REPORT

HUTT CITY COUNCIL

Preliminary Geotechnical Suitability Assessment

3 copies

1 copy

Oakleigh Street, Maungaraki

Report prepared for:

HUTT CITY COUNCIL

Report prepared by:

TONKIN & TAYLOR LTD

Distribution:

HUTT CITY COUNCIL
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Table of contents

1	Intr	oduction	2
	1.1	General	2
	1.2	Scope of Work	2
2	Geo	otechnical Assessment, Oakleigh Street (Site 1)	2
	2.1	Site Description	2
	2.2	Site Geology and Soil Profile	3
	2.3	Geotechnical Considerations	3
	2.4	Site Geotechnical Summary Information	4
3	Apr	olicability	4

Appendix A: Test Pit Logs

Executive summary

Tonkin and Taylor Ltd (T&T) has been engaged by Hutt City Council (HCC) to undertake an Urban Development and Planning Assessment for strategic sites in Hutt City. T&T has included a geotechnical assessment at each of these proposed sites to determine geotechnical constraints to residential development.

The table below summarises the findings of our geotechnical assessment for Oakleigh Street, Maungaraki.

Geotechnical Summary Information

Site reference	*Potential areas of land suitable for residential development (m²)	Typical soil profile	Foundation preparation required	Additional foundation preparation cost per lot**
Oakleigh	1,500 (Refer A/B Fig 3)	0- 2m variable fill over rock	Excavate fill and replace	\$10,000
Street, (Site 3)	5,500 (Refer B/C Fig 3)	6m variable fill over rock	Timber piles driven to rock on 2m grid	\$27,500

^{*} This is the most suitable land for residential development at each site, refer Table 1 for full breakdown of available areas.

^{**} Foundation preparation costs for a 10x15m building platform on each lot. These are costs over and above the costs of standard NZS3604 type shallow foundations.

1 Introduction

1.1 General

Tonkin and Taylor Ltd (T&T) has been engaged by Hutt City Council (HCC) to undertake an Urban Development and Planning Assessment for strategic sites in Hutt City.

A key development consideration in this assessment is the potential geotechnical constraints on each site. T&T has undertaken an initial geotechnical investigation at each of the proposed sites.

This report summarises the findings of our geotechnical investigation for Oakleigh Street, Maungaraki (Site 3). The conditions of our engagement are detailed in our proposal dated October 2008.

1.2 Scope of Work

The scope of work for the geotechnical assessment includes:

Desk top study

- Review of 1:50,000 geological map of the area and HCC historic aerial photographs.
- Liaison with service providers to determine if any services extend through the site.
- Liaison with greater Wellington Regional Council to check historic contamination records (SLUR register)

Site Investigation (refer Figure 3 for investigation locations)

- Test Pitting
- Geological mapping

Analysis and reporting

- Review of all subsurface investigation results
- Preparation of factual summary report and zoning maps of foundation suitability.

Geotechnical Assessment, Oakleigh Street (Site 3)

The soil profile and depth to rock is inferred from limited test pit investigations. It must be appreciated that the subsurface conditions could vary away from the test locations.

2.1 Site Description

Site 3 is a flat area of land forming a terrace between the school site to the north and the residential area to the south. There is a short (approx 2m high), steep (approx 40 degree) batter slope leading up to the northern Site boundary and access road.

To the south, west and south-east of the flat area are steep 35 to 40 degree batter slopes. The western batter leads down to the Maungaraki Road Reserve. The eastern batter leads down to the existing site access off Oakleigh Street.

The southern and western batter slopes are vegetated but the majority of the site is maintained as a playing field.

The extent of the proposed site (Site 3) is shown on Figure 3 attached. We understand that the reserve area and batter slope to the west of the playing field will be used as an access road corridor. We have not included this area in our detailed investigation. However, we envisage no onerous geotechnical constraints to the construction of an access road across this reserve.

2.2 Site Geology and Soil Profile

The geotechnical investigation at Site 3 comprised 7 test pits to max 5.0m depth. Test pit logs TP1 to TP 7 are presented in Appendix A, Test pit locations can be seen in Figure 3.

The site generally comprises a variable depth of uncontrolled fill over greywacke rock. The fill comprises inter-bedded layers of sandy silt and silty sand with a high proportion of organics through the entire fill column.

On the north eastern portion of the site, rock was encountered at between 1 and 3m depth. Over the remainder of the site the uncontrolled fill extended beyond the base of the test pits (at least 4 to 5m depth).

Based on a review of the site geology and topography it is envisaged that the depth of fill will be approximately 5 to 6m along the northern portion of the site and more than 6m depth along the southern portion of the site.

2.3 Geotechnical Considerations

There is a potential for moderate ongoing differential settlement over the entire site. This is due to uneven decomposition of buried organics and consolidation under additional loading.

Our investigations so far (to a maximum depth of 5.0m) have not located natural ground over the southern portion of the site. Figure 3 shows the different areas of the site classified according to inferred fill depth (and, therefore, foundation preparation requirements). Table 3 summarises the site geology, foundation considerations and expected remedial work.

Where the fill depth is less than 2m we would consider that the unsuitable material could be excavated and replaced at modest expense.

Where the fill is between 3 and 6m in depth it is likely to be uneconomic to excavate and replace the unsuitable material. Timber or steel piles could be used to provide suitable foundation pads or a hardfill raft could be constructed by excavating and replacing the top 2.0m of fill.

Where the fill is greater than 6m in depth the remedial options become more extensive and risk of differential settlements increase. Possible options could include driven steel piles down to rock or a geogrid reinforced hardfill raft.

Further investigation (boreholes) will be required to confirm the fill depth in the north eastern and southern portions of the site if these are to be considered for future residential development.

These foundation recommendations are inferred from limited test pits. It must be appreciated that ground conditions could vary away from these investigation locations.

2.4 Site Geotechnical Summary Information

Table 1: Summary information for Site 3, Oakleigh Street

Geotechnical suitability classification (refer figure 3)	Approximate total area available (m²)	Typical soil profile	Most appropriate remedial solution	Additional foundation preparation cost per lot*
A/B	1,500	Up to 2m fill over weathered rock	Cut and remove unsuitable fill. Backfill with imported granular hardfill.	\$10,000
B/C	5,500	2-6m fill over weathered rock	Driven timber piles extending to rock. Piles on 2x2m grid (48 no. 8m long piles, 380m total length for each lot).	\$27,500
С	4,500	+6m fill over weathered rock	Excavate 3m depth of fill and replace with geogrid reinforced hardfill raft (450m³ earthworks with 300m² geogrid for each lot).	\$47,000

^{*}Foundation preparation costs for a 10x15m building platform on each lot. These are costs over and above the costs of standard NZS3604 type shallow foundations.

3 Applicability

This report has been prepared for the benefit of Hutt City Council with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

TONKIN & TAYLOR LTD

Environmental and Engineering Consultants

Report prepared by: Authorised for Tonkin & Taylor by:

Andrew Kennedy Bruce Symmans

Geotechnical Engineer Senior Geotechnical Engineer

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Appendix A: Test Pit Logs

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TONKIN & TAYLOR LTD.

EXCAVATION LOG

EXCAVATION NO: TP1

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PROJECT: Hutt City Plan		LOCATION: Oakleigh St.		JOB NO: 64009, 00	14
CO-ORDINATES: Pi+ N-S		EXPOSURE TYPE: Test Pit EQUIPMENT: Donne excellent		RTED: 26/11/08 SHED: 26/11/08	
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EXCAVATION LOG

EXCAVATION NO: TP2

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PROJECT: Hutt City	Plan	LOCATION: Oakleigh St JOB NO: 84009, 004
CO-ORDINATES:	,	EXPOSURE TYPE: Test PH HOLE STARTED: 26/11/08 EQUIPMENT: 12-bane execution HOLE FINISHED: 26/11/08
(N-S)		OPERATOR: Berry Bellony LOGGED BY: WWW
DATUM:		EXCAVATION DIMENSIONS: 4-8, × 2.1, CHECKED BY:
EXCAVATION AND TESTS:	ENGINE	ERING DESCRIPTION: GEOLOGICAL:
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EXCAVATION NO: TP3

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CO-ORDINATES:	u-s)		E	:QUIPMENT: 12 tonne excavator				ED: 26/11/07		
RL:	• •)	,		DPERATOR: Barry Bellamy	LC	GGE	BY:	MUTA		
DATUM:										
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## **EXCAVATION LOG**

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PROJECT: U	luff city Pla	2v			OCATION: Oableigh St. EXPOSURE TYPE: Test Pit	HC	DLE S	TARTEI	JOB NO: 84009,004
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## **EXCAVATION LOG**

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### **EXCAVATION LOG**

EXCAVATION NO: TP6

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84009.004 Hutt City Plan Oakleigh St. LOCATION: JOB NO: PROJECT: EXPOSURE TYPE: Test PH HOLE STARTED: 26/11/08 **CO-ORDINATES:** 12 torre exceptor HOLE FINISHED: 26/11/08 EQUIPMENT: LOGGED BY: MJWW Barry Bellamy RL: OPERATOR: EXCAVATION DIMENSIONS: 42m × 29m DATUM: CHECKED BY: **EXCAVATION AND TESTS: ENGINEERING DESCRIPTION: GEOLOGICAL:** SHEAR STRENGTH OR RELATIVE DENSITY ORIGIN TYPE, CLASSIFICATION SYMBOL SOIL NAME, PLASTICITY OR MOISTURE CONDITION RL (m) DEPTH (m) PARTICLE SIZE CHARACTERISTICS, COLOUR, MINERAL COMPOSITION, SAMPLES, TESTS SUPPORT DEFECTS, STRUCTURE SECONDARY AND MINOR COMPONENTS ត់វាខត្តខ្ល 123 dayey SILT, derk brown, moderate placefully, organis present. S Μ Topsoll sordy SILT, orange/brown, non-PP = 200 kPa colverve, fire grains D 11.24 (iron engineered.) NA e water absenced scaping from force a line depth Sondy, clayey SILT Grey blue, moderate plastraty five groins R.V M PP= 150KB 2 Interbedded SILTS and SANDS Vanable wow: yellow/brow b pp = 175kPa 12.1 blue I gray, low plasticity, fine Μ 3 grains. Organics present throughout entire layer, (tree roots + lags) 4 Test pit terminated @ 4,2m Jepth 5 X-Section SKETCH observed for the fore Facing West

## **EXCAVATION LOG**

EXCAVATION NO: TP7

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111				_	Air V	5M	yellow/white and blue/ grey	D	L	1111/1		-
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