GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown, NSW 2148, Australia
PO Box 1543, Macquarie Centre. North Ryde, NSW 2113

ABN: 62 084 294 762
Tel: (02) 9679 8733
Fax: (02) 9679 8744
Email: geoenviro@exemail.com.au

Report

Salinity and Phase 1 Contamination Assessment Carrington Centennial Care – Paling Court da Carrington Lot 10 DP 845472, No 90 Werombi Road Grasmere, NSW

Prepared for
Carrington Centennial Care
C/- Michael Brown Planning Strategies
PO BOX 295
CAMDEN NSW 2570

Ref: JC12114A-r2
October 2012

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown, NSW 2148, Australia
PO Box 1543, Macquarie Centre. North Ryde, NSW 2113

ABN: 62 084 294 762
Tel: (02) 9679 8733
Fax: (02) 9679 8744
Email: geoenviro@exemail.com.au

5th October 2012

Ref: JC12114A-r2

Carrington Centennial Care
C/- Michael Brown Planning Strategies
PO BOX 295
CAMDEN NSW 2570

Attention: Mr Michael Brown

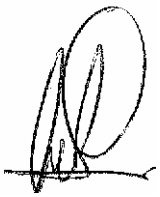
Dear Sir

Re Phase 1 Contamination and Salinity Assessment
Carrington Centennial Care – Paling Court da Carrington
Lot 10 DP 845472 – No 90 Werombi Road, Grasmere

We are pleased to submit our Phase 1 Contamination and Salinity Investigation for the proposed housing development at the above address.

Should you have any queries, please contact the undersigned.

Yours faithfully
GeoEnviro Consultancy Pty Ltd



Solern Liew CPEng (NPER)
Director

D:\12OB\114\JC12114A-r2.DOC

TABLE OF CONTENTS

LIST OF DRAWINGS

LIST OF APPENDICES

1 INTRODUCTION

This report presents the results of a Phase 1 Contamination and Salinity investigation for the proposed new building referred to as Paling Court da Carrington to be constructed at the Carrington Centennial Care located at No 90 Werombi Road in Grasmere, as shown on Drawing No 1. The investigation was commissioned by Mr Michael Brown, following our fee proposal Ref PE12978A dated 15th June 2012.

We understand that the proposed development will include replacing the existing aged care building with a new building and this will involve demolition of the existing building and construction of a new building at the same location.

The objectives of this study were as follows;

- To determine if significant subsurface soil contamination is likely to exist on site that may present a risk to human health and/or the environment as a result of previous and current land use.
- To assess the salinity of the subsurface soil and the potential adverse impact on the proposed development.

2 SCOPE OF WORK

2.1 Contamination Assessment

The Phase 1 contamination assessment was performed in general conformance with our understanding of the guidelines by the Australian and New Zealand Conservation Council (ANZECC) and the Office of Environment and Heritage (OEH).

The scope of work conducted consisted of:

- A search of records on previous notices issued by OEH and Camden Council Section 149(2) Zoning Certificate.
- A review of available information on the site history from aerial photographs and historical titles search,
- A review of published information on the subsurface conditions in the general area,

- An inspection of the site to identify apparent or suspected areas of contamination,
- A limited test pit investigation to detect the presence or fill or other obvious signs of contamination,

2.2 Salinity Assessment

The salinity assessment was performed in general conformance with our understanding of the guidelines prepared by the Department of Land and Water Conservation (Reference 10) and the Salinity Code of Practice prepared by Western Sydney Regional Organisation Council (Reference 11). The scope of work conducted consisted of:

- Drilling of six boreholes (BH 1 to 6) using a pendulum drill rig attached to a rubber tyred tractor at accessible locations around the existing building. The boreholes were drilled through topsoil and fill and into natural clay and in some locations, into shale to depths varying from 1.2m and 2.6m below existing ground surface.

- Soil sampling of the topsoil and at every change in the soil texture at various depths in three boreholes.

- Laboratory analysis to aid assessment of physical and chemical properties

3 SITE INFORMATION

3.1 Site Location

The proposed building site is located within the Carrington Centennial Care facility, on north eastern side of Werombi Road in Grasmere.

The site is within the jurisdiction of Camden Council, Parish Camden and the county of Cumberland.

3.2 Geological Setting

The site is situated on gently undulating terrain. Ground surface within the site slopes down in a general direction to the south east at angles of about 4 to 7 degrees.

The 1:100,000 Soil Landscape of Penrith Series 9030 (Reference 1) prepared by the Soil Conservation Services of NSW indicates the site to be underlain by Blacktown soil of the Residual Soil Landscape group. The soil typically consists of shallow to moderately deep red and brown podzolic soils in upper slope and well drained area, and yellow podzolic soil in lower slope and poor drained area.

The 1:100,000 geological map of Penrith (Reference 2) indicates the site to be underlain by Bringelly shale of the Wianamatta Group comprising of carbonaceous shale, mudstone and fine to medium grained lithic sandstone.

3.3 Hydrogeology

The subject site is situated on undulating terrain and was found to be underlain by moderately reactive and highly plastic clayey soil. A drainage channel is situated about 500m north of the site and this drainage channel flows towards Nepean River about 900m to the northeast of the site.

Based on our site investigation, groundwater is expected at depths greater than 3m below the existing ground surface.

A study of groundwater conditions beneath the site and search of the NSW Governments NSW Water Information groundwater database for the region was carried out. The search encountered one groundwater monitoring bore within 1km from the site.

The following is a summary of the information obtained:

Groundwater Number	Authorised uses	Northing	Easting	Standing Water Level	Water Bearing Zones	Final Depth
GW105251	Domestic Stock	6229667	284660	40.0m-	-	162.0m

Groundwater is considered a resource in the general region and is likely to fluctuate in depth seasonally. Reference should be made to the Work Summary search in Appendix A for details.

3.4 Site Inspection and Description

A site visit was carried out on the 6th September 2012 by an environmental engineer to observe existing site features and identify obvious or suspected areas of potential contamination.

At the time of our site inspection, there is an existing age care building with a number of cluster houses to the east of the site.

4. SITE HISTORY

4.1 Historical Proprietors

Historical information on the previous owners of the site was obtained from the Department of Lands. The information can often be linked to possible land uses and provides and indication of potential contamination on the site. The following is a summary of information obtained;

Title Reference	**Dealing No**	**Registration Date**	**Registered Proprietors**
Vol 14808 Folio 67	W442730	10/10/1986	Peter Gerald Oxford, Robert William Fowler, Bruce Hanson Cunningham and John Carlyle Southwell, as joint tenants.
Folio 1/620909	I689845	01/10/1993	Peter Gerald Oxford, Robert William Fowler, Bruce Hanson Cunningham, John Carlyle Southwell and Kenneth John Macaulay, as joint tenants.
Folio 10/845472	AF647597X	18/06/1913	Margaret Ellen Mcentee, Graham Gordon Pascoe and Bruce Vincent Harahan, as joint tenants.
	TZ AF747942	9/9/2010	Aleksander Kazimerz Jankowski, Margaret Ellen Mcentee, Graham Gordon Pascoe and Bruce Vincent Harahan, as joint tenants.

4.2 Aerial Photographs

A review of aerial photographs from 1947 to 1990 was carried out. The following is a summary of the observations made from the review;

Year	Reference	Description
1947	NSW 836 5092, Cumberland Series 1961, Run 47	The subject site appeared to be used as an agricultural land. The surrounding properties to the North, South and East were cleared of trees and large scale agricultural activities were wide spread across the region.
1956	NSW 235 5210, Camden RUN 32, 02/01/1956	There appeared no significant change in site conditions on the subject site and surrounding properties since 1947.
1966	NSW 1440 5123 Wollongong Run 2C 22/03/1966	The subject site appeared to have no change since 1956
1975	NSW 2362 64 Wollongong Run 1 30/11/75	Agricultural activities within the subject site appeared to have ceased. Across Furguson Road to the east, earthworks for the construction of the wastewater treatment plant were in progress.
1990	Wollongong 1:16000 NSW 3762 Run 3 11/11/1990	The existing buildings and cluster houses were constructed. The waste water plant east of the site had been established.

4.3 DECCW Records

A search of DECCW's contaminated land register and licensing register indicate the site to have no records kept under the Contaminated Land Management Act 1995 and Environmentally Hazardous Chemical Act 1985.

Refer to Appendix A for details of the DECC search.

4.4 Section 149 (2) Certificate

A copy of the Section 149 (2) zoning certificate was obtained from the Camden Council to determine conditions applicable to the site in relation to the Contaminated Land Management Act. Reference may be made to the certificate attached in Appendix A.

The certificate indicates the following;

- The site is not within land declared to be an investigation area or remediation site under Part 3 of that Act.
- The site is not subject to an investigation order or a remediation order within the meaning of the Act
- The site is not the subject of a voluntary investigation proposal (or voluntary remediation proposal) the subject of the Environmental Protection Authority's agreement under Section 19 or 26 of that Act.
- The site is not the subject of a site audit statement within the meaning of Part 4 of that Act.

5. FIELDWORK

Fieldwork for the investigation included drilling of 6 boreholes (BH 1 to 6) using a pendulum drill rig attached to a rubber tyred tractor on the 6th September 2012. The borehole locations are shown on Drawing No 1.

The boreholes were drilled to depths varying from 1.2m to 2.6m below existing ground surface. The boreholes were observed for groundwater during and upon completion of the site investigation.

Prior to borehole drilling, an underground services check was carried out using drawings provided by Dial-before-you-dig. An underground locater equipped with an electromagnetic device was engaged as a precautionary measure to avoid drilling into underground services.

Upon completion of the site investigation, the boreholes were backfilled with drilling spoil.

The field results together with details of the subsurface strata encountered are presented in Borehole Reports in Appendix B.

6. LABORATORY ANALYSIS

To assess the likely impact of soil salinity to the proposed development, the following laboratory analysis was carried out;

- pH
- Electrical Conductivity (Ec)
- Cation Exchange Capacity (CEC)
- Exchangeable Sodium Percentage (ESP)
- Chloride (Cl)
- Sulphate ($S0_4$)
- Resistivity

The salinity analysis was carried out by Envirolab Services. The laboratory test reports for the salinity assessment are attached in Appendix C of this report.

7. SUBSURFACE CONDITIONS

Reference should be made to the attached Table 1 for a summary of subsurface profiles encountered. The following is a summary of the subsurface profiles encountered in the test pits;

Topsoil/fill and Topsoil

Topsoil/fill and topsoil were encountered in all boreholes except BH 6 comprising of low liquid limit Clayey Silt. Generally the topsoil/fill and topsoil were found to be dry to moist with thickness varying from 50mm to 300mm.

Fill

Beneath the topsoil/fill in BH 3, fill was encountered consisting predominantly of Silty Clay of high plasticity with some shale gravel. A trace of asphalt and concrete fragments was encountered in the fill.

The fill was found to be generally dry and thickness of the fill was found to be about 550mm.

Natural Soil

Natural Silty Clay was encountered underlying topsoil and fill at depths of about 50mm to 600mm below existing ground surface. In BH 6, natural soil was encountered on the surface.

The natural clay was generally found to have moisture content less than the plastic limit and very stiff.

Bedrock

Shale bedrock was encountered in all boreholes except BH 1, at depths ranging from about 1.1m to 2.3m below existing ground level. Generally the shale was found to have low to medium strength and distinctly weathered.

Groundwater

All boreholes were found to be dry during and shortly after completion of the borehole investigation.

8. RESULTS OF THE INVESTIGATION

8.1 Guidelines

Salinity refers to the presence of excess salt in the environment and is able to occur if salts which are naturally found in soil or groundwater mobilise, allowing capillary rise and evaporation to concentrate the salt at the upper subsurface soil profile. Such movements are caused by changes in the natural water cycle. In urban areas, the processes which cause salinity are intensified by the increased volumes of water added to the natural system from irrigation of gardens, lawn and parks and from leaking infrastructures (eg pipes, sewer, stormwater, etc) and pool.

Saline soil may have adverse impact on development such as;

- Damage to buildings and houses caused by deterioration of bricks, mortar and concrete when salt drawn up into capillaries of bricks and mortar expands resulting in spalling.
- Deterioration of concrete kerbs and gutters as a result of chemical reaction between concrete and sulphates.
- High chloride content in the soil may result in corrosion of steel reinforcement and buried metal structures.
- Damage to underground pipes and infrastructures.
- Water logging of ground surface due to sealing effect of sodic and dispersive soil.
- Loss of vegetation cover and plants due to high salt content resulting in retardation of plants.

In recognition of the potential adverse impact of salinity to development, the Western Sydney Regional Organisation of Councils Ltd has drafted a Salinity Code of Practice (Reference 11) to address the issue of salinity. It was acknowledge in the Code that salinity problems can change substantially over time and it is difficult to predict exactly where salinity will occur and how it will respond to the changing environment conditions.

The fundamental criterion for assessing soil salinity is based on Electrical Conductivity (Reference 10).

Class	**EC_e (ds/m)**
Non-Saline	<2
Slightly Saline	2-4
Moderately Saline	4-8
Very Saline	8-16
Highly Saline	>16

As soil salinity is a function of soil stability, other parameters such Cation Exchange Capacity (CEC), Exchangeable Sodium (ESP), Sodium Exchangeable Ratio (SAR) were used to assess saline soil. The following tables obtained from the various guidelines (Reference 10 and 12).

Sodic soils are dispersible and are vulnerable to erosion and tunnelling. Sodicity is a measure of Exchangeable Sodium Percentage (ESP) and Cation Exchangeable Capacity (CEC). The following is a measure of soil sodicity;

ESP (%)	**Rating**
Less than 5	Non-Sodic
5 to 15	Sodic
Greater than 15	Highly Sodic

The measure of Cation Exchangeable Capacity is as follows;

CEC ($cmol^+/kg$)	**Rating**
Less than 6	Very Low
6 to 12	Low
12 to 25	Moderate
25 to 40	High
Greater than 40	Very High

In addition to the above, the presence of Sulphate and Chloride in the soil has the potential to cause high soil aggressivity to concrete and steel structures, in particular if the structures are in direct contact with the soil. The following is a measure of soil aggressivity to concrete based on the Australian Standard (Reference 13).

Sulfate expressed as SO_3		**PH**	**Chloride in water (ppm)**	**Soil conditions A***	**Soil conditions B#**
In Soil (ppm)	**In Groundwater (ppm)**				
<5000	<1000	>5.5	<6000	Non-aggressive	Non-aggressive
5000-1000	1000-3000	4.5-5.5	6000-12000	Mild	Mild
10000-20000	3000-10000	4-4.5	12000-30000	Severe	Moderate
>20000	>10000	<4	>30000	Very Severe	Severe

Approximate 100ppm of SO_4=80ppm of SO_3
* Soil condition A = High permeability soils (eg sands and gravels) which is below groundwater
# Soil conditions B = Low permeability soils (eg silts and clays) and all soils above groundwater

The following is a measure of soil aggressivity to steel piles based on the Australian Standard (Reference 13).

pH	**Chlorides (Cl)**		**Resistivity Ohm.cm**	**Soil conditions A***	**Soil conditions B#**
	In Soil Ppm	**In water ppm**			
>5	<5000	<1000	>5000	Non-aggressive	Non-aggressive
4-5	5000-20000	1000-10000	2000-5000	Mild	Non-aggressive
3-4	20000-50000	10000-20000	1000-2000	Moderate	Mild
<3	>50000	>20000	<1000	Severe	Moderate

* Soil condition A = High permeability soils (eg sands and gravels) which is below groundwater
# Soil conditions B = Low permeability soils (eg silts and clays) and all soils above groundwater

8.2 Laboratory Results

The following is a summary of the laboratory test results;

Borehole	Depth	pH	EC	ECe	ESP	CEC	SO4	Cl-	Resistivity
BH 1	0-0.1	6.3	0.14	1.4					
	0.5 - 0.6	7	0.05	0.36			14	6	20000
	1 - 1.1	7	0.13	0.91	5.1	9.4	120	22	7900
	2 - 2.1	5.4	0.13	0.91			8	140	7700
BH 2	0 - 0.1	6.5	0.07	0.66			15		
	0.4 - 0.5	6.5	0.04	0.28			11	3	25000
	1 - 1.1	5.3	0.05	0.32			40	4	22000
BH 4	0 - 0.1	6.8	0.08	0.81					
	0.5 - 0.6	5.2	0.19	1.33			93	150	5100
	1.1 - 1.2	4.9	0.43	3.01			94	480	2300
	1.8 - 1.9	7.8	0.65	4.55	16.1	2.7	100	680	1500

Note: EC – Electrical Conductivity (dS/m) Resistivity – ohm/cm
EC_e-Electrical Conductivity (dS/m) CL – Chloride (mg/kg)
CEC – Cation Exchange Capacity (cmol+/kg) SO4- Sulphate (mg/kg)
ESP – Exchangeable Sodium Percentage (%)

Emerson Class

Sample	Material Description	Class	Dispersivenes s
BH 1 (1.0-1.4m)	Silty Clay: High plasticity, brown	4	Moderate
BH 4 (0.4-0.8m)	Silty Clay: High plasticity, red brown mottled grey	4	Moderate

Particle Size Distribution

Sample	Clay & Silt (%)	Sand (%)	Gravel (%)
BH 1 (1.0-1.1m)	53	37	10
BH 4 (0.4-0.8m)	81	14	5

9. ASSESSMENT AND RECOMMENDATIONS

9.1 Contamination Assessment

The scope of this Phase 1 -Preliminary Contamination Assessment comprises of a site history appraisal, a visual site inspection and limited borehole drilling. The conclusions presented in this report are professional opinions based solely upon visual observations of the site and its vicinity, limited borehole investigation and our interpretation of the documentation made available. The quantitative level and extent of any contamination present could not be determined from this limited scope of work and the assessment has not undertaken any independent validation of the advice provided.

Based on the historical information gathered, the site was originally part of a large parcel of land used for agricultural activities in the 1940's. Theagricultural activities within the site appeared to have ceased in the 1970's. The existing building and other buildings within the facility appeared to have been constructed in the 1980's.

The proposed site did not appear to have been subjected to major ground disturbance or landfill activities. The test pit investigation revealed the site to be predominantly underlain by natural clayey soil overlying shale at relatively shallow depths of less than 1.1m to 2.3m below existing ground surface. Some minor fill up to about 0.6m was encountered on the surface in TP 3 and this was placed to form a level building platform for the existing building. The fill appeared to consist mainly of Silty Clay of high plasticity with a trace of asphalt and concrete fragments. There were no obvious signs of significant building rubbish or asbestos encountered in the boreholes.

Based on the results of this preliminary study, we consider the risk of significant soil contamination within the proposed building site to be generally considered low.

We note that though rubbish fill and/or asbestos were not encountered in the boreholes, it may still be present elsewhere away from the borehole locations as the boreholes were drilled at discrete location. All rubbish fill containing building material (eg concrete, bricks and pipes) if encountered during building platform construction should be removed from the site and disposed to a OEH approved landfill in accordance with regulatory requirements. Should asbestos be encountered during site preparation and construction, we recommend the procedure based on "Unexpected Asbestos Finds" protocol as outlined in Appendix E should be adopted

9.2 Salinity Assessment

Our comments and assessment on soil salinity are as follows;

- The topsoil and the insitu soil were assessed to be non to slightly saline with EC_e ranging from 0.32 to 3.01 dS/m. In BH 4 (1.8-1.9m) the interbedded shale and clay was assessed to be moderately saline and this is considered typical of Bringelly shale.

- The laboratory test results indicate the insitu soil to have low concentrations of Sulphate and in an environment where the lowest soil pH is 4.9, the soil was assessed to be Mildly Aggressive to buried concrete.

- The laboratory test results indicate the insitu soil to have low concentrations of Chloride and low resistivity of 1500 ohm cm and in an environment where the lowest soil pH is 4.9, the insitu soil may be classified as Mildly Aggressive to buried steel structures.

- The Emerson tests indicate that the site to be underlain by Moderately dispersive soil.

- The CEC and ESP indicate the insitu soil to be Sodic to Very Sodic

Based on the laboratory test results, the proposed development should adopt a good soil and water management strategy to minimise impact of soil degradation caused by stormwater runoff and infiltration. As the site is situated within a saline prone environment, the proposed development should include the following suggested management strategies;

Site Preparation and Earthworks

- Appropriate batter slopes for excavations should be adopted to prevent erosion and scouring. Under good drainage conditions, the following batter slopes or less may be adopted;

Material	Recommended Minimum Batter Slopes
Compacted Fill	2.5 Horizontal : 1 Vertical
Natural Sandy and Clayey Soil	2 Horizontal : 1 Vertical

- Any site regrading should be planned to reduce cutting and filling to the absolute minimum and the earthworks undertaken in stages to alleviate erosion and localised instability problem. To minimise the effects of erosion, all batters, whether in cut or fill should be stabilised by planting (or the application of a sprayed-on mulch) with appropriate species of vegetation as soon as practical after construction.

- The site should be regularly inspected for rills, erosion and scouring of slopes as the insitu soil was assessed to be dispersive. In areas with notable ground instability, the upper 300mm of the ground surface should be treated by stabilising with 3% by weight of lime or covering the area with good quality stable fill such as ripped sandstone.

- All proposed imported fill should be verified by sampling and testing to ensure the material is non to slightly saline. Moderately saline soil is not considered acceptable. Supporting information and documentation should be supplied verifying that the subject material complies.

- Adequate revegetation of the site should be carried out and this may involve treatment of topsoil material and planting appropriate plant species which are salt-tolerant.

Proposed Building

- A high impact waterproof membrane, not just a vapour proof membrane, should be lain under house slabs (refer to NSW Building Code of Australia). The waterproof membrane must be extended to the outside face of the external edge beam up to the finishing ground level, as detailed in the Building Code of Australia (BCA).

- For masonry building construction, the damp proof course must consist of poly-ethylene or poly-ethylene coated metal and correctly placed in accordance with BCA. Ground levels immediately adjacent to masonry walls must be kept below the damp proof course

- For slab on ground construction, a layer of bedding sand at least 50mm thick should be laid under the slab to allow free drainage of water and to prevent pooling of water potentially carrying salts.

- Concrete floor slabs comprise of Class 32MPa concrete or sulphate resisting Type SR cement with a water cement ratio of 0.5. Similar concrete should be used for bored piers or footings. Refer to AS2159:2009 "Piling – Design and installation" and AS 3600 -2009 "Concrete" for recommendations on concrete and steel durability
- Slabs must be vibrated and cured for a minimum 3 days
- The minimum cover to reinforcement should be 30mm from a membrane in contact with the ground.
- The minimum cover to reinforcement should be 50mm for strip footings and beams.
- Admixtures for waterproofing and /or corrosion prevention may be used.
- Use of salt tolerant masonry and mortar below the damp proof course
- Constant monitoring of water pipes to detect any leakages and the repair of damages pipes as soon as possible after detection

- Use Copper or non-metallic pipes instead of galvanised iron
- Ensure any underground services are provided with adequate corrosion protection.

For detail recommendations on building requirements, refer to the following documentations;

- Australian Standard, AS2159:2009 "Piling – Design and installation"
- Australian Standard, AS 3600 -2009 "Concrete"
- Camden Council Policy on "Building in Salinity Prone Environments" File No 4196/1 dated March 2004 (Amended 2009)

10. LIMITATIONS

The findings contained in this report are the results of discreet/specific sampling methodologies used in accordance with normal practices and standards. There is no investigation which is thorough enough to preclude the presence of material which presently, or in future, may be considered hazardous to the site. The site has been the subject of dumping of rubbish fill in the past and the scope of this report do not cover for future dumping and burial of such material on the subject site.

As regulatory evaluation criteria are constantly updated, concentrations of contaminants presently considered low, may in the future fall short of regulatory standards that require further investigation/redemption.

The statements presented in these documents are intended to advise you of what should be your realistic expectations of this report, and to present you with recommendations on how to minimise the risks associated with the groundworks for this project. The document is not intended to reduce the level of responsibility accepted by GeoEnviro Consultancy Pty Ltd, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

Attached in Appendix D are documents entitled "Important Information about Your Environmental Site Assessment" and Explanatory Notes in conjunction with which this report must be read, as it details important limitations regarding the investigation undertaken and this report.

REFERENCES

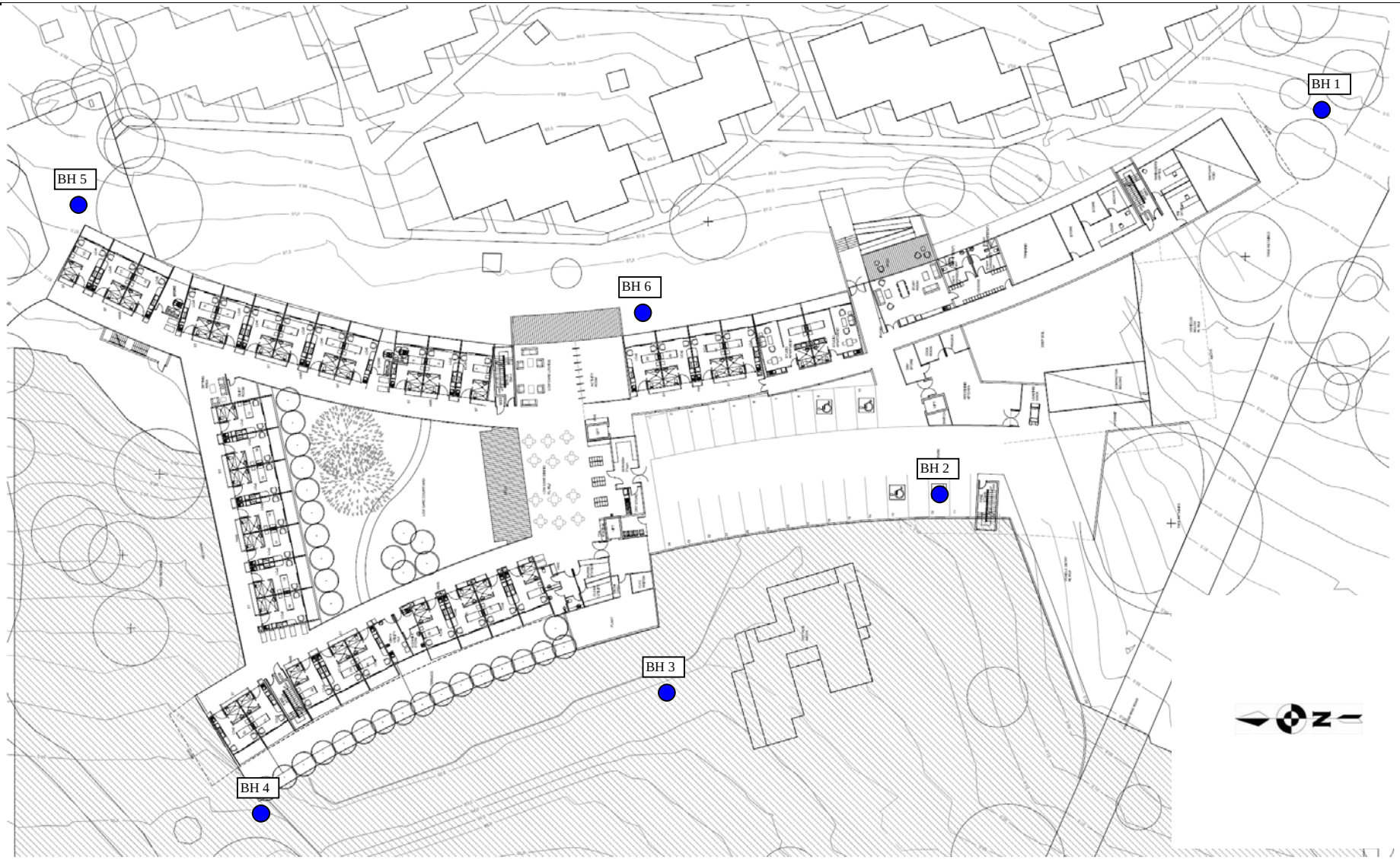
1. *1:100,000 Geological Map of Port Hacking-Wollongong– Geological Series Sheet 9029-9129 (Edition 1) 1985*
2. *1:100,000 Soil Landscape Map of Port Hacking -Wollongong– Soil Conservation Service of NSW ; Sheet 9029-9129*
3. *Australian & New Zealand Guidelines for the Assessment and Management of Contaminated Sites, Australian and New Zealand Conservation Council and National Health and Medical Research Council, 1992.*
4. *Assessment of Orchard and Market Garden Contamination - Contaminated Sites Discussion Paper, NSW EPA 1995.*
5. *Health Based Soil Investigation Levels, National Environmental Health Forum Monographs Soil series No. 1 – 1996*
6. *Assessment of Site Contamination- Measure 1999 – National Environment Protection*
7. *Guidelines for Assessment Service Station Sites – NSW EPA 1994*
8. *Guidelines for the NSW Auditor Scheme(2nd Edition), NSW EPA 2004*
9. *DEC 2009 guidelines "Part 1 – Classifying Waste*
10. *Department of Land and Water Conservation – "Site Investigation for Urban Salinity".2002*
11. *Salinity Code of Practice – Western Sydney Regional Organisation of Councils Ltd – 2002*
12. *What do all the numbers mean? A guide for the interpretation of soil test results. – Department of Conservation and Land Management, 1992*
13. *Australian Standard, AS 2159-2009 "Piling – Design and Installation"*
14. *Australian Standard, AS 3600 -2009 "Piling – Concrete"*

GeoEnviro Consultancy

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia

Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: WW	Date: 28/09/2012	Michael Brown Planning & Strategies	
Checked By: SL	Date: 28/09/2012	Paling Court (Carrington Centenary Care), Grasmere	
Revision By:	Date:	Site Locality and Proposed Building Location	
Scale: Proportional	A3	Project No: JC12114A	Drawing No: 1



Legend

Borehole

GeoEnviro Consultancy
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: WW	**Date: 28/09/2012**	**Michael Brown Planning & Strategies**	
Checked By: SL	**Date: 28/09/2012**	**Paling Court (Carrington Centenary Care), Grasmere**	
Revision By:	**Date:**	**Test Location Plan**	
Scale: Proportional	**A3**	**Project No: JC12114A**	**Drawing No: 2**

APPENDIX A

Section 149 (2) Certificate. DEC records and Groundwater Data

Rate this site

Office of Environment & Heritage

You are here: Home > Contaminated land > Record of notices

Search results

Your search for: Text: Environmentally Hazardous Chemicals Act 1985
LGA: Camden Council
Date from: 01 Jan 1985
Date to: 06 Feb 2012

Search Again

Refine Search

did not find any records in our database.
If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the planning process.

Search TIP
To search for a specific site, search by LGA (local government area) and carefully review all sites listed.
... more search tips

More information about particular sites may be available from:

- The POEO public register
- The appropriate planning authority: for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act.

See What's in the record and What's not in the record.

6 February 2012

Rate this site

Office of Environment & Heritage

You are here: Home > Contaminated land > Record of notices

Search results

Your search for: Text: Contaminated Land Management Act 1997
LGA: Camden Council
Date from: 01 Jan 1995
Date to: 06 Feb 2012

Search Again

Refine Search

did not find any records in our database.
If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the planning process.

Search TIP
To search for a specific site, search by LGA (local government area) and carefully review all sites listed.
... more search tips

More information about particular sites may be available from:

- The POEO public register
- The appropriate planning authority: for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act.

See What's in the record and What's not in the record.

6 February 2012

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Monday, February 6, 2012

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW105251

Works Details (top)

GROUNDWATER NUMBER	GW105251
LIC-NUM	10WA111036
AUTHORISED-PURPOSES	DOMESTIC STOCK
INTENDED-PURPOSES	DOMESTIC STOCK
WORK-TYPE	Bore
WORK-STATUS	Supply Obtained
CONSTRUCTION-METHOD	Rotary
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-10-03
FINAL-DEPTH (metres)	162.00
DRILLED-DEPTH (metres)	162.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	ROMEO
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	40.00
SALINITY	1260.00
YIELD	0.30

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	212 - HAWKESBURY RIVER
AREA-DISTRICT	
CMA-MAP	9029-4N
GRID-ZONE	56/1
SCALE	1:25,000
ELEVATION	
ELEVATION-SOURCE	(Unknown)
NORTHING	6229667.00
EASTING	284660.00
LATITUDE	34 3' 6"
LONGITUDE	150 40' 1"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	CAMDEN
PORTION-LOT-DP	116 854483

Licensed (top)

COUNTY	CAMDEN
PARISH	CAMDEN
PORTION-LOT-DP	116 854483

Construction (top)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE-NO	PIPE-NO	COMPONENT-CODE	COMPONENT-TYPE	DEPTH-FROM (metres)	DEPTH-TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	5.50	208			Rotary Air
1		Hole	Hole	5.50	162.00	158			Down Hole Hammer
1	1	Casing	Steel	-0.50	5.50	168.3	158.7		C: -.1-5.5m; Driven into Hole
1	1	Casing	PVC Class 9	-0.50	71.50	140			Screwed and Glued; Suspended in Clamps

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
28.00	30.00	2.00				0.05	36.00	0.25	3200.00
86.00	89.00	3.00				0.20	90.00	0.25	960.00
109.00	110.50	1.50				0.30	114.00	0.25	940.00
122.00	124.00	2.00		40.00		0.30	162.00	0.25	1260.00

Drillers Log (top)

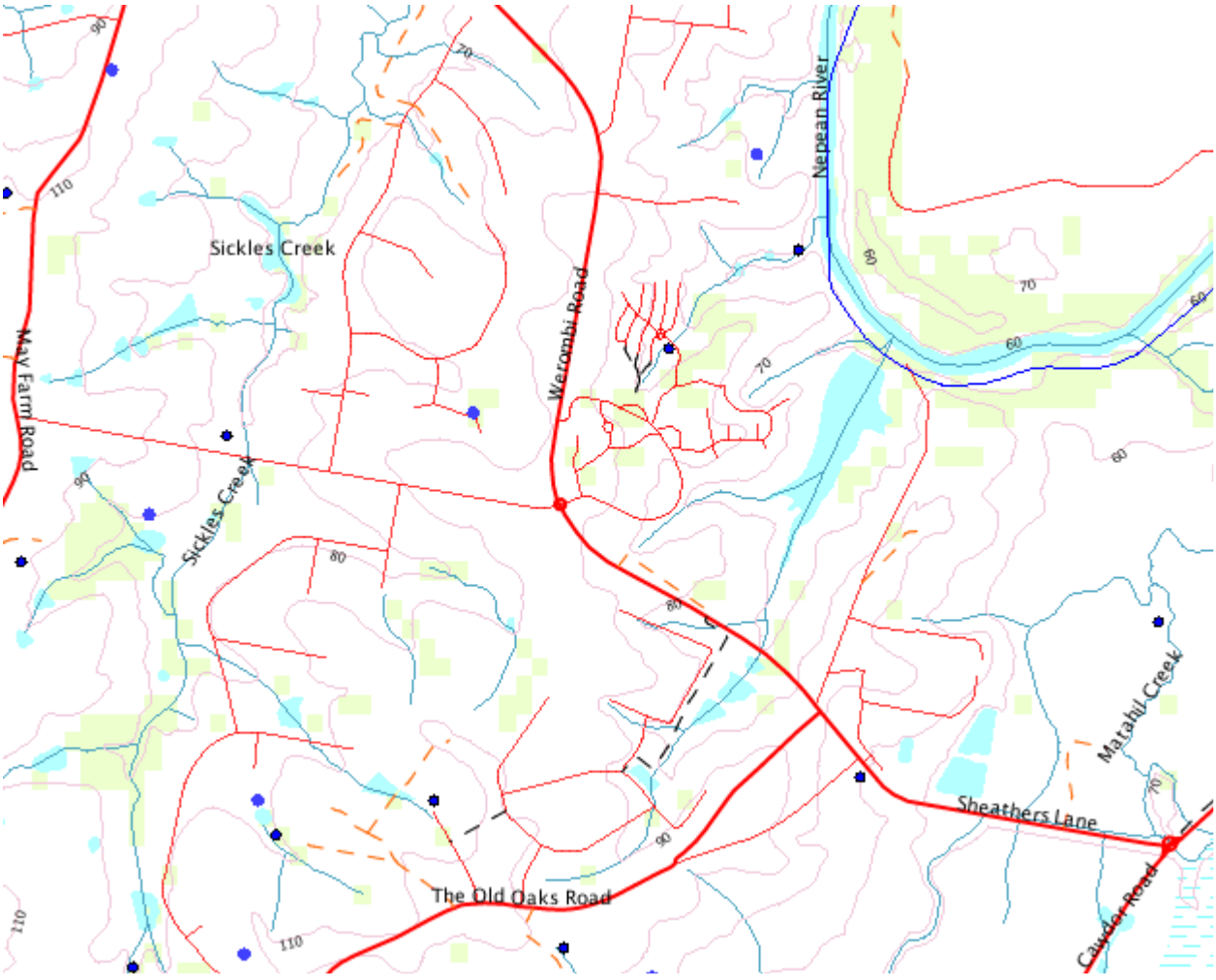
FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	3.00	3.00	CLAY STIFF		
3.00	5.00	2.00	CLAY SILTY WET		
5.00	65.00	60.00	SHALE HARD		

65.00	70.00	5.00	SANDSTONE GREY
70.00	72.00	2.00	SHALE
72.00	86.00	14.00	SANDSTONE GREY
86.00	89.00	3.00	SANDSTONE FINE QUARTZ
89.00	109.00	20.00	SANDSTONE GREY
109.00	110.50	1.50	SANDSTONE QUARTZ
110.50	114.50	4.00	SANDSTONE GREY
114.50	117.00	2.50	SHALE
117.00	122.00	5.00	SANDSTONE GREY
122.00	124.00	2.00	SANDSTONE QUARTZ
124.00	130.00	6.00	SANDSTONE GREY
130.00	131.00	1.00	SANDSTONE FRACTURED QUARTZ
131.00	139.00	8.00	SANDSTONE GREY
139.00	140.00	1.00	SANDSTONE QUARTZ
140.00	151.00	11.00	SANDSTONE GREY
151.00	162.00	11.00	SHALE

90 Werombi Road, Grasmere

Map created with NSW Natural Resource Atlas - http://nratlas.nsw.gov.au

Monday, February 06, 2012



0 3 Km

Legend

Symbol	Layer	Custodian
	Cities and large towns renderImage: Cannot build image from features	
Cowra	Populated places renderImage: Cannot build image from features	
	Towns	
	Groundwater Bores	
	Catchment Management Authority boundaries	
	Major rivers	
	Topographic base map	

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
7/2/2012 11:44AM

FOLIO: 1/620909

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 14808 FOL 67

Recorded	Number	Type of Instrument	C.T. Issue
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
27/9/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
1/10/1993	I689845	TRANSFER	EDITION 1
15/12/1994	DP845472	DEPOSITED PLAN	FOLIO CANCELLED RESIDUE REMAINS
20/9/1999	6210607	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

HAZ-DANIEL- PRINTED ON 7/2/2012

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
7/2/2012 11:42AM

FOLIO: 10/845472

First Title(s): VOL 14 FOL 185 VOL 13465 FOL 102
Prior Title(s): 1/620909

Recorded	Number	Type of Instrument	C.T. Issue
15/12/1994	DP845472	DEPOSITED PLAN	FOLIO CREATED EDITION 1
26/7/1999	6019827	DEPARTMENTAL DEALING	
28/9/2000	7114105	MORTGAGE	EDITION 2
15/9/2006	AC600051	APPLICATION	EDITION 3
21/11/2007	AD581340	DISCHARGE OF MORTGAGE	EDITION 4
31/1/2008	AD685655	WITHDRAWN - TRANSFER SEVERING JOINT TENANCY	
10/12/2008	AE369649	APPLICATION	EDITION 5
6/4/2009	AE588395	APPLICATION	EDITION 6
4/2/2010	AF292547	RESTRICTION ON USE OF LAND BY/VESTED IN PRESCRIBED AUTHORITY	
7/4/2010	AF410070	REQUEST	
26/7/2010	AF647597	TRANSFER WITHOUT MONETARY CONSIDERATION	EDITION 7
9/9/2010	AF747942	TRANSFER WITHOUT MONETARY CONSIDERATION	
16/9/2010	AF678314	DEPARTMENTAL DEALING	EDITION 8
14/12/2010	AF943570	DEPARTMENTAL DEALING	
12/5/2011	DP1164646	DEPOSITED PLAN	EDITION 9

*** END OF SEARCH ***

HAZ-DANIEL- PRINTED ON 7/2/2012

FOLIO: 10/845472

SEARCH DATE	TIME	EDITION NO	DATE
7/2/2012	11:42 AM	9	12/5/2011

LAND

LOT 10 IN DEPOSITED PLAN 845472
AT GRASMERE
LOCAL GOVERNMENT AREA CAMDEN
PARISH OF CAMDEN COUNTY OF CAMDEN
TITLE DIAGRAM DP845472

FIRST SCHEDULE

ALEKSANDER KAZIMERZ JANKOWSKI
MARGARET ELLEN MCENTEE
GRAHAM GORDON PASCOE
BRUCE VINCENT HANRAHAN
AS JOINT TENANTS (TZ AF747942)

SECOND SCHEDULE (15 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 AF410070 THE LAND ABOVE DESCRIBED IS USED AS A RETIREMENT VILLAGE UNDER THE RETIREMENT VILLAGES ACT 1999 KNOWN AS CARRINGTON CENTENNIAL CARE RETIREMENT VILLAGE
3 PROVISIONS OF S. 235A CROWN LANDS CONSOLIDATION ACT 1913 AS TO BOUNDARIES TO RIVERS AND LAKES AFFECTING THE LAND SHOWN SO BURDENED IN DP620909
4 BK 1818 NO 49 EASEMENT FOR TRANSMISSION LINE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP620909
5 AF292547 RESTRICTION(S) ON THE USE OF LAND
6 DP1164646 EASEMENT FOR UNDERGROUND CABLES 3 METRE(S) WIDE REFERRED TO AND NUMBERED (1) IN THE S.88B INSTRUMENT AFFECTING THE SITE DESIGNATED (E1) IN DP1164646
7 DP1164646 EASEMENT FOR UNDERGROUND CABLES 4 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1164646
8 DP1164646 EASEMENT FOR UNDERGROUND CABLES 3 METRE(S) WIDE REFERRED TO AND NUMBERED (3) IN THE S.88B INSTRUMENT AFFECTING THE SITE DESIGNATED (E3) IN DP1164646
9 DP1164646 EASEMENT FOR UNDERGROUND CABLES VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1164646
10 DP1164646 EASEMENT FOR PADMOUNT SUBSTATION 2.75 METRE(S) WIDE REFERRED TO AND NUMBERED (5) IN THE S.88B INSTRUMENT AFFECTING THE SITE DESIGNATED (E5) IN DP1164646
11 DP1164646 EASEMENT FOR PADMOUNT SUBSTATION 2.75 METRE(S) WIDE REFERRED TO AND NUMBERED (6) IN THE S.88B INSTRUMENT

END OF PAGE 1 - CONTINUED OVER

HAZ-DANIEL- PRINTED ON 7/2/2012

SECOND SCHEDULE (15 NOTIFICATIONS) (CONTINUED)

AFFECTING THE SITE DESIGNATED (E6) IN DP1164646
12 DP1164646 EASEMENT FOR PADMOUNT SUBSTATION 4.23 METRE(S) WIDE
AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1164646
13 DP1164646 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (8) IN THE S.88B INSTRUMENT
14 DP1164646 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (9) IN THE S.88B INSTRUMENT
15 DP1164646 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (10) IN THE S.88B INSTRUMENT

NOTATIONS

AF410070 NOTE: REFER ALL DEALINGS TO SD2 (RETIREMENT VILLAGE)
UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Camden Council
37 John Street, Camden NSW 2570 DX 25807
PO Box 183, Camden 2570 ABN: 31 117 341 764
Telephone: 02 4654 7777 Fax: 02 4654 7829
Email: mail@camden.nsw.gov.au

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979

Applicant: Mr S Goss
PO Box 1543, Macquarie Centre
NORTH RYDE NSW 2113

Certificate number:	20120212
Receipt number:	774819
Property number:	112400
Certificate date:	08/02/2012
Certificate fee:	$53.00
Applicant's reference:	JC12114A

DESCRIPTION OF PROPERTY

Title: LOT: 10 DP: 845472
Property: 90 Werombi Road GRASMERE 2570

BACKGROUND INFORMATION

This certificate provides information on how a property (such as land, a house, commercial building, etc) may be used and the limits on its development. The certificates contains information Council is aware of through records and environmental plans with data supplied by the State Government. The details contained in this certificate are limited to that required by Section 149 of the Environmental Planning and Assessment Act.

---

1. NAMES OF RELEVANT PLANNING INSTRUMENTS AND DCPs

(1) The name of each environmental planning instrument that applies to the carrying out of development on the land.

CAMDEN LOCAL ENVIRONMENTAL PLAN 2010.

GAZETTED 3RD SEPTEMBER 2010.

(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act (unless the Director-General has notified the Council that the making of the proposed instrument has been deferred indefinitely or has not been approved.

The subject land is not affected by an exhibited Draft Local Environmental Plan.

(3) The name of each development control plan that applies to the carrying out of development on the land.

Camden Development Control Plan (DCP) 2011 was adopted by Council on 8 February 2011, and takes effect on 16 February 2011. This DCP applies to all land within the Camden Local Government Area.

2. ZONING AND LAND USE UNDER RELEVANT LEPs

For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP) that includes the land in any zone (However described):

(a) the zone;

THIS ZONES THE LAND:- R5 LARGE LOT RESIDENTIAL

Objectives of zone:

(a) To provide residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive locations and scenic quality.
(b) To ensure that large residential allotments do not hinder the proper and orderly development of urban areas in the future.
(c) To ensure that development in the area does not unreasonably increase the demand for public services or public facilities.
(d) To minimise conflict between land uses within the zone and land uses within adjoining zones.

(b) the purposes for which the instrument provides that development may be carried out within the zone without the need for development consent;

Extensive agriculture; Home occupations

(c) the purposes for which the instrument provides that development may not be carried out within the zone except with development consent;

Bed and breakfast accommodation; Boarding houses; Dual occupancies (attached); Dwelling houses; Home industries; Roads; Any other development not specified in item b or d.

(d) the purposes for which the instrument provides that development is prohibited within the zone;

Advertising structures; Agriculture; Air transport facilities; Amusement centres; Animal boarding or training establishments; Boat building and repair facilities; Boat sheds; Camping grounds; Car parks; Caravan parks; Charter and tourism boating facilities; Commercial premises; Correctional centres; Crematoria; Depots; Eco-tourist facilities; Electricity generating works; Entertainment facilities; Exhibition homes; Extractive industries; Freight transport facilities; Function centres; Heavy industrial storage establishments; Home occupations (sex services); Industries; Information and education facilities; Mortuaries; Public administration buildings; Recreation facilities (indoor); Recreation facilities (major); Registered clubs; Residential accommodation; Restricted premises; Rural industries; Service stations; Sewerage systems; Sex services premises; Storage premises; Tourist and visitor accommodation; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Veterinary hospitals; Waste or resource management facilities; Wharf or boating facilities; Wholesale supplies

(e) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed;

No.

(f) whether the land includes or comprises critical habitat;

No.

(g) whether the land is in a conservation area (however described), whether an item of environmental heritage (however described) is situated on the land;

An item of environmental heritage is located on the site.

The subject land is not in a Conservation Area.

3. COMPLYING DEVELOPMENT

(1) Whether or not the land is land on which complying development may be carried out under each of the codes for complying development in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

If complying development may not be carried out on that land because of one or more of the requirements under clause 1.19 of that Policy, why it may not be carried out.

(a) General Housing Code

Complying development under the General Housing Code **may not** be carried out on the land, The land is affected by specific land exemptions:

(a) Heritage Item.

(b) Rural Housing Code

Complying development under the Rural Housing Code **may** be carried out on the land.

(c) Housing Alterations Code

Complying development under the Housing Internal Alterations Code **may not** be carried out on the land.

(a) Heritage Item.

(d) General Commercial and Industrial Code

Complying development under the General Commercial and Industrial Code **may not** be carried out on the land.

(a) Heritage Item.

(e) General Development Code

Complying development under the General Development Code **may** be carried out on the land.

(f) Demolition Code

Complying development under the Demolition Code **may not** be carried out on the land.

4. COASTAL PROTECTION

Whether or not the land is affected by the operation of section 38 or 39 of the *Coastal Protection Act 1979*, but only to the extent that the council has been so notified by the Department of Public Works.

No.

---

5. MINE SUBSIDENCE

Whether or not the land is proclaimed to be a mine subsidence district within the meaning of section 15 of the Mine Subsidence Compensation Act 1961.

The subject land is not affected by sec.15 of the Mine Subsidence Compensation Act, 1961, proclaiming land to be in the South Campbelltown Mine Subsidence District.

---

6. ROAD WIDENING AND ROAD REALIGNMENT

Whether or not the land is affected by any road widening or road realignment under:

(a) Division 2 of Part 3 of the *Roads Act 1993*, or
(b) any environmental planning instrument, or
(c) any resolution of the council.

The subject land is not affected by road widening or road realignment under:

(1) Division 2 of Part 3 of the Roads Act 1993.
(2) Any Environmental Planning Instrument.
(3) Any resolution of Council.

However, should your property be near a main road you should check with the Roads and Traffic Authority for possible affectation.

---

7. COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

Whether or not the land is affected by a policy:

(a) adopted by the council, or
(b) adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council,

that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

No. (Except bushfire).

7a. FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

(a) Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi-dwelling housing or residential flat buildings (not including development for the purposes of group homes or senior housing) is subject to flood related development controls.

The subject land is affected by a policy adopted by the Council/Public Authority and notified to Council that restricts the development of the subject land because of the likelihood of flooding.

(b) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls.

The subject land is affected by a policy adopted by the Council/Public Authority and notified to Council that restricts the development of the subject land because of the likelihood of flooding.

It should also be noted that more information is provided under Section 149.5 in relation to flooding.

8. LAND RESERVED FOR ACQUISITION

Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Act.

The land is not subject to acquisition by Council or any public authority under any Local Environmental Plan, deemed environmental planning instrument or draft Local Environmental Plan applying to the land, as referred to in Section 27 of the Environmental Planning and Assessment Act, 1979.

9. CONTRIBUTIONS PLANS

The name of each contributions plan applying to the land

Section 94 Camden Contributions Plan - Adopted by Council: 28 June 2004. In Force: 21 July 2004.

* On 13 December 2011, Council resolved to adopt the Draft Camden Contribution 2011, and repeal Camden Contribution Plan 2004, once advice is received from the Minister regarding the Camden Contributions Plan 2011.

Section 94 Contributions Plan No 16 - Ellis Lane And Grasmere Adopted By Council: 27 January 1998. Section 94 Contributions Plan No 16 - Amended Adopted by Council: 27 October 2003 - In Force: 12 November 2003

Section 94 Contributions Plan No 20 - Fire And Other Emergency Services. Adopted By Council: 14 October 1996. Section 94 Contributions Plan No 20 - Under Review.

* On 13 December 2011, Council resolved to repeal Contributions Plan No 20, once advice is received from the Minister regarding the Camden Contributions Plan 2011.

9A. BIODIVERSITY CERTIFIED LAND

If the land is biodiversity certified land (within the meaning of Part 7AA of the *Threatened Species Conservation Act 1995*), a statement to that effect.

The name of each contributions plan applying to the land

No.

10. BIOBANKING AGREEMENTS

If the land is land to which a biobanking agreement under Part 7A of the Threatened Species Conservation Act 1995 relates, a statement to that effect (but only if the council has been notified of the existence of the agreement by the Director-General of the Department of Environment, Climate Change and Water).

No.

11. BUSH FIRE PRONE LAND

If any of the land is bush fire prone land (as defined in the Act) a statement that all or, as the case may be, some of the land is bush fire prone land.

Council has been supplied by the NSW Rural Fire Service with a Bush Fire Prone Land Map for the purposes of a bush fire risk management plan applying to the land within the Camden Local Government Area. Based on that map, it appears the land referred to in this certificate is bush fire prone land as defined in s.4 of the Environmental Planning and Assessment Act, 1979. For further details contact Council's Development Branch.

12. PROPERTY VEGETATION PLANS

If the land is land to which a property vegetation plan under the *Native Vegetation Act 2003* applies, a statement to that effect (but only if the council has been notified of the existence of the plan by the person or body that approved the plan under that Act).

No.

13. ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Whether an order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land (but only if the council has been notified of the order).

No.

14. DIRECTIONS UNDER PART 3A

If there is a direction by the Minister in force under section 75P (2) (c2) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of project or a stage of a project on the land under Part 4 of the Act does not have effect, a statement to that effect identifying the provision that does not have effect.

No.

15. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

If the land is land to which *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004* applies:

(a) a statement of whether there is a current site compatibility certificate (seniors housing), or which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include:

(i) that period for which the certificate is current, and
(ii) that a copy may be obtained from the head office of the Department of Planning.

And,

(b) a statement setting out any terms of a kind referred to in clause 18(2) of that Policy that have been imposed as a condition of consent to a development application granted after 11 October 2007, in respect of the land.

No.

16. SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

A statement of whether there is a valid site compatibility certificate (infrastructure), of which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include:

(a) the period for which the certificate is valid, and
(b) that a copy may be obtained from the head office of the Department of Planning.

No.

17. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

(1) A statement of whether there is a current site compatibility certificate (affordable rental housing), of which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include:

(a) the period for which the certificate is current, and
(b) that a copy may be obtained from the head office of the Department of Planning.

(2) A statement setting out any terms of a kind referred to in clause 17(1) or 37(1) of *State Environmental Planning Policy (Affordable Rental Housing) 2009* that have been imposed as a condition of consent to a development application in respect of the land.

No.

CONTAMINATED LAND – The following matters are prescribed by section 59 (2) of the *Contaminated Land Management Act 1997* as additional matters to be specified in a planning certificate

(a) that the land to which the certificate relates is significantly contaminated land within the meaning of that Act – if the land (or part of the land) is significantly contaminated land at the date when the certificate is issued.

No.

(b) that the land to which the certificate relates is subject to a management order within the meaning of that Act – if it is subject to such an order at the date when the certificate is issued,

No.

(c) that the land to which the certificate relates is the subject of an approved voluntary management proposal within the meaning of that Act – if it is the subject of such an approved proposal at the date when the certificate is issued,

No.

(d) that the land to which the certificate relates is subject to an on-going maintenance order within the meaning of that Act – if it is subject to such an order at the date when the certificate is issued,

No.

(e) that the land to which the certificate relates is the subject of a site audit statement within the meaning of that Act – if a copy of such a statement has been provided at any time to the local authority issuing the certificate.

No.

This information is provided in good faith and the Council shall not incur any liability in respect of any such advice. Council relies on state agencies for advice and accordingly can only provide that information in accordance with the advice. Verification of the currency of agency advice should occur. Further information, please contact Council's Land Information Section.

Greg Wright
General Manager
per:

APPENDIX B

Borehole Reports

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Borehole Report

Borehole no: 1

Client: Michael Brown Planning & Strategies
Job no: JC12114A

Project: Proposed Paling Court Redevelopment
Date: 6/09/2012

Location: Carrington Centennial Care, Grasmere
Logged by: WW

Drill Model and Mounting: Backhoe | Slope: Vertical | R.L. Surface:

Hole Diameter: 200 mm | Bearing: | Datum:

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
BACKHOE	NIL	DRY					Topsoil: Clayey Silt, low liquid limit, brown	D			
				0.5		CH	Silty Clay: High plasticity, brown, with a trace of ironstone grave;	MC < PL			
				1.0							
				1.5							
				2.0			As Above but brown mottled grey with a trace of gravel				
				2.5			As above mottled grey and brown				
				3.0			End BH 1 at 2.6m				
				3.5							
				4.0							

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Borehole Report

Borehole no: 2

Client: Michael Brown Planning & Strategies
Job no: JC12114A

Project: Proposed Paling Court Redevelopment
Date: 6/09/2012

Location: Carrington Centennial Care, Grasmere
Logged by: WW

Drill Model and Mounting: Backhoe | Slope: Vertical | R.L. Surface:

Hole Diameter: 200 mm | Bearing: | Datum:

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
BACKHOE	NIL	DRY		0.5			Topsoil: Clayey Silt, low liquid limit, brown Silty Clay: High plasticity, brown	MC < PL			
				1.0			As above but brown mottled grey, with a trace of gravel				
				1.5			Shale: Grey, with clay bands, low strength, extremely weathered				
				2.0							
				2.5			End BH 2 at 2.0m				
				3.0							
				3.5							
				4.0							

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Borehole Report

Borehole no: 3

Client: Michael Brown Planning & Strategies
Job no: JC12114A

Project: Proposed Paling Court Redevelopment
Date: 6/09/2012

Location: Carrington Centennial Care, Grasmere
Logged by: WW

Drill Model and Mounting: Backhoe | Slope: Vertical | R.L. Surface:

Hole Diameter: 200 mm | Bearing: | Datum:

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
BACKHOE	NIL	DRY		0.5			Topsoil/Fill: Clayey Silt, low liquid limit, with roots and gravels	D-M			
							Fill: Silty Clay, high plasticity, mottled brown and grey with shale gravels, asphalt and concrete fragment	MC < PL			
				1.0		CH	Silty Clay: High plasticity, grey	MC < PL			
							Shale: Grey/brown, low to medium strength, distinctly weathered				
				1.5			End BH 3 at 1.2m				
				2.0							
				2.5							
				3.0							
				3.5							
				4.0							

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Borehole Report

Borehole no: 4

Client: Michael Brown Planning & Strategies
Job no: JC12114A

Project: Proposed Paling Court Redevelopment
Date: 6/09/2012

Location: Carrington Centennial Care, Grasmere
Logged by: WW

Drill Model and Mounting: Backhoe | Slope: Vertical | R.L. Surface:

Hole Diameter: 200 mm | Bearing: | Datum:

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
BACKHOE	NIL	DRY					Topsoil/Fill: Silty Clay, high plasticity, brown, with brick and asphalt pieces	MC< PL			
				0.5		CH	Silty Clay: High plasticity, brown with a trace of root fibre and ironstone gravels	MC < PL			
				1.0			As above grey mottled brown with ironstone gravels				
				1.5							
				2.0			Interbedded Shale and Clay layer: Brown/grey				
				2.5			Shale: Grey, low to medium strength, distinctly weathered				
							End BH 4 at 2.5m				
				3.0							
				3.5							
				4.0							

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Borehole Report

Borehole no: 5

Client: Michael Brown Planning & Strategies
Job no: JC12114A

Project: Proposed Paling Court Redevelopment
Date: 6/09/2012

Location: Carrington Centennial Care, Grasmere
Logged by: WW

Drill Model and Mounting: Backhoe | Slope: Vertical | R.L. Surface:

Hole Diameter: 200 mm | Bearing: | Datum:

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
BACKHOE	NIL	DRY		0.0			Topsoil: Clayey Silt, low liquid limit, brown				
						CH	Silty Clay: High plasticity, brown, with a trace of ironstone gravel	MC ≤ PL			
				0.5							
							As above grey mottled brown, with ironstone gravels				
				1.0							
							As above but with shale and ironstone gravels	MC <			
				1.5		CL	Clayey Shale/Shaley Clay: Low plasticity, grey mottled brown	PL			
							Shale: Grey, low strengh, extremely to distinctly weathered				
				2.0			End BH 5 at 1.8m				
				2.5							
				3.0							
				3.5							
				4.0							

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Borehole Report

Borehole no: 6

Client: Michael Brown Planning & Strategies
Job no: JC12114A

Project: Proposed Paling Court Redevelopment
Date: 6/09/2012

Location: Carrington Centennial Care, Grasmere
Logged by: WW

Drill Model and Mounting: Backhoe | Slope: Vertical | R.L. Surface:

Hole Diameter: 200 mm | Bearing: | Datum:

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
BACKHOE	NIL	DRY		0.5		CH	Silty Clay: High plasticity, brown, with a trace of gravel				
				1.0			As above but mottled brown and grey, with a trace of shale gravel				
							Silty Clay: High plasticity, brown with bands of shale				
				1.5			Shale: Grey/Brown, low to medium strength, distinctly weathered				
				2.0			End BH 6 at 1.7m				
				2.5							
				3.0							
				3.5							
				4.0							

APPENDIX C

Laboratory Certificates – Salinity

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 78634

Client:
Geoenviro Consultancy Pty Ltd
PO Box 1543, Macquarie Centre
North Ryde
NSW 2113

Attention: Solern Liew

Sample log in details:

Your Reference:	**JC12114A, Paling Court**
No. of samples:	11 Soils
Date samples received / completed instructions received	10/09/12 / 10/09/12

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	17/09/12 / 17/09/12
Date of Preliminary Report:	Not issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Priya Samarawickrama
Senior Chemist

Alex MacLean
Chemist

ACCREDITED FOR TECHNICAL COMPETENCE

Miscellaneous Inorg - soil						
Our Reference:	UNITS	78634-1	78634-2	78634-3	78634-4	78634-5
Your Reference	----------	BH1	BH1	BH1	BH1	BH2
Depth	----------	0.0-0.1	0.5-0.6	1.0-1.1	2.0-2.1	0.0-0.1
Date Sampled		07/09/2012	07/09/2012	07/09/2012	07/09/2012	07/09/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/09/2012	12/09/2012	12/09/2012	12/09/2012	12/09/2012
Date analysed	-	12/09/2012	12/09/2012	12/09/2012	12/09/2012	12/09/2012
pH 1:5 soil:water	pH Units	6.3	7.0	7.0	5.4	6.5
Electrical Conductivity 1:5 soil:water	µS/cm	140	51	130	130	66
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	6	22	140	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	14	120	8	[NA]
Resistivity in soil*	ohmm	[NA]	200	79	77	[NA]

Miscellaneous Inorg - soil						
Our Reference:	UNITS	78634-6	78634-7	78634-8	78634-9	78634-10
Your Reference	----------	BH2	BH2	BH4	BH4	BH4
Depth	----------	0.4-0.5	1.0-1.1	0.00-0.1	0.5-0.6	1.1-1.2
Date Sampled		07/09/2012	07/09/2012	07/09/2012	07/09/2012	07/09/2012
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	12/09/2012	12/09/2012	12/09/2012	12/09/2012	12/09/2012
Date analysed	-	12/09/2012	12/09/2012	12/09/2012	12/09/2012	12/09/2012
pH 1:5 soil:water	pH Units	6.5	5.3	6.8	5.2	4.9
Electrical Conductivity 1:5 soil:water	µS/cm	40	46	81	190	430
Chloride, Cl 1:5 soil:water	mg/kg	3	4	[NA]	150	480
Sulphate, SO4 1:5 soil:water	mg/kg	11	40	[NA]	93	94
Resistivity in soil*	ohmm	250	220	[NA]	51	23

Miscellaneous Inorg - soil		
Our Reference:	UNITS	78634-11
Your Reference	----------	BH4
Depth	----------	1.8-1.9
Date Sampled		07/09/2012
Type of sample		Soil
Date prepared	-	12/09/2012
Date analysed	-	12/09/2012
pH 1:5 soil:water	pH Units	7.8
Electrical Conductivity 1:5 soil:water	µS/cm	650
Chloride, Cl 1:5 soil:water	mg/kg	680
Sulphate, SO4 1:5 soil:water	mg/kg	100
Resistivity in soil*	ohmm	15

ESP/CEC Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ---------- 	78634-3 BH1 1.0-1.1 07/09/2012 Soil	78634-11 BH4 1.8-1.9 07/09/2012 Soil
Exchangeable Ca	meq/100g	5.8	0.82
Exchangeable K	meq/100g	0.12	0.13
Exchangeable Mg	meq/100g	3.0	1.3
Exchangeable Na	meq/100g	0.48	0.44
Cation Exchange Capacity	meq/100g	9.4	2.7
ESP	%	5.1	16.1

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell and dedicated meter, in accordance with APHA 22nd ED 2510 and Rayment & Lyons.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA 22nd ED, 4110 -B.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soil based on Rayment and Lyons 2011.

Client Reference: JC12114A, Paling Court

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			12/09/2012	78634-2	12/09/2012 || 12/09/2012	LCS-1	12/09/2012
Date analysed	-			12/09/2012	78634-2	12/09/2012 || 12/09/2012	LCS-1	12/09/2012
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	78634-2	7.0 || 7.0 || RPD: 0	LCS-1	101%
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	78634-2	51 || 51 || RPD: 0	LCS-1	105%
Chloride, Cl 1:5 soil:water	mg/kg	2	Inorg-081	<2	78634-2	6 || 5 || RPD: 18	LCS-1	94%
Sulphate, SO4 1:5 soil:water	mg/kg	2	Inorg-081	<2	78634-2	14 || 13 || RPD: 7	LCS-1	95%
Resistivity in soil*	ohm m	1	Inorg-002	<1.0	78634-2	200 || 210 || RPD: 5	LCS-1	105%
QUALITY CONTROL ESP/CEC	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Exchangeable Ca	meq/100g	0.01	Metals-009	<0.01	78634-3	5.8 || 5.7 || RPD: 2	LCS-1	100%
Exchangeable K	meq/100g	0.01	Metals-009	<0.01	78634-3	0.12 || 0.11 || RPD: 9	LCS-1	89%
Exchangeable Mg	meq/100g	0.01	Metals-009	<0.01	78634-3	3.0 || 2.6 || RPD: 14	LCS-1	96%
Exchangeable Na	meq/100g	0.01	Metals-009	<0.01	78634-3	0.48 || 0.41 || RPD: 16	LCS-1	90%
Cation Exchange Capacity	meq/100g	1	Metals-009	<1.0	78634-3	9.4 || 8.9 || RPD: 5	[NR]	[NR]
ESP	%	1	Metals-009	<1.0	78634-3	5.1 || 4.6 || RPD: 10	[NR]	[NR]

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	78634-11	12/09/2012 || 12/09/2012	78634-3	12/09/2012
Date analysed	-	78634-11	12/09/2012 || 12/09/2012	78634-3	12/09/2012
pH 1:5 soil:water	pH Units	78634-11	7.8 || 7.9 || RPD: 1	[NR]	[NR]
Electrical Conductivity 1:5 soil:water	µS/cm	78634-11	650 || 650 || RPD: 0	[NR]	[NR]
Chloride, Cl 1:5 soil:water	mg/kg	78634-11	680 || [N/T]	78634-3	91%
Sulphate, SO4 1:5 soil:water	mg/kg	78634-11	100 || [N/T]	78634-3	76%
Resistivity in soil*	ohm m	78634-11	15 || 15 || RPD: 0	[NR]	[NR]

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

Geoenviro Consultancy Pty Ltd
PO Box 1543, Macquarie Centre
North Ryde NSW 2113

ph: 9679 8733
Fax: 9679 8744

Attention: Solern Liew

Sample log in details:

Your reference:	**JC12114A, Paling Court**
Envirolab Reference:	**78634**
Date received:	10/09/12
Date results expected to be reported:	**17/09/12**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	11 Soils
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice Pack
Sampling Date Provided:	YES

Comments:

Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Job No: 78634

Laboratory Test Request/Chain of Custody Record

Job Details
Job Number: JC12114A
Client: -
Project: Carrington Centennial Care - Paling Court
Location: Grasmere

Sample Date: 7/09/2012
Sampled By: W.W
Project Manager: SL
Store Location:

Date Received: 10/9/12
Time Received: 18:30
Received by: PT
Temp: (Cool/Ambient
Condition: Ice/Icepack
Sample Intact: Yes/Broken/None

External Laboratory Details:
Laboratory name: Envirolab Services Pty Ltd
Address: 12 Ashley Street
Chatswood
Contact: Tania Notaris

Sampling Details				Sample Type		Test Required (\) / Test Performed(X)																										
Location		Depth (m)		Soil	Water	Metals (As Cd Cr Cu Pb Zn Ni Hg)	OCP / PCB		Combination 5	Combination 12			pH	EC	CEC/ESP	Cl / SO4	Resistivity														Keep Sample
		From	To																													
1)	BH 1	0.00	0.10	DG									X	X																		
2)	BH 1	0.50	0.60	DG									X	X																		
3)	BH 1	1.00	1.10	DG									X	X		X	X															
4)	BH 1	2.00	2.10	DG									X	X		X	X															
5)	BH 2	0.00	0.10	DG									X	X		X	X															
6)	BH 2	0.40	0.50	DG									X	X		X	X															
7)	BH 2	1.00	1.10	DG									X	X		X	X															
8)	BH 4	0.00	0.10	DG									X	X		X	X															
9)	BH 4	0.50	0.60	DG									X	X		X	X															
10)	BH 4	1.10	1.20	DG									X	X		X	X															
11)	BH 4	1.80	1.90	DG									X	X	X	X	X															

Relinquished by				Received By			
Laboratory	Name	Signature	Date	Laboratory	Name	Signature	Date
GeoEnviro Consultancy	William Wijaya	W.W	10/09/2012	GLB	Prathiba	PT	10/9/12

Legend
DB Disturbed Sample (Bulk, Plastic bag)
DS Disturbed Sample (Small, Plastic bag)
DG Disturbed Sample (Glass Jar)
STP Standard Penetration Test Sample
U50 Undisturbed Sample, 50mm Tube
U75 Undisturbed Sample, 75mm Tube
WG Water Sample, Amber Glass Jar
WP Water Sample, Plastic Bottle
Y Keep Sample
N Discard Sample

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Emerson Class Number of a Soil

Client / Address: Michael Brown Planning & Strategies / PO Box 295 CAMDEN	Job No: JC12114A-r2
Project: Proposed Paling Court Redevelopment	Date: 28/09/2012
Location: Carrington Centenary Care, Grasmere	Report No: R01A
Test Procedure: AS 1289 1.1, 1.2.1, 3.8.1	Lab Reference No. SR 7530
Sample Procedure: AS 1289 1.1, 1.2.1 (6.5.4)	Sample Identification: BH 1 (1 - 1.4m)
Sample Date: 10/09/2012	Test Date: 11/09/2012
Sample Description: (CH) Silty Clay: High plasticity, brown	

Details of Test

AIR DRIED CRUMBS

Time in water:
10:47
Time dispersion starts:
-

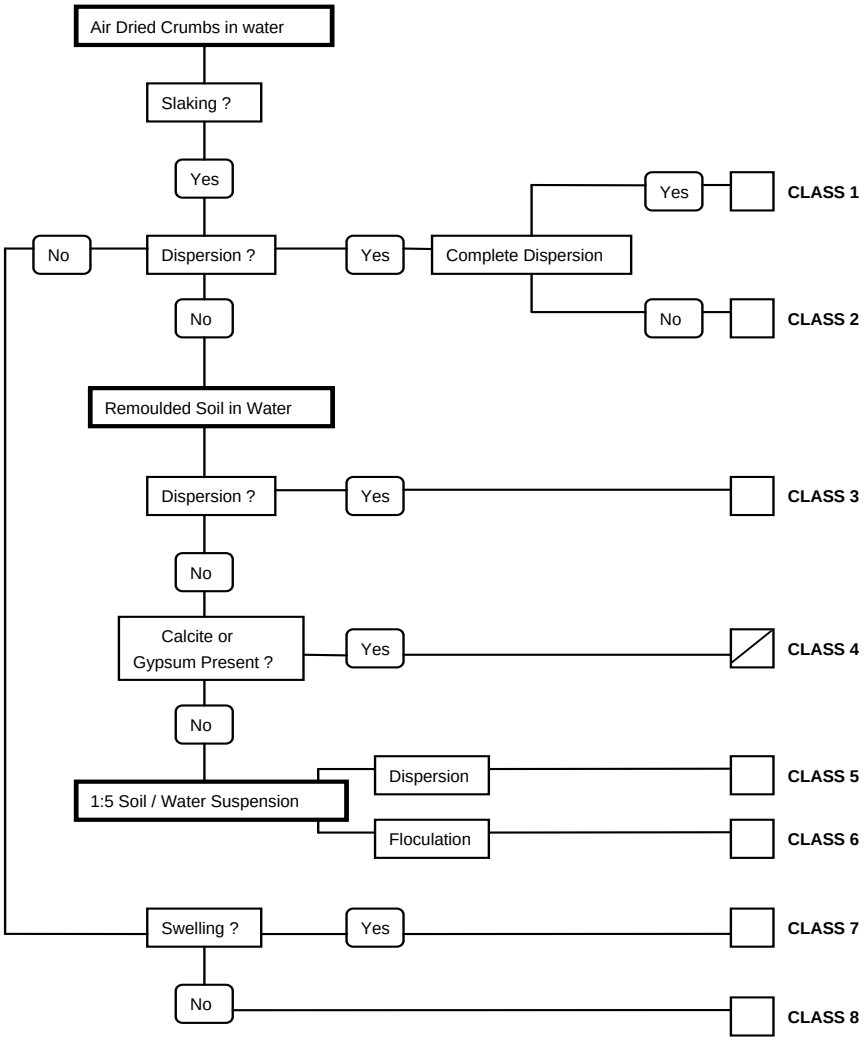
REMOULDED SOIL

Time in water:
11:03
Time dispersion starts:
-

TYPE OF WATER
Distilled
Temp. of water
19 degree

OTHER OBSERVATIONS:

Dispersion Flow Chart



Remarks

Approved Signatory _____ So Lern Liew Date 28/09/2012

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Emerson Class Number of a Soil

Client / Address: Michael Brown Planning & Strategies / PO Box 295 CAMDEN	Job No: JC12114A-r2
Project: Proposed Paling Court Redevelopment	Date: 28/09/2012
Location: Carrington Centenary Care, Grasmere	Report No: R02A

Test Procedure: AS 1289 1.1, 1.2.1, 3.8.1	Lab Reference No. SR 7531
Sample Procedure: AS 1289 1.1, 1.2.1 (6.5.4)	Sample Identification: BH 4 (0.4 - 0.8m)
Sample Date: 10/09/2012	Test Date: 11/09/2012

Sample Description: (CH) Silty Clay: High plasticity, brown

Details of Test

AIR DRIED CRUMBS

Time in water:
10:36
Time dispersion starts:
-

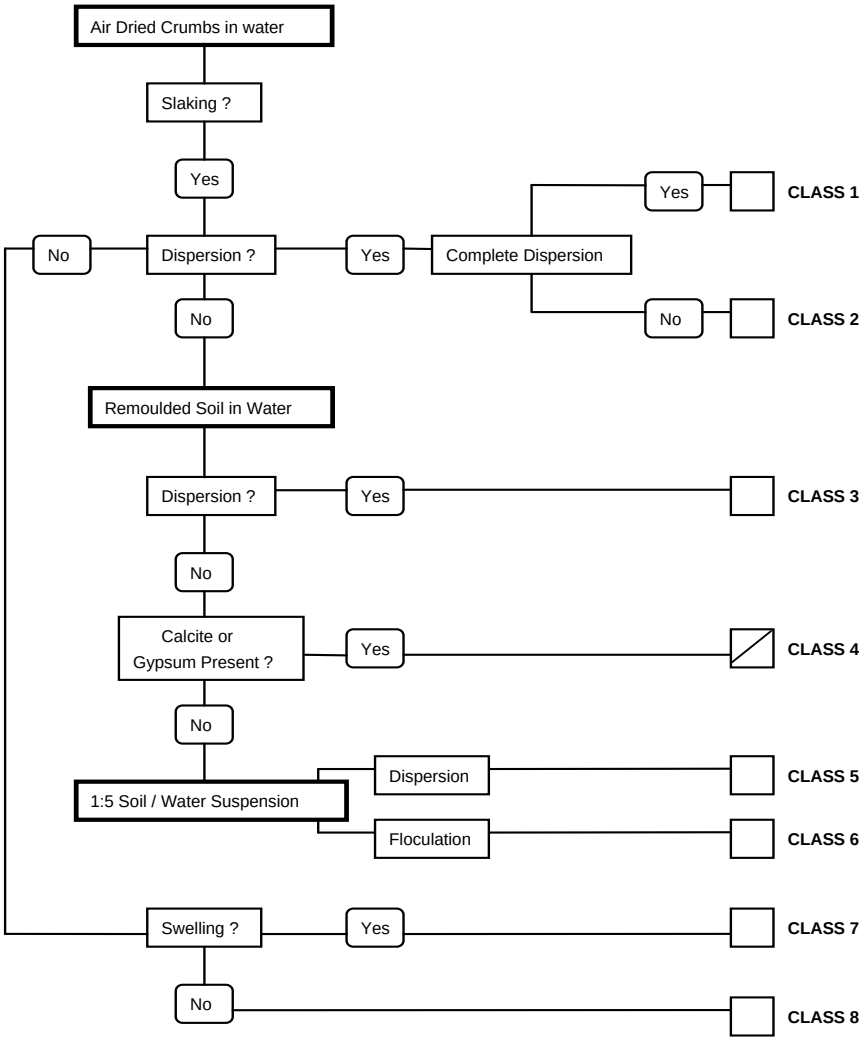
REMOULDED SOIL

Time in water:
10:50
Time dispersion starts:
-

TYPE OF WATER
Distilled
Temp. of water
19 degree

OTHER OBSERVATIONS:

Dispersion Flow Chart



Remarks

Approved Signatory _____ So Lern Liew Date 28/09/2012

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Particle Size Distribution

Client / Address: Michael Brown Planning & Strategies / PO Box 295, CAMDEN — Job No: JC12114A-r2

Project: Proposed Paling Court Redevelopment — Date: 28/09/2012

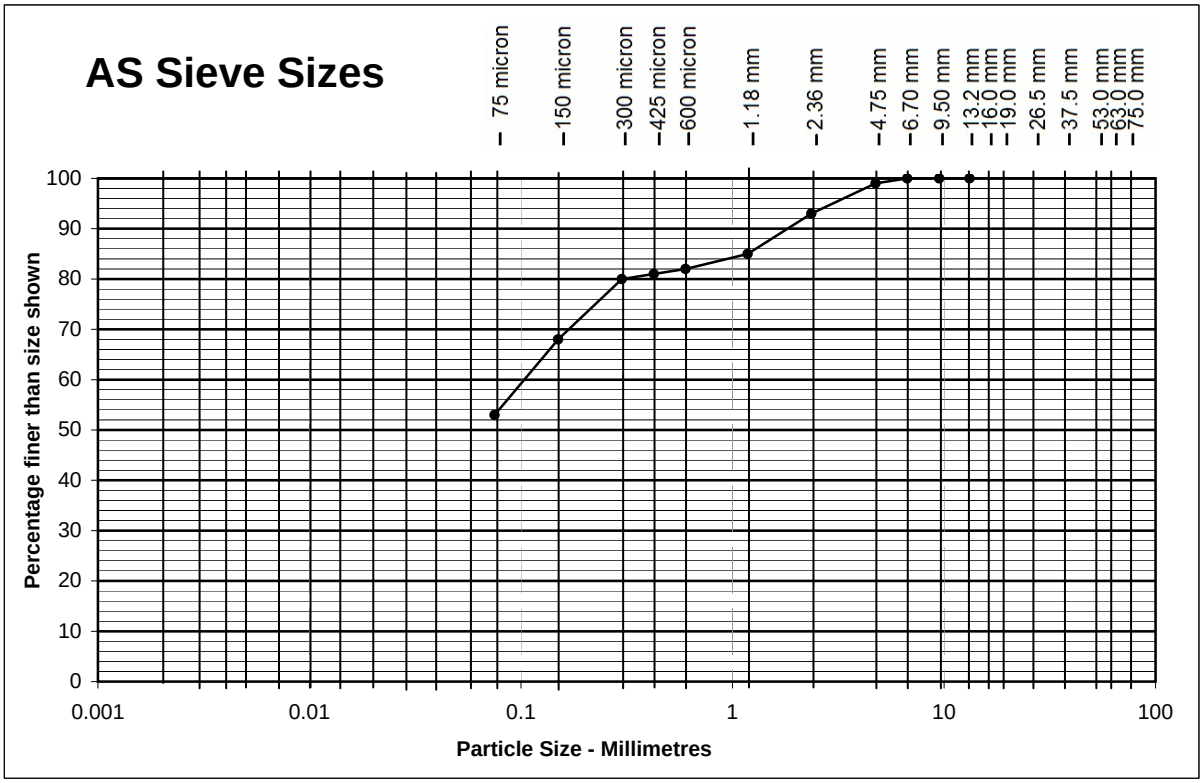
Location: Carrington Centenary Care, Grasmere — Report No: R03A

Lab Reference No: SR 7350 — Sample Identification: BH 1 (1 - 1.1m)

Laboratory Specimen Description: (CH) Silty Clay: High plasticity, brown

Test Procedure AS1289 3.5.1, 3.6.1, 3.6.3 — Sample Procedure

Sieve Size	% Passing	Specification	Sieve Size	% Passing	Specification
150 mm			425 um	81	
75 mm			300 um	80	
63 mm			150 um	68	
53 mm			75 um	53	
37.5 mm			59 um		
26.5 mm			39 um		
19 mm			28 um		
16 mm			20 um		
13.2 mm	100		14 um		
9.5 mm	100		10 um		
6.7 mm	100		7 um		
4.75 mm	99		5 um		
2.36 mm	93		4 um		
1.18 mm	85		3 um		
600 um	82		2 um		



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	

Remarks: Particle Density: t/m^3

c:\\Lab\report\R030 — Form no. R030/Ver02/06/10

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

This document is issued in accordance with NATA's accreditation requirements
Accredited for compliance with ISO/IEC 17025
NATA Accredited Laboratory Number: 14208

Approved Signatory _____ So Lern Liew Date 28/09/2012

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Particle Size Distribution

Client / Address: Michael Brown Planning & Strategies / PO Box 295, CAMDEN — Job No: JC12114A-r2

Project: Proposed Paling Court Redevelopment — Date: 28/09/2012

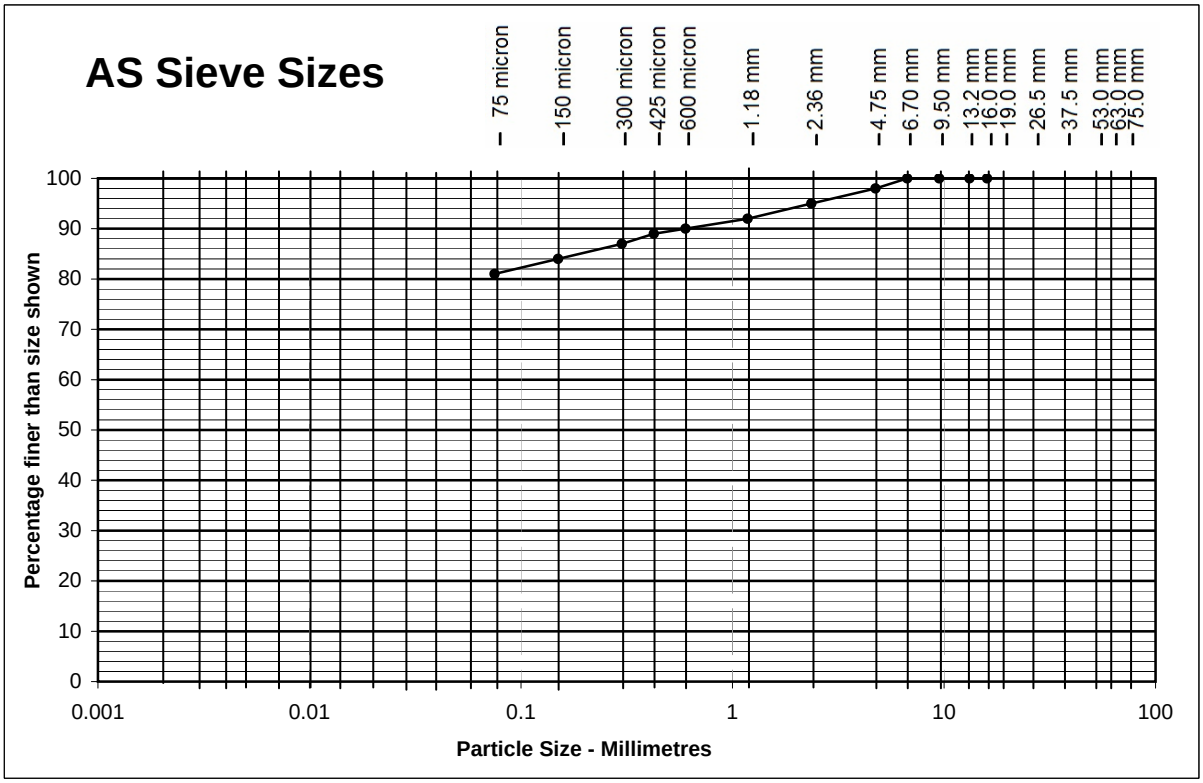
Location: Carrington Centenary Care, Grasmere — Report No: R04A

Lab Reference No: SR 7351 — Sample Identification: BH 4 (0.4 - 0.8m)

Laboratory Specimen Description: (CH) Silty Clay: High plasticity, brown

Test Procedure AS1289 3.5.1, 3.6.1, 3.6.3 — Sample Procedure

Sieve Size	% Passing	Specification	Sieve Size	% Passing	Specification
150 mm			425 um	89	
75 mm			300 um	87	
63 mm			150 um	84	
53 mm			75 um	81	
37.5 mm			59 um		
26.5 mm			39 um		
19 mm			28 um		
16 mm	100		20 um		
13.2 mm	100		14 um		
9.5 mm	100		10 um		
6.7 mm	100		7 um		
4.75 mm	98		5 um		
2.36 mm	95		4 um		
1.18 mm	92		3 um		
600 um	90		2 um		



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	

Remarks: Particle Density: t/m^3

c:\\Lab\report\R030 — Form no. R030/Ver02/06/10

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

This document is issued in accordance with NATA's accreditation requirements
Accredited for compliance with ISO/IEC 17025
NATA Accredited Laboratory Number: 14208

Approved Signatory _____ So Lern Liew Date 28/09/2012

APPENDIX D

Important Information about your Environmental Site Assessment
Explanatory Notes

IMPORTANT INFORMATION REGARDING YOUR ENVIRONMENTAL SITE ASSESSMENT

These notes have been prepared by GeoEnviro Consultancy Pty Ltd, using guidelines prepared by ASFE. The Association of Engineering Firms Practising in the Geosciences. The notes are offered as an aid in the interpretation of your environmental site assessment report.

REASONS FOR AN ENVIRONMENTAL SITE ASSESSMENT

Environmental site assessments are typically, though not exclusively, performed in the following circumstances:

- As a pre- acquisition assessment on behalf of either a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has change, eg from a factory to a residential subdivision
- As a pre-development assessment of greenfield sites, to establish baseline conditions and assess environmental, geological and hydrological constraints to the development of, eg, a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to the assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible, quantify the risks which unrecognised contamination poses to the ongoing or proposed activity. Such risk may be both financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination within a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which did not show signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur, only the most likely contaminants are screened.

AN ENVIRONMANTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

Your environmental assessment report should not be used;

- When the nature of the proposed development is changed, eg, if a residential development is proposed, rather than a commercial development

- When the size or configuration of the proposed development is altered, eg, if a basement is added

- When the location or orientation of the proposed structure is modified
- When there is a change of land ownership, or
- For application to an adjacent site

In order to avoid costly problems, you should ask your consultant to assess any changes in the project since the assessment and the implications, if any, to recommendations made in the assessment.

ENVIRONMENTAL SITE ASSESSMENT FINDINGS ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual sub-surface conditions only at those points where samples are taken, when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientist and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on any proposed development and appropriate remediation measures. Actual conditions may differ from those inferred, because no professional, no matter how qualified and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, however, steps can be taken to help minimise the impact. For this reason, site owner should retain the services of their consultants throughout the development stage of the project in order to identify variances, conduct additional tests which may be necessary and to recommend solutions to problems encountered on site.

Soil and groundwater contamination is a field in which legislation and interpretation of legislation by government departments is changing rapidly. Whilst every attempt is made by GeoEnviro Consultancy Pty Ltd to be familiar with current policy, our interpretation of the investigation findings should not be taken to be that of the relevant authority. When approval from a statutory authority is required for a project, that approval should be directly sought.

STABILITY OF SUB-SURFACE CONDITIONS

Sub-surface conditions can change by natural processes and site activities. As an environmental site assessment is based on conditions existing at the time of the investigation, project decisions should not be based on environmental site assessment data which may have been affected by time. The consultant should be requested to advise if additional tests are required.

ENVIRONMENTAL SITE ASSESSMENTS ARE PERFORMED FOR SPECIFIC PURPOSES AND CLIENTS

Environmental site assessments are prepared in response to a specific scope of work required to meet the specific needs or specific individuals. An assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another civil engineer.

An assessment should not be used by other persons for any purpose, or by the client for a different purposes. No individual, other than the client, should apply an assessment, even for its intended purposes, without first conferring with the consultant. No person should apply an assessment for any purposes other than that originally contemplated, without first conferring with the consultant.

MISINTERPRETATION OF ENVIRONMENTAL SITE ASSESSMENTS

Costly problems can occur when design professionals develop plans based on misinterpretation of an environmental site assessment. In order to minimise problems, the environmental consultant should be retained to work with appropriate design professionals, to explain relevant findings and to review the adequacy of plans and specifications relative to contamination issues.

LOGS SHOULD NOT BE SEPARATED FORM THE REPORT

Borehole and test pit logs are prepared by environmental scientists, engineers or geologist, based upon interpretation of field conditions and laboratory evaluation of field samples. Field logs normally provided in our reports and these should not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however, contractors can still misinterpret the logs during bid preparation if separated from the test of the assessment. Should this occur, delays and disputes , or unanticipated costs may result.

To reduce the likelihood of boreholes and test pit logs misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of sub-surface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations, such as contractors.

READ RESPONSIBILITY CLAUSES CLOSELY

An environmental site assessment is based extensively on judgement and opinion, therefore, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claim being lodged against consultants. In order to aid in prevention of this problem, model clauses have been developed for use in written transmittals. These are definitive clauses, designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment and you are encouraged to read them closely. Your consultant will be happy to give full and frank answers to any questions you may have.

EXPLANATORY NOTES

Introduction

These notes have been provided to amplify the geotechnical report with regard to investigation procedures, classification methods and certain matters relating to the Discussion and Comments sections. Not all notes are necessarily relevant to all reports.

Geotechnical reports are based on information gained from finite sub-surface probing, excavation, boring, sampling or other means of investigation, supplemented by experience and knowledge of local geology. For this reason they must be regarded as interpretative rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods
The methods the description and classification of soils and rocks used in this report are based on Australian standard 1726, the SSA Site investigation Code, in general descriptions cover the following properties - strength or density, colour, structure, soil or rock type and inclusions. Identification and classification of soil and rock involves to a large extent, judgement within the acceptable level commonly adopted by current geotechnical practices.

Soil types are described according to the predominating particle size, qualified by the grading or other particles present (eg sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	Less than 0.002mm
Silt	0.002 to 0.6mm
Sand	0.6 to 2.00mm
Gravel	2.00m to 60.00mm

Soil Classification	Particle size
Clay	less than 0.002mm
Silt	0.002 to 0.06mm
Sand	0.06 to 2.00mm
Gravel	2.00mm to 60.00mm

Cohesive soils are classified on the basis of strength, either by laboratory testing or engineering examination. The strength terms are defined as follows:

Classification	Undrained Shear Strength kPa
Very Soft	Less than 12
Soft	12 - 25
Firm	25 - 50
Stiff	50 - 100
Very Stiff	100 - 200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer test (CPT), as below:

Relative Dense	SPT 'N' Value (blows/300mm)	CPT Cone Value (q_c-Mpa)
Very Loose	Less than 5	Less than 2
Loose	5 - 10	2 - 5
Medium Dense	10 - 30	5 - 15
Dense	30 - 50	15 - 25
Very Dense	> 50	> 25

Rock types are classified by their geological names, together with descriptive terms on degrees of weathering strength, defects and other minor components. Where relevant, further information regarding rock classification, is given on the following sheet.

Sampling
Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provided information on plasticity, grained size, colour, type, moisture content, inclusions and depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin walled sample tube (normally know as U_{50}) into the soil and withdrawing a sample of the soil in a relatively undisturbed state. Such Samples yield information on structure and strength and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils. Details of the type and method of sampling are given in the report.

Field Investigation Methods
The following is a brief summary of investigation methods currently carried out by this company and comments on their use and application.

Hand Auger Drilling
The borehole is advanced by manually operated equipment. The diameter of the borehole ranges from 50mm to 100mm. Penetration depth of hand augered boreholes may be limited by premature refusal on a variety of materials, such as hard clay, gravels or ironstone.

Test Pits
These are excavated with a tractor-mounted backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3.0m for a backhoe and up to 6.0m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Care must be taken if construction is to be carried out near, or within the test pit locations, to either adequately recompact the backfill during construction, or to design the structure or accommodate the poorly compacted backfill.

Large Diameter Auger (eg Pengo)
The hole is advanced by a rotating plate or short spiral auger generally 300mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 05m) and are disturbed, but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers and is usually supplemented by occasional undisturbed tube sampling.

Continuous Spiral Flight Augers
The hole is advanced by using 90mm - 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling or insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the augers flights, but they are very disturbed and may be highly mixed with soil of other stratum.

Information from the drilling (as distinct from specific sampling by SPT or undisturbed samples) is of relatively low reliability due to remoulding, mixing or softening of samples by ground water, resulting in uncertainties of the original sample depth.

Continuous Spiral Flight Augers (continued)
The spiral augers are usually advanced by using a V - bit through the soil profile refusal, followed by Tungsten Carbide (TC) bit, to penetrate into bedrock. The quality and continuity of the bedrock may be assessed by examination of the recovered rock fragments and through observation of the drilling penetration resistance.

Non - core Rotary Drilling (Wash Boring)
The hole is advanced by a rotary bit, with water being pumped down the drill rod and returned up the annulus, carrying the cuttings, together with some information from the "feel" and rate of penetration.

Rotary Mud Stabilised Drilling
This is similar to rotary drilling, but uses drilling mud as a circulating fluid, which may consist of a range of products, from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg SPT and U_{50} samples).

Continuous Core Drilling
A continuous core sample is obtained using a diamond tipped core barrel. Providing full core recovery is achieved (which is not always possible in very weak rock and granular soils) this technique provides a very reliable (but relatively expensive) method of investigation. In rocks an NMLC triple tube core barrel which gives a core of about 50mm diameter, is usually used with water flush.

Portable Proline Drilling
This is manually operated equipment and is only used in sites which require bedrock core sampling and there is restricted site access to truck mounted drill rigs. The boreholes are usually advanced initially using a tricone roller bit and water circulation to penetrate the upper soil profile. In some instances a hand auger may be used to penetrate the soil profile. Subsequent drilling into bedrock involves the use of NMLC triple tube equipment, using water as a lubricant.

Standard Penetration Tests
Standard penetration tests are used mainly in non-cohesive soils, but occasionally also in cohesive soils, as a means of determining density or strength and of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289 "Methods of testing Soils for Engineering Purpose"- Test F31.

The test is carried out in a borehole by driving a 50mm diameter split sample tube under the impact of a 63Kg hammer with a free fall of 769mm. It is normal for the tube to be driven in three successive 150mm increments and the "N" value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rocks, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In a case where full penetration is obtained with successive blows counts for each 150mm of, say 4, 6, and 7 blows.

  as 4, 6, 7
  N = 13

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm.

  as 15,30/40mm

The results of the tests can be related empirically to the engineering properties of the soil. Occasionally the test methods is used to obtain samples in 50mm diameter thin walled samples tubes in clays. In these circumstances, the best results are shown on the bore logs in brackets.

Dynamic Cone Penetration Test
A modification to the SPT test is where the same driving system is used with a solid 60^0 tipped steel cone of the same diameter as the SPT hollow sampler. The cone can be continuously driven into the borehole and is normally used in areas with thick layers of soft clays or loose sand. The results of this test are shown as 'N_c' on the bore logs, together with the number of blows per 150mm penetration.

Cone Penetrometer Testing and Interpretation
Cone penetrometer testing (sometimes referred to as Dutch Cone-CPT) described in this report, has been carried out using an electrical friction cone penetrometer and the test is described in Australian Standard 1289 test F5.1.

In the test, a 35mm diameter rod with cone tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig, which is fitted with a hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130mm long sleeve, immediately behind the cone. Transducer in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20mm per second) the information is output on continuous chart recorders. The plotted results in this report have been traced from the original records. The information provided on the charts comprises:

- Cone resistance - the actual end bearing force divided by the cross sectional area of the cone, expressed in Mpa.
- Sleeve friction - the frictional force on the sleeve divided by the surface area, expressed in kPa.
- Friction ratio - the ratio of sleeve friction to cone resistance, expressed in percentage.

There are two scales available for measurement of cone resistance. The lower "A" scale (0-5Mpa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main "B" scale (0-50Mpa) is less sensitive and is shown as a full line.

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative frictions in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and very soft clays, rising to 4% to 10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:

$$q_c \text{ (Mpa)} = (0.4 \text{ to } 0.6)\ N \text{ (blows per 300mm)}$$

In clays the relationship between undrained shear strength and cone resistance is commonly in the range:

$$q_c = (12 \text{ to} 18)\ C_u$$

Interpretation of CPT values can also be made to allow estimate of modulus or compressibility values to allow calculation of foundation settlements. Inferred stratification, as shown on the attached report, is assessed from the cone and friction traces, from experience and information from nearby boreholes etc.

Cone Penetrometer Testing and Interpretation continued
This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties and where precise information or soil classification is required, direct drilling and sampling may be preferable.

Portable Dynamic Cone Penetrometer (AS1289)
Portable dynamic cone penetrometer tests are carried out by driving a rod in to the ground with a falling weight hammer and measuring the blows per successive 100mm increments of penetration.

There are two similar tests, Cone Penetrometer (commonly known as Scala Penetrometer) and the Perth Sand Penetrometer. Scala Penetrometer is commonly adopted by this company and consists of a 16mm rod with a 20mm diameter cone end, driven with a 9kg hammer, dropping 510mm (AS 1289 Test F3.2).

Laboratory Testing
Laboratory testing is carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedures are given on the individual report forms.

Engineering Logs
The engineering logs presented herein are an engineering and/or geological interpretation of the sub-surface conditions and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, however, this is not always practicable or possible to justify economically. As it is, the boreholes represent only a small sample of the total sub-surface profile. Interpretation of the information and its application to design and construction should take into account the spacing of boreholes, frequency of sampling and the possibility of other than "straight line" variations between the boreholes.

Ground water
Where ground water levels are measured in boreholes, there are several potential problems:
- In low permeability soils, ground water although present, may enter the hole slowly, or perhaps not at all, during the investigation period.
- A localised perched water table may lead to a erroneous indication of the true water table.
- Water table levels will vary from time to time, due to the seasons or recent weather changes. They may not be the same at the time of construction as indicated in the report.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole if any water observations are to be made.

More reliable measurements can be made by installing stand pipes, which are read at intervals over several days, or weeks for low permeability soils. Piezometers sealed in a particular stratum may be interference from a perched water table or surface water.

Engineering Reports
Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal is changed, say to a twenty storey building. If this occurs, the company will be pleased to review the report and sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of sub-surface conditions, discussions of geotechnical aspects and recommendations or suggestions for design and construction. However, the company cannot always anticipate or assume responsibility for:
- Unexpected variations in ground conditions. The potential for this will depend partly on bore spacing and sampling frequency.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of contractors responding to commercial pressures.

If these occur, the company will be pleased to assist with investigation or advice to resolve the matter.

Site Anomalies
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the company request immediate notification. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

Reproduction of Information for Contractual Purposes
Attention is drawn to the document “Guidelines for the Provision of Geotechnical Information trader Documents”, published by the Institute of Engineers Australia. Where information obtained for this investigation is provided for tender purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The Company would be pleased to assist in this regard and/or make additional copies of the report available for contract purpose, at a nominal charge.

Site Inspection

The Company will always be pleased to provide engineering inspection services for geotechnical aspect of work to which this report is related. This could range from a site visit to confirm that the conditions exposed are as expected, to full time engineering presence on site

Review of Design
Where major civil or structural developments are proposed, or where only a limited investigation has been completed, or where the geotechnical conditions are complex, it is prudent to have the design reviewed by a Senior Geotechnical Engineer.

Appendix E

Unexpected Asbestos Finds Protocol

Unexpected Asbestos Finds

If asbestos is detected in area not identified as containing asbestos prior to, or during, bulk excavation works the following 'Unexpected Finds Protocol' will apply:

- Upon discovery of suspected asbestos containing material, the Council officer is to be notified and the affected area closed off by the use of barrier tape and warning signs. Warning signs shall be specific to Asbestos Hazards and shall comply with the Australian Standard 1319-1994 – Safety Signs for the Occupational Environment;
- Work shall comply with WorkCover requirements including *Working with Asbestos, 2008*;
- An OHS consultant or a hygienist is to be notified to inspect the area and confirm the presence of asbestos and determine whether the asbestos is classified as friable or bonded asbestos and determine the extent of remediation works to be undertaken. A report detailing this information will be compiled by the OHS consultant and provided to the Council officer (or his representative);
- The impacted soil will be classified and disposed of, as a minimum, as Special Waste (Asbestos) at an appropriately licensed facility. In dry and windy conditions the stockpile will be kept lightly wetted and may be covered with plastic sheet whilst awaiting disposal;
- All work associated with asbestos in soil will be undertaken by a contractor holding a class AS-1 Licence (friable) or AS2 Licence for bonded asbestos, as appropriate. WorkCover must be notified 7 days in advance of any asbestos works;
- Monitoring for airborne asbestos fibres is to be carried out during the soil excavation in asbestos contaminated materials;
- Documentary evidence (weighbridge dockets) of correct disposal is to be provided to the Council officer (or their representative);
- At the completion of the excavation, a clearance inspection is to be carried out, soil samples taken and analysed for asbestos fibres followed by written certification provided by an OHS Consultant that the area is safe to be accessed and worked (with respect to asbestos impact). If required, the filling material remaining in the inspected area can be covered/ sealed by an appropriate physical barrier layer of non-asbestos containing material prior to sign–off;
- Details are to be recorded in the site record system.