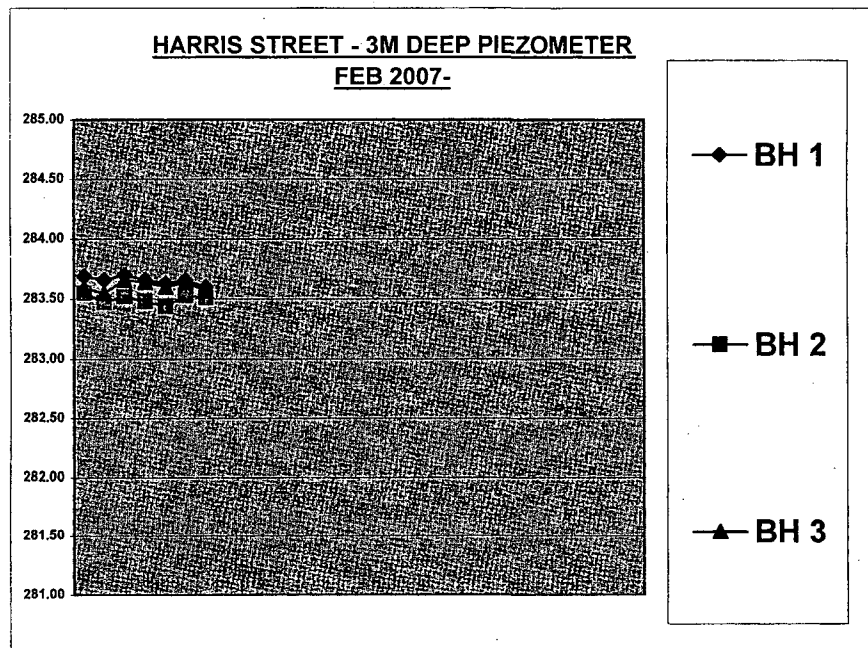
MTEC CONSULTANTS LTD

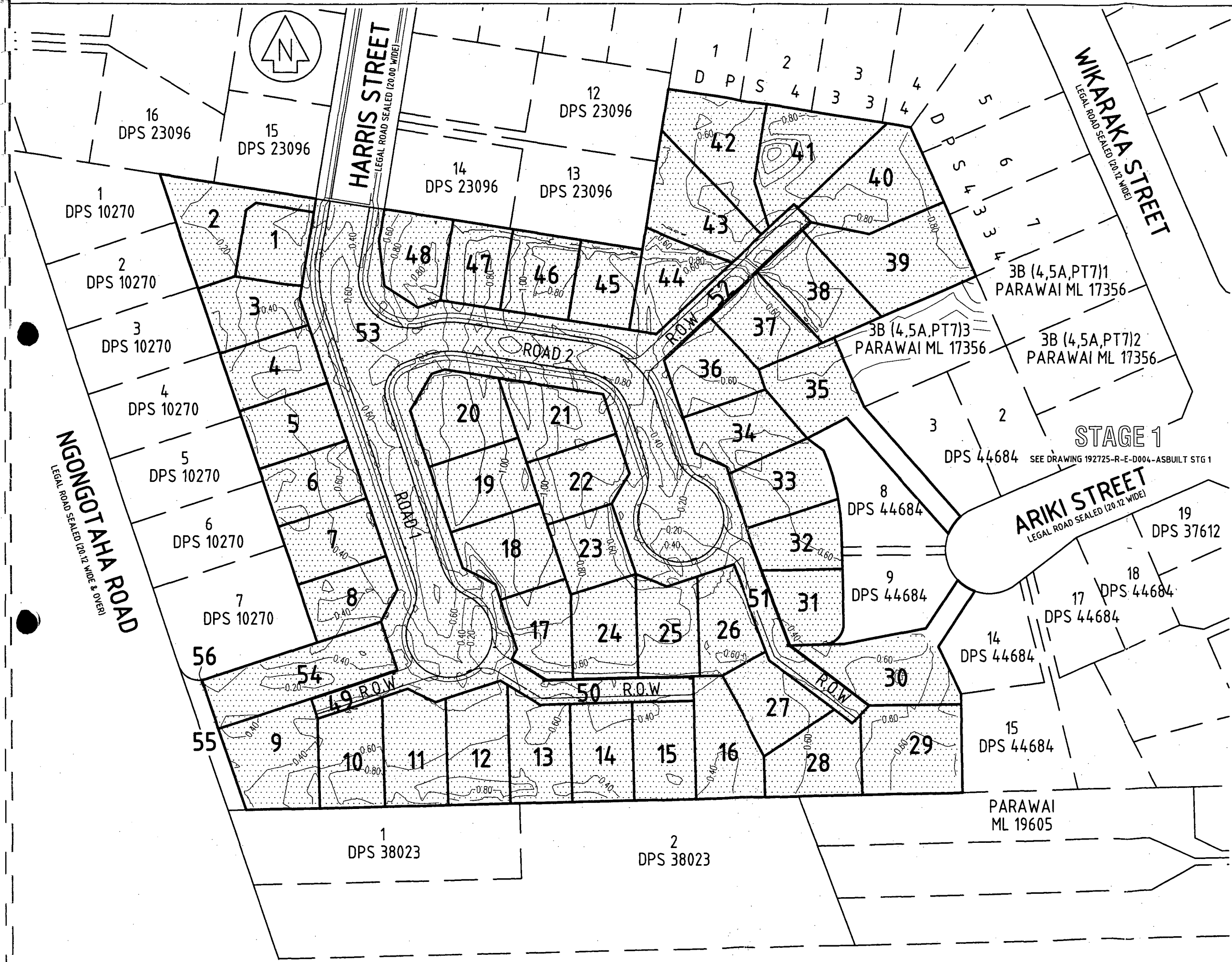
WATER TABLE LOGS - 3M DEEP PIEZOMETERS

JOB NAME: GENERATION DEVELOPMENTS
 SITE ADDRESS: HARRIS STREET, NGONGOTAHA
 JOB NUMBER: 192725/E

NOTE: DEPTH OF PENETRATION BEGINS AT EXISTING GROUND LEVEL

LOC	RL	HOLE DEPTH (mm)	WATER TABLE (mm)	RL	WATER TABLE (mm)	RL	WATER TABLE (mm)	RL	WATER TABLE (mm)	RL	WATER TABLE (mm)	RL	WATER TABLE (mm)	RL	WATER TABLE (mm)	RL
			23/02/2007		1/03/2007		8/03/2007		16/03/2007		23/03/2007		30/03/2007		4/04/2007	
BH 1	285.22	3000	1.53	283.69	1.56	283.66	1.52	283.70	1.56	283.66	1.59	283.63	1.56	283.66	1.62	283.60
BH 2	284.58	3000	1.03	283.55	1.11	283.47	1.06	283.52	1.10	283.48	1.14	283.44	1.05	283.53	1.07	283.51
BH 3	284.77	3000	1.18	283.59	1.22	283.55	1.11	283.66	1.13	283.64	1.17	283.60	1.13	283.64	1.20	283.57





NOTES/KEY:

- 1. FIELD WORK COMPLETED ON 13 APRIL 2007
- 2. LEVELS ARE IN TERMS OF MOTURIKI DATUM
ORIGIN: AQ 55 (AGX3)
BENCHMARK - CORNER OF WIKARAKA ST & NGONGOTAHA RD
RL = 284.66
- 3. FOR SCHEDULE OF NZGD BAY OF PLENTY 2000
CO-ORDINATES SEE SEPERATE SHEET
- 4. FOR DETAIL ON POWER, TELECOM AND GAS RETICULATION
REFER TO CONTROLLING AUTHORITY

—+0.20— CUT TO FILL CONTOUR INTERVAL AT 0.20m

AREA OF FILL (0.0 - +1.2)

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THIS DOCUMENT SHALL BE USED ONLY FOR THE PURPOSE FOR WHICH IT WAS SUPPLIED
AND MUST NOT BE USED IN ISOLATION FROM OTHER ASSOCIATED INFORMATION.

SERVICES:
THE EXISTING SERVICES SHOWN ON THIS PLAN ARE INDICATIVE ONLY AND MAY NOT INCLUDE ALL
EXISTING SERVICES.
IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL EXISTING SERVICES PRIOR TO STARTING WORK.

No.	Date	By	Issue/Revision
A	20/04/07	ACB	ISSUED FOR APPROVAL

DRAWN: ACB		DESIGNED: CP
CHECKED: CP		SURVEYED BY: CP

LOCAL AUTHORITY REF: 63-06-012

**SURVEYORS
ENGINEERS
PLANNERS**
ROTORUA TE PUKE OPOTIKI
MT MAUNGANUI WHAKATANE

CLIENT
GENERATION DEVELOPMENTS LTD

PROJECT/LOCATION
HARRIS STREET
NGONGOTAHA
ROTORUA

DRAWING DESCRIPTION
ASBUILT RETICULATION
CUT TO FILL PLAN
STAGE 2

SCALE: 1 : 750	ORIGINAL DWG. SIZE A2	
DRAWING No. 192725-R-E-D004	SHEET No. 13	ISSUE A

