

Report on Phase 1 Contamination Assessment with Limited Sampling

> Fernhill Estate Western Precinct Fairlight Road, Mulgoa

Prepared for Cubelic Holdings Pty Ltd

> Project 71706.01 June 2013



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### Executive Summary

Douglas Partners Pty Ltd (DP) was commissioned in 2010 to undertake a Phase 1 Contamination Assessment at Lot 1 in DP 549247 and Lot 31 in DP 237163 (The Western Precinct of the Fernhill Estate, hereafter referred to as "the site") Mulgoa. It is understood that the assessment is required for rural residential rezoning and concurrent development application purposes.

The Phase 1 Contamination Assessment was conducted to assess the potential for broad scale contamination of the site based on past and present site usage, and, if contamination exists, the likely nature of this contamination. The scope of works for the assessment included a limited site history search and limited intrusive soil sampling with a view to obtaining data pertaining to the broad scale contamination status of the site.

From a review of historical aerial photographs, the site appears to have comprised bushland and subsequently used for rural purposes from at least 1947 to date, with the observable changes during that time appearing to be limited to the gradual clearing of dense bushland across the site and to the addition of dams.

Based on the available historical information and site features, the potential for contamination was considered to be low, and include:

- the limited placement of fill to develop the site with material from unknown sources (i.e. dams) and potential localised filling not observed during the assessment;
- the possible general spraying of pesticides during past land use; and
- asbestos containing material, which may be present as a result of fly tipping (not observed during the assessment) or within filling material.

The analytical results for the limited number of soil samples analysed show that the levels of contaminants within the analysed samples were all within the adopted Site Assessment Criteria (SAC).

The analytical results for the surface water samples from the dams showed that the levels of OCP and OPP were all below the laboratory PQL. The Heavy Metals concentrations were reported at less than the adopted Surface Water Investigation Levels (SWIL) or at concentrations not considered significant.

Based on the results of the preliminary contamination assessment, it is considered that the site, in general, has a low risk of contamination and does not present an unacceptable risk of contamination with respect to rural residential land use. However, given the limited and generally broad nature of the assessment, it is recommended that further investigative studies be undertaken to address the following:

- Potential for consumption of home grown produce;
- Dam water quality prior to dewatering;
- Dam wall and sediment materials;
- Unexpected finds protocol;
- · Waste classification prior to disposal; and
- Imported fill protocol.

Further details are provided in Section 13 of the report.



## **Glossary of Terms**

As	arsenic
Bgl	below ground level
B(a)P	benzo(a)pyrene (a polycyclic aromatic hydrocarbon compound)
BTEX	benzene, toluene, ethyl benzene, total xylenes (monocyclic aromatic hydrocarbons)
Cd	cadmium
Cr	chromium (total)
Cr(III)	chromium with oxidation state III (stable in normal environments)
Cr(VI)	chromium with oxidation state VI (typically not stable in normal en∨ironments)
Cu	copper
$C_{6}-C_{9}$	light hydrocarbon chain groups
$C_{10} - C_{14}$	medium hydrocarbon chain groups
C <sub>15</sub> -C <sub>28</sub>	hea∨y hydrocarbon chain groups
C <sub>29</sub> -C <sub>36</sub>	heavy hydrocarbon chain groups
DEC	Department of Environment and Conservation
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DIPNR	Department of Infrastructure, Planning and Natural Resources
DNR	Department of Natural Resources
DWE	Department of Water and Energy
DP	Douglas Partners Pty Ltd
EPA	Environment Protection Authority
GW	groundwater
ha	hectares
HIL	NSW EPA Contaminated Sites: Guidelines for the NSW Site Auditors Scheme, 2 <sup>nd</sup> Edition
	2006. Health-based investigation levels (Columns 1 to 4)
Hg	mercury
m	metres
mg/kg	milligrams per kilogram (or parts per million)
NATA	National Association of Testing Authorities
Ni	nickel
NSW	New South Wales
OCP	organochlorine pesticides
PAH	polycyclic aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyls
PID	photo ionisation detector
TPH	total petroleum hydrocarbons
VOC	Volatile Chlorinated Hydrocarbons
Zn	Zinc



## Table of Contents

#### Page

1.	Introduction				
2.	Background				
3.	Scop	pe of Work	2		
	3.1	Desktop	2		
	3.2	Fieldwork	3		
	3.3	3			
4.	Site	Identification and History	4		
	4.1	Site Identification	4		
	4.2 Site History		4		
		4.2.1 Aerial Photographs	4		
		4.2.2 Regulatory Notices Search	5		
		4.2.3 Groundwater Bore Search	6		
5.	Geol	logy, Hydrogeology and Topography	6		
6.	Site	Description	7		
	6.1	Adjacent Site Use			
7.	Pote	ntial for Contamination	8		
8.	Field	I Work	9		
	8.1	Data Quality Objectives and Data Quality Indicators	9		
	8.2	Quality Assurance and Quality Control	11		
9.	Sam	pling Rationale	11		
10.	Site Assessment Criteria				
11.	1. Results of Investigation				
	11.1	Field Observations			
	11.2	Analytical Results	15		
		11.2.1 Soil			
		11.2.2 Surface Water	16		
12.	Interpretation and Discussion of Results1				
13.	Conclusion and Recommendations				
14.	Limitations				



## Appendices

Appendix A:	About this Report		
	Site Drawing		
Appendix B:	Site History Documentation		
Appendix C:	Site Photographs		
Appendix D:	Test Pit Logs		
Appendix E:	Laboratory Reports and Chain-of-Custody Documentation		
Appendix F:	Quality Assurance and Quality Control Results		



Report on Phase 1 Contamination Assessment with Limited Sampling Fernhill Estate, Western Precinct Fairlight Road, Mulgoa

## 1. Introduction

This report details the methodology and results of a Phase 1 Contamination Assessment (with limited sampling) undertaken by Douglas Partners Pty Ltd (DP) in 2010 at Lot 1 in DP 549247 and Lot 31 in DP 237163 Mulgoa (The Western Precinct of the Fernhill Estate, hereafter referred to as "the site"). The 2010 assessment was commissioned by Urbis Pty Ltd (Urbis – head consultant), on behalf of Owston Nominees No.2 Pty Ltd (Owston – developer). This report comprises an update to the 2010 report, as commissioned by Cubelic Holdings Pty Ltd, on behalf of the new property developer.

It is understood that the proposed development will include the subdivision of the site into 38 rural/residential allotments with a typical allotment size of approximately 20,000 m<sup>2</sup>. The new lots will be serviced by a new road aligned centrally through the site that will provide access from two entry points located on Fairlight Road and Nepean Gorge Drive. Presently, the development is at a concurrent rezoning and development application stage, with the current proposed development layout shown on Drawing 1, in Appendix A.

To assist the rezoning and development application and to comply with Penrith City Council's (Council) Stage 2 Local Environmental Plan requirements, DP has investigated and assessed the site to determine its suitability for urban development, with specific consideration given to geotechnical surface and subsurface conditions, slope instability and soil erosion risks, soil and surface/groundwater salinity and the potential for soil contamination. The results of the land capability assessment undertaken for this site are reported separately. Please refer to DP's *Report on Land Capability Assessment* (Project 71706.01, dated June 2013).

The Phase 1 Contamination Assessment was conducted to:

- (a) provide a preliminary assessment of the potential for contamination of the site based on past and present site usage and the likely nature of this potential contamination.
- (b) make a preliminary evaluation on the likely suitability of the site from a contamination perspective for rezoning purposes.

This report documents the findings.

## 2. Background

The Phase 1 contamination assessment with limited sampling was originally undertaken by DP for a previous developer of the site, Owston Nominees No. 2 Pty Ltd. The results of the assessment were presented in DP's original environmental Report on Phase 1 Contamination Assessment with Limitied Sampling (refer DP Project No. 71706, dated 16 August 2010). DP understands that the appropriate



permissions have been granted by the original developer and their appointed Receivers and Managers (Korda Mentha) to access all prior reports to assist the new development proposal.

The current report comprises an update to DP's 2010 report, with amendments made to reflect the newly proposed development layout only. No new assessment works have been undertaken. Although all references to the previous development proposal have been updated, all data previously presented in the 2010 report appendices remains unchanged. The findings of the report also remain unchanged.

### 3. Scope of Work

The scope of work for the contamination assessment, as outlined in DP's proposal dated 5 February 2010 and then accepted by Owston Nominees No.2 Pty Ltd generally comprised:

#### 3.1 Desktop

- A search through the NSW EPA Land Information records to confirm the status of statutory Notices under the Contaminated Land Management Act 1997 in relation to any parts of the release area;
- Review of historical aerial photography for the area through the records available from the former Department of Environment, Climate Change and Water (now NSW EPA). This information was used to assess the historical, potentially contaminating land use;
- Review of local history records/photographs at Penrith City Library, obtaining background information on local planning/land use issues from discussion with Council's planner and a review of Council's zoning plans for the area was recommended as part of the scope of works, however was not undertaken as part of the current assessment.
- Drive-over/walk-over field mapping to draw together the desktop studies and link it with field mapping;
- Identify areas of potential areas of environmental concern (AEC);
- Based on the findings of the above a base map identifying areas of potential environmental concern (AEC) was developed;
- Each AEC was to be assessed individually using professional judgement and the results of the above investigations and a risk rating applied to the AEC (high, medium, low);
- Search on NSW Office of Water's registered groundwater bore database;
- A review of Council's Section 149 Certificates, land title and WorkCover licence records for the storage of Dangerous Goods were also recommended, however these were not conducted at this stage.



#### 3.2 Fieldwork

- Test pit locations were cleared for services and pipes based on dial-before-you-dig information and an electro-magnetic sweep;
- For this contamination assessment, representative soil samples of soil/filling from the surface and near surface materials were collected from seven of the 30 test pits excavated as part of the geotechnical and salinity assessments which were conducted concurrently;
- Laboratory analysis was conducted on 14 selected soil samples at a NATA accredited laboratory for a combination of the following potential contaminants:
  - Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
  - Polycyclic Aromatic Hydrocarbons (PAH);
  - Total Petroleum Hydrocarbons (TPH);
  - Monocyclic Aromatic Hydrocarbons (Benzene, Toluene, Ethylbenzene and Xylene BTEX);
  - Organochlorine and Organophosphorus Pesticides (OCP and OPPs); and
  - Asbestos.

Analysis was conducted on the following additional samples for QA/QC purposes:

- 1 inter-laboratory replicate (heavy metals, TPH, BTEX, OCP and OPP); and
- I inter-laboratory replicate (heavy metals, OCP and OPP).
- A total of 16 surface water samples were collected from six dams within the site.
- Laboratory analysis was conducted on 16 surface water samples (two from each sampling location) at a NATA accredited laboratory for a combination of the following potential contaminants:
  - Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
  - Organochlorine Pesticides (OCP); and
  - Organophosphorus Pesticides (OPPs).

#### 3.3 Reporting

 A Phase 1 contamination assessment report was prepared detailing the methodology and results of the assessment to provide a preliminary evaluation of the likely suitability of the site to support urban development from a contamination perspective as well as providing recommendations regarding the need for any additional investigations. Douglas Partners
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## 4. Site Identification and History

#### 4.1 Site Identification

The site in whole occupies an area of about 180 hectares (ha) and comprises two registered allotments as shown on Drawing 1, Appendix A, namely:

- Lot 1 in DP549247; and
- Lot 31 in DP237163

Most of the proposed subdivision development is planned for northern and southern parts of Lot 1, although the planned subdivision will also occupy the southern part of Lot 31 (refer Drawing 1).

The subject site is within the southern region of the Penrith City Council local government area, in the Parish of Mulgoa and the County of Cumberland. For the purpose of the rezoning and development application process, the subject site is referred to as "The Western Precinct". The site has an irregular shape and comprises of rural land, with access outside of the Estate from Fairlight Road. A site plan and locality map is presented in Drawing 1.

#### 4.2 Site History

A limited site historical information review was conducted, comprising a review of historical aerial photographs, Contaminated Land Register for Notices issued under the *Contaminated Land Management Act 1997*, as well as a groundwater bore search of the NSW Office of Water database. These reviews can provide a broad scale indication of potentially contaminating activities or features that may have been carried out at the subject site. The site history search information referenced in the following sub-sections is presented in Appendix B.

#### 4.2.1 Aerial Photographs

The aerial photographs from 1947, 1961, 1970, 1978, 1986 and 1998 were provided by Urbis, obtained from the NSW Department of Lands Office. The recent image was obtained from the NSW Department of Lands website (<u>www.lands.nsw.gov.au</u>) on 5 July 2010. The aerial photographs are presented in Appendix B. These aerial photos were reviewed and interpreted to assess the possible past uses and features of the site. The findings are summarised as follows:

- 1947 The site was in an area of bushland and rural land use. It is not clear from the photograph
  if there are any dwellings within the subject site, but there appears to be areas of cleared land
  which may be agricultural fields in the southern portion of the site. The majority of the site appears
  to be covered by bushland, with a few unpaved roads running through. There is a property with a
  dwelling located at the southern boundary of the site and what appear to be market
  gardens/agricultural fields to its east.
- 1961 The site appears similar to that observed in the 1947 image, with some of the bushland within the southern half of the site being cleared. The surrounding lands appear generally the same with the majority of the area comprising bushland with some cultivated agricultural fields to the south and east. The addition of a dam just outside of the subject site boundary, and further



tree-clearing to the east of the site is also observed. The dwelling to the south of the site is still present.

- 1970 Due to the low quality of the image, it is unclear if there are any dwellings within the subject site. It does not, however, appear that there have been significant changed to the site since the 1961 image. The surrounding lands appear generally similar, with the area of cleared lands expanding to the east of the site, and the addition of Fairlight Road thru bushland to the west of the subject site. The dam to the east is still present, with the addition of a larger dam to the north-east of the site.
- 1978 Although observations are restricted by the quality of the image, it appears that there have been at least three dams developed within the north and west of the subject site. The bushland cover within the site appears more sparse in the 1978 image than in the previous photographs. Although limited by the quality of the image, there does not appear to be any dwellings within the subject site. The surrounding lands appear similar to observations made for the 1970 image.
- 1986 The subject site appears predominantly cleared of bushland, with the dams noted in the 1978 image still observable. Dwellings are noted to the east of the site within rural properties (which may have been present in the 1978 image although were not noted due to the lack of image clarity), as well as the addition of a dwelling to the south of the site. Bushland remains to the north-west of the site.
- 1998 The site appears generally similar to the 1986 image, however due to the image quality it
  is unclear whether there have been additional dams developed or if the site has seen an increase
  in tree/vegetation cover. There does not appear to be any dwellings on the site, however once
  again observations are limited due to image quality. The surrounding land uses appear to be
  similar to those observed in the 1986 image.
- 2009 (most current) The features of the subject site and the surrounding lands do not appear significantly different from observations made in the 1998 image, although the bushland within the southern area of the subject site appears to have been cleared as it is more sparse than observations made on the 1998 image. There is also the addition of a dwelling within a neighbouring property to the west of the site. Generally the area has not been changed significantly.

## 4.2.2 Regulatory Notices Search

The NSW EPA (formerly DECCW) publishes records of contaminated sites under Section 58 of the *Contaminated Land Management* (CLM) Act 1997 on a public database accessed via the Internet. The Notices relate to investigation and/or remediation of contaminated sites considered to pose a significant risk of harm under the definition in the CLM Act. A search of the public database revealed that the subject site is not listed. However, although prior to the implementation of the CLM Act, the search did list one site within 5 km of the subject site. Penrith Waste Services Pty Ltd, located at 842 Mulgoa Road, was issued with a Notice under Section 35 of the *Environmentally Hazardous Chemicals* Act, 1985, on 14 October 1992 by the EPA which, at the time, had reason to believe that the premises being used for or in connection with a prescribed activity, was contaminated by chemical wastes, namely aluminium processing waste plus various undifferentiated industrial wastes. The Notice was later revoked on 17 May 1993. The search results are included in Appendix B.

The NSW EPA (formerly DECCW) also issues environmental protection licences to the owners or operators of various industrial premises under the *Protection of the Environment Operations* Act 1997



(POEO Act). Licence conditions relate to pollution prevention and monitoring, and cleaner production through recycling and reuse and the implementation of best practice. A search of the public register did not locate any listing for the subject site.

A search for licences, applications and notices of the surrounding area, however, did locate records for Penrith Waste Services Pty Ltd, 'Winbourne' and Joe David Gauci. A licence summary and associated licence variations were listed for Penrith Waste Services for waste disposal (application to land), with the licence review completed on 18 January 2006. 'Winbourne', a property listed under the irrigation industry, is located approximately 4 km south-east of the subject site on Mulgoa Road, and was issued with a Surrender Licence Notice under Section 80 on 9 December 1999. Joe David Gauci, located at 254 Park River Close (approximately 800 m south-west of the subject site), was issued with a Notice of Clean Up Action by the EPA on 30 September 2002. The Notice followed an inspection carried out by the EPA at the property which provided reason to believe that industrial waste may have been placed on the land and that clean-up action was to be undertaken in relation to any stockpiles or areas on the property which had received fill materials over a particular time-frame. No further notices for sites in the area were listed on the database. It is noted that the sites discussed above are not located up-gradient from the subject site, or within close proximately of the site, therefore are not considered to have posed a threat with regards to contamination migrating onto the subject site.

#### 4.2.3 Groundwater Bore Search

A groundwater bore search of the Department of Water and Energy (Note: water related issues now the responsibility of the NSW Office of Water) website database was conducted. Twelve groundwater bores within a 2 km radius were located north, south and east of the site. Nine of the twelve bores were used for domestic stock purposes. Bore GW029819, located south of the subject site, had an authorised purpose of domestic recreation (groundwater) with the intended purpose of irrigation. GW02982 was also located south of the site and was used for stock purposes. Bore GW105157, which was located north-east of the site was authorised and intended for irrigation use.

Groundwater zones were not listed, with standing water levels only recorded for five of the registered bores being at 100 m, 120 m, 142.7 m, 143.5 m and 177 m all within sandstone. Standing water at 100 m was encountered in GW108642 located east of the site, and at 177 m in GW108726, located south-west of the site. The shallowest water bearing zones were recorded at 15.20 m - 24.30 m in GW029819 and at 24.30 m - 25.80 m in GW29820 both within clay profiles and located south-east of the subject site. The groundwater bore search map and Groundwater Works Summary for the registered bores are attached in Appendix B.

#### 5. Geology, Hydrogeology and Topography

Reference to the Penrith 1:100,000 Geological Sheet indicates that the subject site is underlain by Ashfield Shale from the Wianamatta Group from the Middle Triassic Period. The lithology description is that of dark-grey to black claystone-siltstone and fine sandstone-siltstone laminate. The western boundaries of the subject site are along the boundary where Ashfield Shale meets Hawkesbury Sandstone, also from the Middle Triassic Period, described as medium to very coarse-grained quartz sandstone, minor laminated mudstone and siltstone lenses. Although this formation is located within the Estate, it does appear to only at the western boundaries of The Western Precinct (subject site).



Reference to the Penrith 1:100,000 Soils Landscape Sheet indicates that the site is situated within the Residual Blacktown Landscape, which is typified by gently undulating rises on Wianamatta Group shales and Hawkesbury Shale, with broad rounded crests and ridges with gently inclined slopes. Deep Yellow Podsolic Soils and Soloths are expected on lower slopes and in areas of poor drainage, with shallow to moderately deep Red and Brown Podsolic Soils on crests, upper slopes and well drained areas. Limitations of the soil type include moderately reactive, highly plastic subsoil, low soil fertility and poor soil drainage.

The nearest waterways to the site are the Nepean and Warragamba Rivers. The Nepean River is located broadly west of the site, with Warragamba River connecting to the south. Nepean River is located within approximately 1.5 km to the west, and Warragamba River within 2.5 km to the south. The Rivers are expected to flow in a northerly direction eventually connecting to the Hawkesbury River which is located approximately 27 km north-east of the subject site.

Topographical relief across the majority of the site is slight, with the overall landform being undulating and varying in elevation from reduced levels of RL 202 m in the south east portion of the site to RL 164 m in the north east portion relative to Australian height datum (AHD). A broad ridge line runs north to south through the centre of the site and falls to the east and west where broad gullies approximate the eastern and western extents of the proposed development area.

The site is located in an area outside of the Department of Land & Water Acid Sulphate Soil Risk Map Series 1:25 000, Edition II.

## 6. Site Description

The observations made during the various inspections of the site undertaken during and following the field investigation programme (April and May 2010) are summarised below:

- It was noted that the site is currently vacant rural land that is covered with grass and scattered slight to moderately dense natural tree growth. Although the site is essentially undeveloped and appeared to follow the inferred natural land form, comparison of the site with those adjoining suggests some degree of vegetation clearing. Prior rural/grazing land use is also indicated by the presence of several existing rural dams.
- Rock outcrops were not identified within the site. Outcrops of sandstone are evident to the west
  of the site in road cuttings and at the ground surface. Although not observed, it is likely that insitu rock would be present at the base of some dam excavations at this site.
- The soil profile across the site is residual and comprises silty and sandy clay overlying shale and sandstone bedrock. The residual soil is sometimes mottled and contains some ironstone gravel in places.
- The landform is predominantly gently sloping undulating terrain of shallow relief. Crests and gullies are therefore broad and hence there are no areas of significant soil erosion at site.
- Vegetation was relatively healthy across the site with no significant die-back noted.
- Some areas of abruptly changing vegetation (mostly grasses) were noted across the site. All
  vegetation appeared relatively healthy.

- Areas down gradient of some existing dams, particularly those on the slightly steeper eastern side of the site, contained areas of potentially intermittently water-logged ground that supported reedy grasses.
- Six dams were observed within the site. Water levels within the existing dams were low, indicating
  recent dry weather conditions, which is further supported by the dry grasses evident across the
  site, mostly on crests and upper slopes.

The locations and aerial views of the features described above may be obtained with reference to Drawing 1, Appendix A.

#### 6.1 Adjacent Site Use

The proposed development area is bordered by:

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- North Side rural land;
- South Side Fairlight Road and existing rural/residential properties on the northern side of Fairlight Road;
- East Side Existing rural/residential properties on the western side of Nepean Gorge Drive; and
- West Side Fairlight Road.

Due to the nature of the activities and based on the local topography and geology, it is considered that the potential for contamination and migration of contamination onto the subject site would be low.

#### 7. Potential for Contamination

Based on the available information and DP's site observations, the potential areas/issues of environmental concern are not extensive and are all considered to be of low risk. The anticipated potential contaminants of concern may arise from general anthropogenic sources from past and present site activities including the possible limited placement of fill during site development, in particular during dam construction, discarded building material that may be present within the site and the general application of pesticides.

The table below lists the possible contaminants that are associated with the potential areas of environmental concern.

Potential AEC	Description of Potential Contaminating Activity	Chemicals of Concern	
Possible Imported Fill	Fill material may have been placed at site during site development, in particular during dam construction. Some localised filling of depressions may have also taken place in the past. The source of fill material (if present) is likely to be unknown.	Heavy metals, TPH, BTEX, PAH, OCP, phenols and asbestos	

#### Table 1: Areas of Environmental Concern (AEC's)



Potential AEC	Description of Potential Contaminating Activity	Chemicals of Concern	
Possible Use of Pesticides	Although it is not clear that the site was used for rural/agricultural land uses, it may be possible that pesticides were sprayed in parts of the site.	Some Heavy Metals, OCP and OPP	
Possible discarded building rubble within the site	Although not noted during site observations, should building rubble be located within the subject site, the material may contain hazardous building materials.	Asbestos	

As stated earlier, six dams were noted within the site. Rural dams are typically positioned in low lying areas, such as depressions, to maximise the catchment collecting surface water runoff. As such, dams can be collectors of contaminants transported by surface waters. Given the rural nature of the site, the most likely contaminants in the dam water would be Heavy Metals, OCP and OPP.

## 8. Field Work

#### 8.1 Data Quality Objectives and Data Quality Indicators

The data quality objectives (DQO) of the Phase 1 Contamination Assessment have been developed to define the type and quality of the data to achieve the project objectives and were based broadly in accordance with the seven step data quality objective process, as defined in Australian Standard (AS) "Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-volatile and Semi-volatile Compounds (AS 4482.1 – 2005). The DQO process is outlined in the AS and defined by:

- Stating the Problem;
- Identifying the Decision;
- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors; and
- Optimising the Design for Obtaining Data.

The DQO's have been addressed within the report as follows in Table 2.



#### Table 2: Data Quality Objectives

Data Quality Objective	Report Section Where Addressed		
State the Problem	S1	Introduction	
Identify the Decision	S11	Discussions, Recommendations and Conclusions	
Identify Inputs to the Decision	S3 S6 S8 S9 S10	Site Identification and History Potential For Contamination Sampling Rationale Site Assessment Criteria Results of Investigation	
Define the Boundary of the Assessment	S3.1	Site Identification Site Drawing - Appendix A	
Develop a Decision Rule	S9	Site Assessment Criteria	
Specify Acceptable Limits on Decision Errors	S7	Fieldwork QA/QC Procedures and Results - Appendix F	
Optimise the Design for Obtaining Data	S8	Sampling Rationale QA/QC Procedures and Results - Appendix F	

Data quality Indicators (DQI) were established as follows in Table 3.

Table 3:	Data	Quality	Indicators
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Objective	Evaluation Procedure
Documentation completeness	Completion of field and laboratory documentation including chain-of-custody, test pit reports etc.
Data completeness	Sampling from limited sampling points as a broad scale coverage of the site to provide a preliminary assessment, analysis of appropriate contaminants, soil horizons, QA samples etc.
Data comparability	Use of NATA accredited analytical methods, use of a consistent sampling technique, commitment to equipment decontamination, field sample storage techniques, inter- laboratory replicates etc.
Data representativeness	Sampling from targeted areas and to give general site coverage in order to obtain samples generally representative of broad site conditions
Precision and accuracy for sampling and analysis	Use of NATA accredited analytical methods and achievement of laboratory QC criteria (refer Appendix F)

## 8.2 Quality Assurance and Quality Control

Environmental sampling was performed according to standard operating procedures outlined in the DP *Field Procedures Manual* and summarised below. Sample handling and transport procedures were conducted as follows:

- Soil samples were collected directly from excavator returns using disposable gloves;
- Transfer of samples into laboratory-prepared glass jars, and capping immediately with teflon lined lids;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placement of the sample jars into a cooled insulated and sealed container for transport to the laboratory; and
- Chain-of-Custody documentation was maintained at all times and countersigned by the receiving laboratory on the transfer of samples.

Envirolab Services Pty Ltd, a NATA accredited laboratory (accreditation number 2901), was employed as the primary laboratory to conduct analysis on all samples. Labmark Environmental Laboratories (Labmark), also NATA accredited, was employed as the secondary laboratory to conduct analysis of inter-laboratory replicate samples. The laboratories are required to carry out routine in-house QC procedures.

## 9. Sampling Rationale

The NSW EPA's publication Sampling Design Guidelines (1995) recommends a minimum of 55 sampling points to characterise a site of 5 hectares. The subject site has an approximate area of 180 hectares which, under the guidelines, would require in the order of 1980 sampling points. Due to the low potential for contamination at the site and the preliminary nature of the assessment, a limited sampling regime was conducted, with an attempt to provide general coverage of the locations as illustrated in Figure 2 of Hughes Trueman's Consultancy Brief, dated 22 January 2010.

Sample locations were selected to provide general site coverage and an indication of the broad scale contamination status of the site. In this respect, the sampling pattern was systematic, tying in with the requirements of the geotechnical and salinity assessments. No targeted soil sampling was undertaken.

Soil samples were collected from test pits at broadly regular intervals. Out of a total of 30 test pits excavated across the site, samples were selected for analysis from seven. The seven locations were selected in an unbiased manner spread generally across the site. The samples considered most likely to be contaminated from each of the seven test pits were selected for laboratory analysis i.e. the surface/near surface soil profile.

As stated earlier, water samples were recovered from each of the dams identified within the site.



#### 10. Site Assessment Criteria

For the purpose of contamination assessments, the NSW EPA (formerly DECCW) has established assessment criteria for a number of standard, health risk based settings for various land uses, which are defined in the *Guidelines for the NSW Site Auditor Scheme*, 2nd edition, 2006, Appendix II. The following land use scenarios are included:

- Residential with accessible soil and use of home grown produce. Includes child-care centres, primary schools, pre-schools, town houses and villas;
- Residential with minimal access to soil such as high rise apartments and flats;
- · Parks, recreational open space or playing fields and including secondary schools;
- Commercial or industrial use.

In addition, the NSW EPA (formerly DECCW) also sets provisional phytotoxicity-based investigation levels (PPIL) for the protection of plants in the appropriate sensitive land use setting (residential with gardens, or unpaved areas outside of the building footprint of apartments and flats and open space). The PPILs are not applicable to commercial/industrial sites.

With regard to the subject site and its proposed rezoning for rural residential land use, it is considered that the site would fall within a health risk setting of residential land use with accessible soil.

In the case of petroleum hydrocarbons, where other comprehensive assessment criteria are not available, the threshold concentrations for sensitive land use are used as specified in the NSW EPA publication *Guidelines for Assessing Service Station Sites* (1994).

With respect to asbestos, the recent WA Department of Health (2009) approach has been generally adopted, which is as follows:

- No visible asbestos pieces in the top 100 mm of the soil profile;
- 0.001% asbestos fibres by weight;
- 0.01% asbestos cement materials by weight.

It should be noted that this approach has not yet been endorsed by the NSW EPA (formerly DECCW), however it is understood that the same approach will be incorporated within the upcoming National Environmental Protection Measure (NEPM) revision. This approach has been adopted given the lack of available guidance in NSW.

The adopted SACs with respect to the identified contaminants in soils are presented in Table 4.



Contaminant	Adopted (SA	Criteria C)	Guidelines					
$\begin{array}{c} \textbf{TPH} \\ C_6 - C_9 \\ C_{10} - C_{36} \end{array}$	65 m 1000 r	g/kg ng/kg	NSW EPA Contaminated Sites Guidelines for Assessing Service Station Sites (1994)					
BTEX Benzene Toluene Ethylbenzene Xylene	1 mg 1.4 m 3.1 m 14 m	g/kg g/kg g/kg g/kg	threshold concentrations for sensitive land use- soils. Currently there are no other comprehensive EPA endorsed investigation levels for petroleum hydrocarbons					
Metals Arsenic (total) Cadmium Chromium Copper Lead Mercury Nickel Zinc	HIL 100 mg/kg 20 mg/kg 120000 mg/kg 1,000 mg/kg 300 mg/kg 15 mg/kg 600 mg/kg 7,000 mg/kg	<b>PPIL</b> 20 mg/kg 3 mg/kg 1 mg/kg 100 mg/kg 600 mg/kg 1 mg/kg 60 mg/kg 200 mg/kg	NSW EPA Contaminated Sites <i>Guidelines for</i> <i>the NSW Site Auditor Scheme</i> (2 <sup>nd</sup> Edition) (2006) Appendix II, Soil Investigation Levels for Urban Redevelopment Sites in NSW Heath- based investigation levels residential with					
OCP aldrin + dieldrin chlordane DDT (including DDD, DDE, DDT) Heptachlor	10 m 50 m 200 m 10 m	g/kg g/kg g/kg g/kg	gardens and accessible soils (HIL Column 1).					
Asbestos	No visible asbe soil at the 0.001% asbes weig 0.01% asbest weig	stos present in e surface stos fibres by ght os cement by ght	WA Department of Health Guidelines for the Assessment, Remediation, and Management of Asbestos Contaminated Sites in Western Australia, May 2009					

#### Table 4: Site Assessment Criteria for Soil/ Filling

The guidelines used in the assessment of contamination in surface waters are as follows:

 The Australian and New Zealand Guidelines for Fresh and Marine Waters, (2000), published by the Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ).



The site is situated within reasonably close proximity to the Nepean River. As such, it is possible that surface water runoff from within the site could impact on the quality of the Nepean River waters and subsequently the ecosystem within.

In order to determine whether the surface water may impact on aquatic life within the fresh water aquatic ecosystems associated with the River, the surface water test results were assessed against the available Trigger Values for a slightly / moderately disturbed freshwater system, at a general protection level of protection of 95% of species, which are extracted from the abovementioned guidelines.

For ease of reference, the adopted criteria have been referred to as the Surface Water Investigation Levels (SWIL). The adopted SWIL are shown in the following Table 5.

Contaminant	Adopted Criteria (SWIL)	Source
<b>Metals</b> Arsenic (III) Cadmium Chromium Copper Lead Mercury Nickel Zinc	13 μg/L 0.2 μg/L 3.3 μg/L 1.4 μg/L 3.4 μg/L 0.6 μg/L 11 μg/L 8 μg/L	
OCP Aldrin Chlordane DDE DDT Dieldrin Endosulfan Endrin Heptachlor Methoxychlor OPP Chlorpyrifos Diazinon	0.001 μg/L 0.08 μg/L 0.03 μg/L 0.01 μg/L 0.01 μg/L 0.2 μg/L 0.02 μg/L 0.09 μg/L 0.005 μg/L 0.01 μg/L 0.01 μg/L	ANZECC Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) trigger values for toxicants in freshwater waters for the protection of 95% of species.
Dimethoate Fenitrothion	0.15 μg/L 0.2 μg/L	

Table 5: Surface Water Investigation Levels



## 11. Results of Investigation

#### 11.1 Field Observations

Descriptions of the soils encountered in each test pit are given on the Test Pit Logs presented in Appendix D, together with notes defining classification methods and descriptive terms.

In general, the test pits indicate that the site is underlain by variable depths of silty clay topsoil overlying natural clays, weathered shale and weathered sandstone. The typical sub-surface conditions encountered in the test pits are summarised as follows:

- Top Soil:Consisting of firm to stiff dark brown silty clay and firm brown clayey sand with some<br/>rootlets. Topsoils were present at all test pit locations and extended to depths of<br/>between 0.16 m and 0.45 m. Topsoils were generally humid to damp.Residual Soil:Comprising stiff to very stiff and hard, orange brown, mottled red brown and grey<br/>silty clay and sandy clay. Residual clays were present in all thirty test pits and<br/>extended to depths of between 0.8 m and 2 m. Residual clays were generally
- Weathered Rock: Comprising Shale and Sandstone encountered from depths of between 0.8 m and 2 m, generally at shallower levels where sandstone was encountered. Initially of extremely low to low strength, bucket penetration in sandstone was typically less than 0.8 m whereas penetration in shale reached 2.4 m in depth.

humid to moist and of estimated medium to high plasticity.

No signs of gross contamination were observed at any of the sample locations. The water in the dams was observed to be generally brackish. There was no odour or staining / sheen on the water surface to suggest a potential for contamination.

#### 11.2 Analytical Results

#### 11.2.1 Soil

With respect to the topsoil and the underlying natural strata, results recorded relatively low contamination levels in all analysed samples.

All recorded concentrations for TPH, BTEX, OCP and OPP were below laboratory practical quantitation limits (PQL) and well below the respective SAC.

All samples analysed for asbestos recorded results below laboratory reporting limits. No asbestos fragments were found at the test pit locations.

Heavy metal concentrations were generally low and all were well within their respective HILs and within respective PPILs.

The laboratory results are summarised in Table 6, with NATA Laboratory Reports provided in Appendix E.



#### 11.2.2 Surface Water

With respect to the surface waters of the dams located within the subject site, results generally recorded relatively low contamination levels in all analysed samples.

All recorded concentrations for OCP and OPP were below laboratory PQL. It is noted, however, that some of the laboratory PQLs exceed the respective SAC. The general lack of detection of OCP and OPP in both soil and surface water samples, however, suggest that OCP and OPP contamination is not likely to be an issue.

Concentrations of dissolved arsenic, chromium, cadmium, copper, mercury and nickel were also all below laboratory PQL. Lead was detected in samples W9-U, W11 and W12-U. The concentrations detected in samples W9-U and W11 were both below the SAC, however, lead was detected at 15 µg/L in sample W12-U. This concentration is in exceedance of the SAC value of 6.5 µg/L. Zinc was detected in all tested water samples, with exceedances of the high reliability trigger value of 8 µg/L for 95% protection of freshwater species in samples W7, W8, W9-U, W10 and W11. Concentrations were recorded at 22, 41, 9, 15 and 20 µg/L respectively.

The laboratory results are summarised in Table 7, with NATA Laboratory Reports provided in Appendix E.



#### Table 6: Results of Soil Analysis (All results in mg/kg unless otherwise stated)

			(a)		Hea	avy Metal	ls	×	×			трн			CASE.	e	Total Xylene <sup>2</sup>			37.70
Sample ID (Pit No. / depth(m))	Sampling Date	As	Cd	Cr <sup>1</sup>	Cu	Pb	Hg	Ni	Zn	C <sub>6</sub> -C <sub>9</sub>	C10-C14	C <sub>15</sub> -C <sub>28</sub>	C29-C38	Benzene	Toluene	Ethylbenzei		OCP <sup>2</sup>	Opp <sup>2</sup>	Asbestos
	·	(6)	a: a		a	3 3	30	a	a	To	psoil Samp	les				20 625				
TP5/0-0.1	19/04/2010	7	<0.5	31	13	33	<0.1	9	15	<25	<50	<100	<100	<0.5	<0.5	<1.0	<3	<2	<0.8	1.00
262867*	19/04/2010	5	<0.1	19	11	24	0.21	5	11	<10	<50	<100	<100	<0.2	<0.5	<0.5	<1.5	<1.25	<10.5	(*)
TP10/0-0.1	19/04/2010	6	<0.5	30	12	30	<0.1	7	8	<25	<50	<100	<100	<0.5	<0.5	<1.0	<3	<2	<0.8	
TP11/0.2-0.3	19/04/2010	8	<0.5	31	8	24	<0.1	5	5	1	*			*:	-			<2	<0.8	
262868*	19/04/2010	4	<0.1	25	6	15	0.18	2	<5	THE:	i •: 8	24		*2	•	1.413	* 8	<1.25	<10.5	1. C.
TP13/0.2-0.3	20/04/2010	5	<0.5	30	2	19	<0.1	4	3	<25	<50	<100	<100	<0.5	<0.5	<1.0	<3	<2	<0.8	ND
TP16/0.2-0.3	20/04/2010	5	<0.5	23	4	18	<0.1	3	3	<25	<50	<100	<100	<0.5	<0.5	<1.0	<3	<2	<0.8	ND
TP21/0.2-0.3	21/04/2010	9	<0.5	25	<1	13	<0.1	2	2	<25	<50	<100	<100	<0.5	<0.5	<1.0	<3	<2	<0.8	ND
										Natu	ral Clay Sar	nples								
TP5/0.4-0.5	19/04/2010	9	<0.5	21	17	28	<0.1	3	6	<25	<50	<100	<100	<0.5	<0.5	<1.0	<3	<2	<0.8	ND
TP10/0.4-0.5	19/04/2010	6	<0.5	36	6	27	<0.1	5	5	1.	48	1998 - L	, 14 J.	- 46 - 1	100	14	- 19 J.	<2	<0.8	ND
TP11/0.4-0.5	19/04/2010	8	<0.5	36	9	29	<0.1	5	5			68	08	80	10		- 20	<2	<0.8	ND
TP13/0.4-0.5	20/04/2010	5	<0.5	41	1	19	<0.1	5	3		- +2 S	12	E 24 - 3		-		- X - S	<2	<0.8	
TP16/0.4-0.5	20/04/2010	6	<0.5	35	2	19	<0.1	4	3		( ÷)	1	1	÷.	-		÷	<2	<0.8	
TP21/0.4-0.5	21/04/2010	<4	<0.5	6	<1	6	<0.1	<1		- 1×:	E +c - 8			+2			- * 8	<2	<0.8	ND
TP25/0.2-0.3	21/04/2010	<4	<0.5	30	<1	18	<0.1	2	2	<25	<50	<100	<100	<0.5	<0.5	<1.0	<3	<2	<0.8	ND
TP25/0.4-0.5	21/04/2010	5	<0.5	41	<1	17	<0.1	5	3		*:	+	2.00				.+	<2	<0.8	*2
	PQL	4	0.5	1	1	1	0.1	1	t:	25	50	100	100	0.5	0.5	1	3	2	0.8	0.1 g/kg
										Site Asse	ssment Crit	eria (SAC)								
	HIL <sup>3</sup>	100	20	12%	1,000	300	15	600	7,000	65 <sup>6</sup>	2	1000 6		1.0	1.4 5	3.1 5	14 <sup>d</sup>	10/50/200/10 <sup>5</sup>		0.01% / 0.001%7
P	PIL <sup>4</sup>	20	3	400	100	600	1	60	200	0.83	-	25		- 22	8	- 8a ()	8	14		-

Notes:

1 All Chromium are assumed to exist in the stable Cr(III) oxidation state, as Cr(VI) will be too reactive and unstable under the normal environment

2 where analytical results below laboratory practical quantitation limit (PQL) for all compounds, results quoted as <PQL for all compounds

3 Health based investigation levels for residential with gardens and accessible soil

4 Provisional phytotoxicity based investigation levels

5 OCP thresholds given in order Aldrin+Dieldrin/Chlordane/ DDD+DDE+DDT/Heptachlor

6 NSW EPA Service Station Guidelines

7 0.01% asbestos cement / 0.001% for asbestos fibres (WA Department of Health); no asbestos in upper 100mm

ND Not detected at reporting limit of 0.1g/kg

not analysed / not applicable

PQL Laboratory practical quantative limit

\* Interlab QA/QC samples listed directly under corresponding sample; PQL of secondary laboratory differs from those of primary laboratory

BOLD exceeds HIL

BOLD Contamination hotspot

BOLD exceeds PPIL



#### Table 7 - Results of Surface Water Analysis (All results in µg/L )

sec anno mes	Sampling		A2		Heavy	Metal	s	-0	-		Ac.	200	-	805	OCP 7			37			BTEX					
Sample ID	Date	As	Cd	Cr <sup>1</sup>	Cu	Pb	Hg	Ni	Zn	Aldrin	Chlordane	DDE	DDT	Dieldrin	Endosulfan	Endrin	Heptachlor	Methoxychlor	Chlorpyrifos	Diazinon	Dimethoate	Fenitrothion	Benzene	Toluene	Ethyl- benxene	Total Xylene
W7	23/04/2010	<1	<0.1	<1	<1	<1	<0.5	<1	22		24	1	100			0 .	1.00	1.50						-	3 	10 10
W7-1	23/06/2010	11.00		10	3573		10	1.5	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	12:00	S	8	10 15
W8	23/04/2010	<1	<0.1	<1	<1	1	<0.5	<1	41	-		-	1100		-	а (*				-			•		(199) (199)	27 (75
W8-1	23/06/2010	3:52			0.000		100	1.000		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	100		2 	10 (*
W9-U	23/04/2010	<1	<0.1	<1	<1	<1	<0.5	<1	9			-	1100		-	о (т				-				· ·	800	27 (**
W9-U1	23/06/2010	8.02	-	1	0.00		10	1.000		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			3 (19)	22 (25
W9-D	23/04/2010	<1	<0.1	<1	<1	<1	<0.5	<1	5		8	•	100			С. С.	100								1 1 1 1 1 1	
W9-D1	23/06/2010	3 <b>.</b> 2	-		1		100	1.000		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			8 (19)	
W10	23/04/2010	<1	<0.1	<1	<1	<1	< 0.5	<1	15	×	·	-	(#3)		-	2 (*	-	-	24			892		* *	2 (19)	
W10-1	23/06/2010	8.0		38	(14)	8	18		*	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		× .		
W11	23/04/2010	<1	<0.1	<1	<1	3	< 0.5	<1	20			+	(#))			8	-	-	14	-			( <b>.</b> )	×	2 (19)	
W11-1	23/06/2010	8.65	1		(19)	8	124	1.00	× .	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		×	8 1951	
W12-U	23/04/2010	<1	<0.1	<1	<1	15	< 0.5	<1	4	-		-					-		3 <b>8</b>	8			8.00	× .	100	
W12-U1	23/06/2010	8.0		28	(1.4))	8	124		1 ×	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			100	
W12-D	23/04/2010	<1	<0.1	<1	<1	<1	< 0.5	<1	3		-	-	1.632				1.41	1.41				-		8	(ies	1.00
W12-D1	23/06/2010	1940	-		(4)	8	19	1.046	) ×	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			(inter-	1.1
	0 8 -	8	192	90 (C	6 	89	80 X	6	89	1	80	892	97 C		QA	QC Sam	oles	40 	19 10	100			30 	98 	50 	1012
Trip Spike	× *	1942			( <b>#</b> 1)		10	1.043				1 ×	1.632		1 14		1.41						81%	103%	119%	119%
Trip Blank		100	-	(a)	(#)	1.8	19. J	1.000			1 ( <del>.</del>		1.632		1 H.	÷	1.41	le:	1			÷	<1	<1	<1	<3
F	QL	1	0.1	1	1	1	0.5	1		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		0	Ĵ	
	8	×	22)	\$1 - S	<	N/S	S		MS .	dir.	207	\$20		S	urface Water In	nvestigat	ion Level (SWII	L)		227	C2 3					20
SI	WIL <sup>3</sup>	13	0.2	3.3 <sup>4</sup>	1.4	3.4	0.6	11	8 <sup>5</sup>	0.001 4	0.08	0.03 4	0.01	0.01 4	0.2	0.02 6	0.09 6	0.005 4	0.01 5	0.01 6	0.15 <sup>6</sup>	0.2 6	640	2	-	

1 All Chromium are assumed to exist in the stable Cr(III) oxidation state, as Cr(VI) will be too reactive and unstable under the normal environment

where analytical results below laboratory practical quantitation limit (PQL) for all compounds, results quoted as <PQL of most compounds 2

3 ANZECC Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) trigger values for toxicants in fresh waters for the protection of 95% of species.

4 freshwater low reliability trigger value. Refer to Section 8.3.7 of guideline

5 freshwater high reliability trigger value. Refer to Section 8.3.7 of guideline

6 freshwater moderate reliability guideline figure. Refer to Section 8.3.7 of guideline

7 Only those compounds with available SWIL have been shown. Remaining compounds reported at less than PQL.

not analysed / not applicable -

PQL Laboratory practical quantative limit

exceeds guideline Bold



## 12. Interpretation and Discussion of Results

The analytical results for the soil samples show that the levels of contaminants within the analysed samples were all within the relevant health investigation levels for residential land use as well as within the provisional phytotoxicity based investigation levels. The concentrations of TPH, BTEX, OCP, OPP and asbestos were all below the laboratory PQL and therefore less than the SAC. These results are considered to support, in combination with the general site history and current site features, the earlier statement that the site presents only a low potential for contamination.

The analytical results for the surface water samples from the dams showed that the levels of OCP and OPP were all below the laboratory PQL. Furthermore, the majority of heavy metals recorded concentrations below the relevant trigger values, with the exception of lead and zinc in some of the samples.

Lead is generally present in very low concentrations in natural waters, with anthropogenic outputs of lead to the environment, such as runoff, sometimes outweighing natural sources. Zinc is found in most natural waters at low concentrations, however can enter the environment from both natural processes, including erosion and weathering, as well as anthropogenic processes such as urban runoff. Given these potential scenarios, it is considered that the reported elevated lead and zinc concentrations are not significant.

## 13. Conclusion and Recommendations

The results of the environmental assessment to date have not identified any issue that would preclude the rezoning of the Eastern Precinct for residential development. Based on the results of this preliminary contamination assessment, it is considered that the site, in general, has a low risk of contamination and is not likely to present an unacceptable risk of contamination with respect to residential land use. However, given the limited and generally broad nature of the assessment, and the past agricultural use of the site, it is recommended that further investigative studies be undertaken as follows:

- The health based guidelines adopted for the assessment of the test results on soils were taken from the NSW EPA (formerly DECCW) *Guidelines for the NSW Site Auditor Scheme*, 2nd edition, 2006, Appendix II, and are applicable for residential properties where home grown produce contributes less than 10% of the fruit and vegetable uptake, with no poultry. Should any of the proposed properties not comply with this restriction, further assessment of health risks needs to be undertaken
- Further assessment of the water quality in the dams should be undertaken prior to dewatering
  activities to assess the quality of the water at the time of dewatering and subsequently assess
  appropriate disposal methods;
- Assessment of materials in the existing dam walls and dam sediment prior to re-use within the site or disposal off-site;
- An unexpected finds protocol should be implemented during the civil works to provide guidance and methodology for addressing unexpected occurrences of contamination such as localised filling, fly tipping or asbestos fragment. Such a protocol should be prepared by a suitability qualified environmental consultant;

- The disposal of any excess spoil from the site must be carried out in accordance with the relevant legislation. Prior to disposal, materials must initially be classified in accordance with the NSW EPA (formerly DECCW) waste classification guidelines; and
- A fill importation protocol must be implemented to ensure that any imported materials during the subdivision works meet the legislative requirements regarding suitability. Such a protocol should be prepared by a suitability qualified environmental consultant.

## 14. Limitations

Douglas Partners (DP) has prepared this updated report for this project at Fernhill Estate, Western Precinct, Fairlight Road, Mulgoa, in accordance with instructions received from Mr Paul Cubelic of Cubelic Holdings Pty Ltd. The work was carried out under DP's Conditions of Engagement. This updated report is provided for the exclusive use of Cubelic Holdings Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of



potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

**Douglas Partners Pty Ltd** 

# Appendix A

About this Report

Site Drawing



#### Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

#### Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

#### Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

#### Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

 In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

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

#### Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

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

## About this Report

#### 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, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

#### Information for Contractual Purposes

Where information obtained from this report is provided for tendering 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. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

#### Site Inspection

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



# Appendix B

Site History Documentation











Project Address:	Owston Estate - Western Precinct	71706	Plate 3: 1970 Image
Project Suburb/Location:	Mulgoa	August 2010	





Project Title:	Phase 1 Contamination Assessment	Project	
Project Address:	Owston Estate - Western Precinct	71706	Plate 4: 1978 Image
Project Suburb/Location:	Mulgoa	August 2010	
			Deurlas Portnors












Project Title:	Phase 1 Contamination Assessment	Project	Plate 7: 2009 Current Image
Project Address:	Owston Estate - Western Precinct	71706	
Project Suburb/Location:	Mulgoa	August 2010	



Environment Protection Licence - Protection of the Environment Operations Act 1997

### Notice of Clean Up Action

Section 91 Protection of the Environment Operations Act 1997

GAUCI; JOE DAVID, 254 PARKRIVER CLOSE, MULGOA NSW 2745 STANDARD POST

Notice Number1020935File NumberHO5946Date30-Sep-2002

### NOTICE OF CLEAN UP ACTION

#### BACKGROUND

- ≥ The Environment Protection Authority (EPA) has responsibility for the administration and enforcement of environment protection legislation, including the Protection of the Environment Operations Act (POEO Act.).
- Ē The EPA is the appropriate regulatory authority for scheduled activities.
- <u></u> Western Sydney. The EPA is investigating the disposal of industrial waste (a scheduled activity) in areas of
- Ō Following an inspection of the property by the EPA on 11 September 2002 located at 25 Parkriver Close, Mulgoa, the EPA has reason to believe that such waste may have been placed on this land. l at 254
- Ш The EPA reasonably suspects that a pollution incident has occurred in that waste appears to have been applied to the land set out above unlawfully.
- Ш The EPA is continuing to investigate the source of the waste

### DIRECTION TO TAKE CLEAN-UP ACTION

<u>.</u> The Environment Protection Authority directs GAUCI; JOE DAVID to take the following cleanup action in relation to any stockpiles or areas on the property which have received fill materials between 1 February 2002 – 30 August 2002:

Property being: Lot 70 DP 241749 known as 254 Parkriver Close, Mulgoa

Environment Protection Licence - Protection of the Environment Operations Act 1997

### Notice of Clean Up Action

Section 91 Protection of the Environment Operations Act 1997



- Do not disturb in any manner the area referred to above until the earlier of either:
- (a) further advice in writing from the EPA; or
- (b) 8 November 2002
- $\mathbf{\dot{N}}$ 1997. This notice <u>ت</u> issued under section 91 of the Protection of the Environment Operations Act
- ω It is an offence against that Act not to comply with a clean-up notice unless you have a reasonable excuse.

### FEE TO BE PAID

- 4 You are required by law to pay a fee of \$320 for the administrative costs of issuing this notice.
- <u>O</u>I when to pay the fee and how to apply for an extension or a waiver of the fee tee or for the fee to be waived. At the end of this notice It is an offence not to pay this fee. However you can apply for an extension of time to pay the there is information about how and

Mr Steve Beaman Acting Manager Sydney Waste Sydney Waste (By Delegation)

### INFORMATION ABOUT THIS NOTICE

- for each day the offence continues offence continues. The maximum penalty for a corporation is \$250,000 and a further \$120,000 for each day the The maximum penalty for an individual is \$120,000 and a further \$60,000
- complying with the notice from the person who caused the incident. If you comply with this clean-up notice but you are not the person who caused the pollution incident to which the notice relates, you have a right to go to court to recover your costs of
- The fee must be paid by no later than 30 days after the date of this notice

Environment Protection Licence - Protection of the Environment Operations Act 1997

### Notice of Clean Up Action

Section 91 Protection of the Environment Operations Act 1997



- Any application to apply for an extension or a waiver of the fee should be made in writing to the Environment Protection Authority and sent to Manager Sydney Waste, NSW EPA, PO Box A290, Sydney South 1232. The application should set out clearly why you think your application should be granted.
- Details provided in this notice will be available on the EPA's Public Register in accordance with section 308 of the Protection of the Environment Operations Act 1997.



You are here: <u>Home > Environment protection licences > POEO Public Register > Search for licences, applications and notices</u>

	Lice	
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	nary	
		AA
1		

Your search for: Suburb - mulgoa

			Search again	Return to previous page
Summary of Lic	ence No: 343	8		
View this licence (PDF	F document 0 kb)			
Licence holder:	PENRITH WAS	<b>FE SERVICES PTY. LIN</b>	1ITED	
	Trading as : PE	NRITH WASTE SERVICE	S	
Premises:	PENRITH WASTE	SERVICES PTY LTD		
	LGA: Penrith C	atchment: Hawkesbury		
Administrative fee:	\$3,360.00			
Status of licence:	Issued			
Licence type:	Premises			
Activity type:	Waste disposal (	application to land)		
Licence review:	Completed 18 Ja	in 06		
Notices				
Number		Issue date	Notice type	
1095271 View notice		28 Nov 08	S 58 Licence Variation	
1088947 Vlew notice		03 Oct 08	S 58 Licence Variation	
1077131 View notice		20 Aug 07	S 58 Licence Variation	
1074983 Vlew notice		28 Jun 07	S 58 Licence Variation	
1071316 View notice		10 May 07	S 58 Licence Variation	
1057400 View notice		18 Mar 06	S 58 Licence Variation	
1053959 View notice		19 Jan 06	S 58 Licence Variation	
1048204 View notice		27 May 05	S 58 Licence Variation	
1046087 View notice		19 Apr 05	S 58 Licence Variation	
1030173 <u>View notice</u>		18 Nov 03	S 58 Licence Variation	
1013835 View notice		16 May 02	S 58 Licence Variation	
008164 View notice		12 Aug 99	S 58 Licence Variation	
Annual Return Info	ormation inform	ation about non compli	ance	
Start date	End date	Date received	Non-compliance	LBL Data
01 Aug 08	31 Jul 09	29 Sep 09	Yes Details	Not subject to LBL
01 Aug 07	31 Jul 08	24 Sep 08	Yes <u>Details</u>	Not subject to LBL
01 Aug 06	31 Jul 07	08 Oct 07	Yes <u>Details</u>	Not subject to LBL
01 Aug 05	31 Jul 06	26 Sep 06	Yes <u>Details</u>	Not subject to LBL
01 Aug 04	31 Jul 05	06 Oct 05	Yes <u>Details</u>	Not subject to LBL
01 Aug 03	31 Jul 04	29 Sep 04	Yes <u>Details</u>	Not subject to LBL
01 Aug 02	31 Jul 03	30 Sep 03	Yes <u>Details</u>	Not subject to LBL
01 Aug 01	31 Jul 02	30 Sep 02	No	Not subject to LBL
01 Aug 00	31 Jul 01	26 Sep 01	No	Not subject to LBL
01 Aug 99	31 Jul 00	29 Sep 00	No	Not subject to LBL

<u>NSW\_Government</u> | jobs.nsw

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6 July 2010

The Secretary Penrith Waste Services Pty Ltd P Q BOX 222 BOTANY NSW 2019

Our Reference: Kirstie Allen 500148A1

Your Reference:

# THE ENVIRONMENTALLY HAZARDOUS CHEMICALS ACT, 1985: NOTICE UNDER SECTION 35

WHEREAS: -

- ≥ Road, Mulgoa; and Your Company, Penrith Waste Service Pty Ltd is the occupier of premises located at Lot 212 (file note – should be Lots 200 and 201) Deposited Plan 804405, Mulgoa
- φ wastes, namely aluminium processing wastes plus various undifferentiated industrial being used for or in connection with a prescribed activity, is contaminated by chemical wastes The Environment Protection Authority (EPA) has reason to believe that the premises
- 0 The EPA believes that the premises have become environmentally degraded

TAKE NOTICE THAT:-

above nominated premises, is directed that: In accordance with the powers vested in the EPA by the provisions of Section 35 of the Environmentally Hazardous Chemicals Act, 1985, your Company, being the occupier of the

<del>. `</del> undertaken by an engineer or environmental scientist as approved by the EPA and a detailed report by the chosen consultant shall be submitted to the EPA by the close of business 15th January 1993. A survey to assess the aforementioned premises for chemical contamination shall be

existing aluminium salt slag cells on the premises. The survey shall also include the adequacy and the containment integrity of the

- Ņ A draft action plan to appropriately manage the premises shall be prepared and submitted to the EPA with the report referred to in Clause 1 of this Notice.
- ယ information: You shall provide two (2) separate monthly written reports by the 15th November 1992 and 15th December 1992, respectively, which shall include the following
- **a** progress with the procurement of a consultant to carry out the site survey;
- ਭ progress with the sampling, analysis and reporting of the site survey; and
- <u></u> any problems encountered with any of the conditions as set out in this

Page 1 of 3

Notice.

- 4 Your Company shall:
- (a) give prior notice to the EPA of, and
- ত perform only in accordance with an approval in writing given by the EPA

all work carried out on these premises which has the effect of:

further dispersing or covering the contamination; or

Ü

- ij reducing the contamination of the premises; or
- ij restoring or rehabilitating the premises; or
- 3 removing, or disposing of, any soil, rock, water or other solid or liquid material of any kind from the premises,

which would result in the disturbance of any land on the premises below a depth of two

metres

- S premises otherwise relinquished then: be sold, or that occupancy of the premises is to be transferred or responsibility for the If your Company becomes aware that the premises to which this Notice relates is to
- <u>a</u> within one month of becoming aware your Company shall inform the EPA in writing, and
- Ξ occupier you, within 48 hours, in writing shall: where your Company is advised of the name of the prospective owner
- $\odot$ notify the EPA and
- € and notify the intending purchaser or occupier of the conditions of this notice;
- 7 This Notice does not derogate from the provisions of any relevant Environmental

Planning Instrument which may control the use of land on which the premises are

located or from any other Act administered by the Environment Protection Authority

occupier, without lawful authority, wilfully or negligently causes any substance to leak, for any offence committed under any Pollution Control Act including any previous Section Failure to comply with this Notice may result in proceedings being commenced under Section 57 of the Environmentally Hazardous Chemicals Act, 1985 to remedy or restrain a breach of the directions given herein. The EPA retains the right to commence a prosecution 35 notices served on these premises. Your Company is advised that it is an offence if an spill

or otherwise escape (whether or not from a container) in a manner which harms or is likely

to harm the environment pursuant to Section 6(1) of the Environmental Offences and

EPA - Section 35 Notice No. 313

Page 3 of 3

Penalties Act, 1989. The maximum penalty is one million dollars.

(signed - 14/10/1992)

PETER YATES Director of Sydney Operations for Director General

8 Penrith City Council Register of Section 35 Notices

The Secretary Penrith Waste Services Pry Limited c/- Dunhill Madden Butler Solicitors & Notaries DX 254 SYDNEY

CH23L2 JFW:701776 Notice # 356

# **NOTICE OF REVOCATION PURSUANT TO SECTION 35(6)**

# **ENVIRONMENTALLY HAZARDOUS CHEMICALS ACT, 1985.**

The directions contained in the Notice under Section 35 Environmentally Hazardous Chemicals Act, 1985 directed to Penrith Waste Services in relation to premises located at Lot 212 Deposited Plan 804405, Mulgoa Road, Mulgoa and dated 14 November 1992 are hereby revoked.

(signed) Warwick Forrest Executive Director Operations **for Director General.** 

17.5.93

cc: Penrith City Council Register of Section 35 Notices.



For information on the meaning of fields please see <u>Glossary</u> Document Generated on Tuesday, July 6, 2010

Print Report

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

## Work Requested -- GW106219

### Works Details (top)

<b>GROUNDWATER NUMBER</b>	GW106219
LIC-NUM	10BL163684
AUTHORISED-PURPOSES	DOMESTIC STOCK
INTENDED-PURPOSES	DOMESTIC STOCK
WORK-TYPE	Bore
WORK-STATUS	Supply Obtained
CONSTRUCTION-METHOD	Down Hole Hammer
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2004-07-27
FINAL-DEPTH (metres)	228.00
DRILLED-DEPTH (metres)	228.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	FAIRLIGHT ORCHARD
GWMA	•
GW-ZONE	
STANDING-WATER-LEVEL	142.70
SALINITY	145.00
YIELD	0.60

### Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
<b>RIVER-BASIN</b>	212 - HAWKESBURY RIVER
AREA-DISTRICT	
CMA-MAP	9030-3N
GRID-ZONE	56/1
SCALE	1:25,000
ELEVATION	
ELEVATION-SOURCE	(Unknown)
NORTHING	6251906.00
EASTING	277711.00
LATITUDE	33 50' 59"
LONGITUDE	150 35' 51"
GS-MAP	

grey
browr
2
ğ

FROM	то	THICKNESS	DESC
0.00	9.10	9.10	sandstone, light grey brov

### GEO-MATERIAL COMMENT

### Drillers Log (top)

FROM- DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	٣؋؋	гòò	YIELD	TEST-HOLE- DEPTH (metres)	DURATION SALINI	۲
166.50	170.00	3.50				0,40		185.00	
208.40	208.50	0.10				0.05		150.00	
218.20	224.40	6.20				0.15		145.00	

### Water Bearing Zones (top)

HOLE- PIPE- COMPONENT- COMPONENT- DEPTH- DEPTH- OD ID NO NO CODE TYPE (metres) (metres) (mm) (mm)	1 Hole Hole 0.00 5.50 206	1 Hole Hole 5.50 156.00 157.5	1 Hole Hole 156.00 228.00 155	1 1 Casing Steel -0.50 5.50 168 158.4	1 1 Casing PVC Class 9 -0.50 107.50 140	
DEPTH- DEP FROM TO (metres) (met	0.00 5.50	5.50 156.	156.00 228.	-0.50 5.50		-0.50 107.
res) (mm) (	206	00 157.5	00 155	168 1	50 140	
D mm) INTERVAL				58.4		
DETAIL	Down Hole Hammer	Down Hole Hammer	Down Hole Hammer	Driven into Hole; End cap	Screwed and Glued; Suspended in Clamps	-

REMARK COORD-SOURCE AMG-ZONE 56 GIS - Geographic Information System

Groundwater Works Summary

#### Form-A (top)

COUNTY	CUMBERLAND
PARISH	MULGOA
PORTION-LOT-DP	66//241749

Licensed
(top)

DODTION I OT DD BB 04	ARISH MULO	COUNTY CUME	
	30A	BERLAND	

### Construction (top)

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

	0.00	·00	267.70
candetone arev	3 80	00 800	224 40
sandstone, light grey & quartz	6.20	) 224.40	218.20
sandstone, light grey light brown	9.70	218.20	208,50
quartz	0.10	208.50	208.40
siltstone, dark grey	4.20	208.40	204.20
shale, black	0.60	204.20	203.60
sandstone, light grey - grey	33.60	203.60	170.00
sandstone, light grey and quartz	3.50	170.00	166.50
sandstone, light grey & quartz	9.00	166.50	157.50
siltstone, grey	1.00	157.50	156.50
sandstone, brown, light grey quartz	15.20	156.50	141.30
shale, grey	0.30	141.30	141.00
sandstone, brown light grey iron quartz	38.40	141.00	102.60
clay, grey green	0.40	102.60	102.20
sandstone, light brown light grey	13.80	102.20	88.40
shale, grey	1.00	88.40	87.40
sandstone, light grey	2.70	87.40	84.70
shale, grey	0.20	84.70	84.50
sandstone, brown light grey	27.00	84.50	57.50
shale, grey	1.30	57.50	56.20
sandstone, brown	8.00	56.20	48.20
shale,grey	1.70	48.20	46.50
sandstone, grey	3.00	46.50	43.50
shale, grey	1.30	43.50	42.20
sandstone, light grey	4.10	42.20	38.10
clay, brown	0.20	38.10	37.90
sandstone, light brown - brown	26.30	37.90	11.60
shale, grey weathered	2.50	11.60	9.10

Warning To Clients: This raw data has been supplied to the Department of Infrastructure, Planning and Natural Resources (DIPNR) by drillers, licensees and other sources. The DIPNR does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

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For information on the meaning of fields please see <u>Glossary</u> Document Generated on Tuesday, July 6, 2010

Print Report

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

## Work Requested -- GW108726

### Works Details (top)

GROUNDWATER NUMBER LIC-NUM AUTHORISED-PURPOSES INTENDED-PURPOSES WORK-TYPE WORK-STATUS CONSTRUCTION-METHOD OWNER-TYPE	GW108726 10BL600926 DOMESTIC STOCK DOMESTIC STOCK Bore Down Hole Hammer Private
WORK-STATUS CONSTRUCTION-METHOD	Down Hole Hammer
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2008-04-02
FINAL-DEPTH (metres)	258.00
DRILLED-DEPTH (metres)	123,00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GAUCI
GWMA	I
GW-ZONE	I
STANDING-WATER-LEVEL	177.00
SALINITY	
YIELD	
Site Details (ton)	

GS-MAP	LONGITUDE	LATITUDE	EASTING	NORTHING	ELEVATION-SOURCE	ELEVATION	SCALE	GRID-ZONE	CMA-MAP	AREA-DISTRICT	<b>RIVER-BASIN</b>	REGION
	150 35' 51"	33 50' 36"	277691.00	6252611.00								10 - SYDNEY SOUTH COAST

.

AMG-ZONE	56
COORD-SOURCE	GIS - Geographic Information System
REMARK	

#### Form-A (top)

### Licensed (top)

PORTION-LOT-DP	PARISH	COUNTY
70 241749	MULGOA	CUMBERLAND

### 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

	4	<u>ــ</u>	<u>د</u>	
	Hole	Hole	Casing	
	Hole	Hole	PVC Class 9	
•	0.00	42.00	0.00	
	42.00	258.00	42.00	
	170	140	140	
Down	Hole Hammer	Down Hole Hammer	Driven into Hole; Open End	

### Water Bearing Zones (top)

no details

### Drillers Log (top)

00 122.00 122.00 sandstone	0.00 12	22.00	122.00	sandstone	
	FROM TO	0	THICKNESS	DESC	GEO-MATERIAL

122.00 123.00 1.00

cavity

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Print Report

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

## Work Requested --- GW100327

### Works Details (top)

GWMA YIELD FINAL-DEPTH (metres) CONSTRUCTION-METHOD WORK-STATUS WORK-TYPE INTENDED-PURPOSES SALINITY STANDING-WATER-LEVEL GW-ZONE PROPERTY DRILLER-NAME CONTRACTOR-NAME DRILLED-DEPTH (metres) COMPLETION-DATE COMMENCE-DATE OWNER-TYPE AUTHORISED-PURPOSES LIC-NUM GROUNDWATER NUMBER GW100327 Rotary 236.20 NIA 236.20 ı. Bore DOMESTIC STOCK DOMESTIC STOCK (Unknown) 10BL151629 1993-02-20

Site Details (top)

ELEVATION-SOURCE ELEVATION SCALE CMA-MAP **RIVER-BASIN** LONGITUDE LATITUDE EASTING NORTHING **GRID-ZONE** AREA-DISTRICT REGION 278231.00 150 36' 12" 33 50' 35" 6252660.00 10 - SYDNEY SOUTH COAST

GS-MAP

FROM TO THICKNESS DESC GEO-N   0.00 8.00 8.00 BROWN SHALE   0.00 10.00 CDEANV SHITSTONE	25.00 30.00 5.00 30.00 30.00   210.00 213.00 3.00 1.30 213.00   220.00 221.00 1.00 0.70 221.00   225.00 235.00 10.00 145.00 5.00 235.00	Water Bearing Zones (top) Test-   FROM- TO- TEST-   DEPTH DEPTH THICKNESS CAT- S-W-L D- TEST-   (metres) (metres) DESC L (metres)	1 1 Casing Steel 0.00 137.15 133.2	1 Hole Hole 0.00 236.20 150	HOLE- PIPE- COMPONENT- COMPONENT- DEPTH- DEPTH- OD ID	<b>Construction (top)</b> 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	COUNTYCUMBERLANDPARISHMULGOAPORTION-LOT-DP43 241749	Licensed (top)	COUNTYCUMBERLANDPARISHMULGOAPORTION-LOT-DP43//241749	Form-A (top)	AMG-ZONE 56 COORD-SOURCE REMARK
	1.30 0.70 5.00	D- VIELD	137.15	) (metres) 236.20	DEPTH-	Diameter; e;Q-Quantity					
GEO-MATI	(metres) 30.00 213.00 221.00 235.00	TEST- HOLE- DEPTH	133.2	150	(mm) (mm)						
ERIAL COMN	0.20 E 0.10 E 2.00 E	DURATION S	=	۲	INTERVAL D						
	3rackish Excellent Excellent Excellent	<b>SALINITY</b>	Nelded; Driven nto Hole	Rotary Xir	DETAIL						

Warning To Clients: This raw data has been supplied to the Department of Infrastructure, Planning and Natural Resources (DIPNR) by drillers, licensees and other sources. The DIPNR does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

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Print Report

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

## Work Requested -- GW029819

### Works Details (top)

GROUNDWATER NUMBER	GW029819
LIC-NUM	10BL021067
<b>AUTHORISED-PURPOSES</b>	DOMESTIC RECREATION (GROUNDWATER)
INTENDED-PURPOSES	IRRIGATION
WORK-TYPE	Bore open thru rock
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	Cable Tool
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	1968-02-01
FINAL-DEPTH (metres)	258.10
DRILLED-DEPTH (metres)	258.20
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	N/A
GWMA	603 - SYDNEY BASIN
GW-ZONE	•
STANDING-WATER-LEVEL	
SALINITY	
YIELD	
Site Details ( <u>top)</u>	
REGION 10 -	SYDNEY SOUTH COAST
RIVER-BASIN 212	- HAWKESBURY RIVER

REGION	10 - SYDNEY SOUTH COAST
<b>RIVER-BASIN</b>	212 - HAWKESBURY RIVER
AREA-DISTRICT	
CMA-MAP	9030-3N
GRID-ZONE	56/1
SCALE	1:25,000
ELEVATION	
ELEVATION-SOURCE	(Unknown)
NORTHING	6252879.00
EASTING	278757.00
LATITUDE	33 50' 28"
LONGITUDE	150 36' 32"
GS-MAP	0056C4

6/07/2010

AMG-ZONE	56
COORD-SOURCE	GD.,ACC.MAP
REMARK	

#### Form-A (top)

### Licensed (top)

PORTION-LOT-DP	PARISH	COUNTY
-	MULGOA	CUMBERLAND

### 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-	PIPE-	COMPONENT-	COMPONENT-	DEPTH-	DEPTH-	8	₽	
NO	NO	CODE	TYPE	(metres)	(metres)	(mm)	(mm)	
حـ	د	Casing	Welded Steel	0.00	33.50	244		Seated
Water	Rearin	ng Zones (ton)						

#### . Na ត្ត ۰. - 2 B ĩ sauo (100)

FROM- DEPTH (metres)	TO- DEPTH (metres)	THICKNESS (metres)	ROCK-CAT- DESC	S-W-L C	- YIELD	TEST- HOLE- DEPTH (metres)	DURATION SALINITY
15.20	24.30	9.10	Unconsolidated	9.10	0.38		(Unknown)
222.50	224.00	1.50	(Unknown)	165.20	0.63		(Unknown)
246.80	247.40	0.60	(Unknown)	165.20	0.63		(Unknown)

### Drillers Log (top)

FROM	TO	THICKNESS	DESC GEO-MATERIAL COMMENT
0.00	0.91	0.91	Topsoil Black
0,91	7.01	6.10	Clay
7.01	33.52	26.51	Clay Grey
33.52	44.19	10.67	Sandstone Grey
44.19	51.81	7.62	Sandstone
51.81	53.03	1.22	Clay
53.03	85.34	32.31	Sandstone
85.34	88.39	3.05	Sandstone Shale
88.39	97.84	9,45	Sandstone
97.84	99.97	2.13	Sandstone Shale

6/07/2010

99.97

108.81 8.84

Clay Shale

Page 3 of 3

108.81	118.87	10.06	Sandstone White
118.87	160.02	41.15	Sandstone White Clay
160.02	161.84	1.82	Shale White Grey
161.84	165.20	3.36	Conglomerate
165.20	174.65	9,45	Sandstone White Clay
174.65	188.67	14.02	Sandstone Grey Clay
188.67	192.63	3.96	Sandstone Grey
192.63	258.16	65.53	Sandstone Grey Some Clay

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For information on the meaning of fields please see <u>Glossary</u> Document Generated on Tuesday, July 6, 2010

Print Report

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

## Work Requested -- GW029820

Works Details (top)

Site Details ( <u>top</u> )	STANDING-WATER-LEVEL SALINITY YIELD	GWMA GW-ZONE	PROPERTY	CONTRACTOR-NAME DRILLER-NAME	DRILLED-DEPTH (metres)	FINAL-DEPTH (metres)	COMPLETION-DATE	COMMENCE-DATE	OWNER-TYPE	CONSTRUCTION-METHOD	WORK-STATUS	WORK-TYPE	INTENDED-PURPOSES	AUTHORISED-PURPOSES	LIC-NUM	GROUNDWATER NUMBER
		603 - SYDNEY BASIN -	N/A		39.90	39.90	1968-04-01		Private	Cable Tool	(Unknown)	Bore	STOCK	STOCK	10BL022141	GW029820

REGION	10 - SYDNEY SOUTH COAST
<b>RIVER-BASIN</b>	212 - HAWKESBURY RIVER
AREA-DISTRICT	
CMA-MAP	9030-3N
GRID-ZONE	56/1
SCALE	1:25,000
ELEVATION	
ELEVATION-SOURCE	(Unknown)
NORTHING	6252798.00
EASTING	279247.00
LATITUDE	33 50' 31"
LONGITUDE	150 36' 51"
GS-MAP	0056C4

AMG-ZONE	56
COORD-SOURCE	PR.,ACC.MAP
REMARK	

#### Form-A (top)

COUNTY PARISH	CUMBERLAND MULGOA
PARISH	MULGOA
PORTION-LOT-DF	2

#### Licensed (top)

PORTION-LOT-DP	PARISH	COUNTY
2	MULGOA	CUMBERLAND

### 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

					)	ng Zones ( <u>top</u>	Bearii	Water
(Un		0	0.00	0.00	(Unknown)	Casing	<u>ب</u>	<u>د</u>
interval de	lD (mm)	OD (mm)	DEPTH- TO (metres)	DEPTH- FROM (metres)	COMPONENT- TYPE	COMPONENT- CODE	PIPE- NO	HOLE-

24.30	FROM- DEPTH (metres)
25.80	TO- DEPTH (metres)
1.50	THICKNESS (metres)
(Unknown)	ROCK- CAT-DESC
3.00	۸- S
	гòò
0.13	YIELD
	TEST- HOLE- DEPTH (metres)
(Unknown)	DURATION SALINITY

### Drillers Log (top)

39.31	3.65	3.65	0.00	FROM
39.92	39.31	39.31	3.65	0
0.61	35.66	35.66	3.65	THICKNESS
Sandstone	Some Shale	Clay Grey Water Supply	Clay Light Brown	DESC
				GEO-MATERIAL
				COMMENT

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Page 1 of 3

# Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Tuesday, July 6, 2010

Print Report

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

## Work Requested -- GW101558

### Works Details (top)

COMMENCE-DATE CONSTRUCTION-METHOD Rotary Air YIELD **OWNER-TYPE** WORK-STATUS WORK-TYPE **AUTHORISED-PURPOSES** GROUNDWATER NUMBER GW101558 SALINITY STANDING-WATER-LEVEL **GW-ZONE** GWMA PROPERTY DRILLER-NAME CONTRACTOR-NAME DRILLED-DEPTH (metres) FINAL-DEPTH (metres) COMPLETION-DATE INTENDED-PURPOSES LIC-NUM 186.00 N/A 186.00 Bore DOMESTIC STOCK 794.00 1 (Unknown) DOMESTIC STOCK 10BL158806 1998-11-30

### Site Details (top)

ELEVATION-SOURCE ELEVATION SCALE CMA-MAP AREA-DISTRICT **RIVER-BASIN** LONGITUDE LATITUDE EASTING NORTHING **GRID-ZONE** REGION 150 36' 55" 33 50' 23" 279328.00 6253067.00 10 - SYDNEY SOUTH COAST

GS-MAP

AMG-ZON COORD-S REMARK	SOURCE	56						
Form-A	(top)							
COUNTY PARISH PORTION	1-LOT-DP	CUMBERI MULGOA 1//32111	AND					
License	d (top)							
COUNTY PARISH PORTION	I-LOT-DP	CUMBERI MULGOA 1 32111	LAND					
Constru	ction (to	(dc						
Negative dep ID-Inside Dia	oths indicate meter;C-Ce	Above Ground mented;SL-Sid	d Level;H-Hole;P- ot Length;A-Apert	-Pipe;OD-Outside ure;GS-Grain Siz	e;Q-Quantity			
NO NO		MPONENT- DE	- COMPONEI TYPE	NT- DEPTH- FROM (metres)	DEPTH- TO (metres)	OD ID (mm) (mm)	INTERVAL [	DETAIL
-	Hole	(D	Hole	0.00	17.30	210	-	Rotary Air
<u>ب</u>	Hole	(D	Hole	17.30	186.00	157		Rotary Air
<u>د</u> د	Cas	sing	Steel	-0.60	11.40	168.3		Velded; Driven into Hole
<u>د</u> د.	Cas	gnia	PVC Class \$	9 -0.60	35.40	140		Screwed and Glued; Suspended in Clamps
Water B	earing	Zones (to	<u>(d</u>					
FROM- DEPTH (metres)	TO- DEPT (metr	es) (met	res) DE	OCK- IT- S-W-L	, p , b , Aler	TEST- HOLE- DEPTH (metres)	DURATIO	N SALINITY
180.00	180.5	0 0.50		146.0	0 0.80	186.00	0.75	794.00
Drillers	Log (top	<u>(</u> )						
FROM T	ю ТН	ICKNESS	DESC		GEC	)-MATERIAL	COMMENT	
0.00	.50 0.5	öö	Topsoil					
0.50	1.5	š či	Grey Clay					
2.00 6	5.00 4.0	5 8	Red Clay					
6.00 7	.50 1.5	5 8	Grey Clay					
7.50 1	0.00 2.5	00	Brown Shale					

•

Groundwater Works Summary

10.00	Ground
32,00	lwater
22.00	Works Summ
Black Shale	ary

Page 3 of 3

184.00	180.50	180.00	162.50	160.50	89.50	80.00	61.00	60.20 (	47.00 (	46.00 /	32.00 4
186.00	184.00	180.50	180.00	162.50	160.50	89.50	80.00	51.00	30.20	47.00	46.00
2.00	3.50	0.50	17.50	2.00	71.00	9.50	19.00	0.80	13.20	1.00	14.00
Grey Sandstone M.G.	Dark Grey Sandstone F.G.	Sandstone and Quartz, fractured	Grey Sandstone M.G.	Ironstone	Grey Sandstone M.G.	Dark Grey Sandstone F.G.	Grey Sandstone M.G.	Ironstone	Grey Sandstone M.G.	Sandstone and Quartz	Grey Sandstone M.G.

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For information on the meaning of fields please see <u>Glossary</u> Document Generated on Tuesday, July 6, 2010 Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Print Report

Work Requested -- GW106183

### Works Details (top)

	GW106183
LIC-NUM	10BL163499
<b>AUTHORISED-PURPOSES</b>	DOMESTIC STOCK
INTENDED-PURPOSES	DOMESTIC STOCK
WORK-TYPE	Bore
WORK-STATUS	Supply Obtained
CONSTRUCTION-METHOD	Down Hole Hammer
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2004-07-23
FINAL-DEPTH (metres)	156.00
DRILLED-DEPTH (metres)	156.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MARCHANT
GWMA	•
GW-ZONE	•
STANDING-WATER-LEVEL	143.50
SALINITY	1800.00
YIELD	
Rito Dotaila (tan)	
0ito Dotoilo (top)	

### Site Details (top)

LONGITUDE 15	LATITUDE 33	EASTING 27	NORTHING 62	ELEVATION-SOURCE (U	ELEVATION	SCALE 1:	GRID-ZONE 56	CMA-MAP 90	AREA-DISTRICT	RIVER-BASIN 21	REGION 10	
50 37' 21"	3 50' 16"	79991.00	253286.00	Jnknown)		25,000	5/1	)30-3N		12 - HAWKESBURY RIVER	) - SYDNEY SOUTH COAST	

6/07/2010

FROM TO 0.00 1.50	Drillers Lo	145.00 .	FROM- DEPTH I (metres) (	Water Bear	<del>د</del>	ب ب	<u>د</u> د	د	د	<u>ــ</u>	HOLE- PIPE	Negative depths ir ID-Inside Diamete	Constructio	COUNTY PARISH PORTION-LO	Licensed ( <u>t</u>	COUNTY PARISH PORTION-LO
<b>THICKN</b>	g (top)	147.00	TO- DEPTH (metres)	ing Zone	Annulus	Casing	Casing	Hole	Hole	Hole	- COMPOI	ndicate Above rr;C-Cemente	on ( <u>top</u> )	CUN MUI )T-DP 2 23	<u>(do</u>	CUN MUI NT-DP 2//2:
IESS DESC		2.00	THICKNESS CA (metres) DE	es ( <u>top</u> )	Concrete	PVC Class (	Steel	Hole	Hole	Hole	NENT- COMPONEI TYPE	e Ground Level;H-Hole;P. d;SL-Slot Length;A-Apert		MBERLAND LGOA 35175		MBERLAND LGOA 35175
		143.50	OCK- NT- S-W-L ISC		9.50	9 -0.40	-0.40	146.20	11.60	0.00	NT- DEPTH- FROM (metres)	-Pipe;OD-Outside .ure;GS-Grain Size				
		U	r p p YIEL		11.60	89.60	11.60	156.00	146.20	11.60	DEPTH- TO (metres)	Diameter; ə;Q-Quantity				
			.D HOL DEP (me)		206	140	168	157.5	159	206	OD (mm)					
GEO-N			TE- TH TH Tes)		159		158.4				ID (mm)					
MATERIAL (		2.00	DURATIO								INTERVAL					
COMMENT		1800.00	ON SALINITY			Screwed and Glued; Suspended in Clamps	Welded; Driven into Hole; Open End	Down Hole Hammer	Down Hole Hammer	Down Hole Hammer	DETAIL					

Page 2 of 3

AMG-ZONE COORD-SOURCE REMARK

56

GIS - Geographic Information System

Form-A (top)

unknown	13.00	) 156.00	143.00
sandstone, light grey & quartz	0.30	) 143.00	142.70
sandstone, light grey	3.70	) 142.70	139.00
sandstone, light grey & quartz	0.50	139.00	138.50
sandstone, light grey	7.50	) 138.50	131.00
sandstone, light brown	0.50	131.00	130.50
sandstone, light brown grey	) 17.90	130.50	112.60
sandstone, light brown	0.10	) 112.60	112.50
sandstone, light brown	0.50	) 112.50	112.00
sandstone, dark brown	0.40	112.00	111.60
sandstone, light brown	3.90	111.60	107.70
sandstone, brown	0.10	107.70	107.60
sandstone, light grey	1.40	107.60	106.20
sandstone, brown	0.10	106.20	106.10
sandstone, light brown	3.70	106.10	102.40
sandstone, brown	0.90	102.40	101.50
sandstone, light grey, light brown	11.90	101.50	89.60
sandstone, light grey, dark brown weathered	71.60	89.60	18.00
shale dark grey	6.50	18.00	11.50
shale, grey light brown	5.70	11.50	5.80
shale, grey weather	1.30	5.80	4.50
clay, light brown	1.00	4.50	3.50
ironstone	0.50	3.50	3.00
shale, light brown	1.50	3.00	1.50

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Print Report

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

## Work Requested -- GW108515

Works Details (top)

GROUNDWATER NUMBER	GW108515
LIC-NUM	10BL600780
<b>AUTHORISED-PURPOSES</b>	DOMESTIC STOCK
<b>INTENDED-PURPOSES</b>	DOMESTIC STOCK
WORK-TYPE	Bore
WORK-STATUS	Supply Obtained
CONSTRUCTION-METHOD	Down Hole Hammer
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2006-11-16
FINAL-DEPTH (metres)	162.00
DRILLED-DEPTH (metres)	162.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	WILLIAMS
GWMA	
GW-ZONE	ł
STANDING-WATER-LEVEL	120.00
SALINITY	1320.00
YIELD	0.80

Site Details (top)

GS-MAP	LONGITUDE	LATITUDE	EASTING	NORTHING	ELEVATION-SOURCE	ELEVATION	SCALE	<b>GRID-ZONE</b>	CMA-MAP	AREA-DISTRICT	<b>RIVER-BASIN</b>	REGION	
	150 37' 39"	33 50' 10"	280464.00	6253487.00								10 - SYDNEY SOUTH COAST	

http://is	<b>FROM</b> 0.00	Drillers	139.00 148.00 157.00	FROM- DEPTH (metres	Water I	ح	<u>ب</u>	د_			NO HOLE-	Negative de ID-Inside Di	Constru	COUNT) PARISH PORTIO	License	COUNT PARISH PORTIO	Form-A	AMG-ZO COORD- REMARJ
2.dnr.n	<b>то</b> 2.50	s Log	15 15 15	) 1922	Bearin						NO PIPE-	pths indi	uction	N-LOT-	)d (top	N-LOT-	(top)	SOUR
sw.gov	<b>THICK</b> 2.50	(top)	3.00 1.00 7.20	)- EPTH ietres)	ıg Zon	Annulus	Casing	Hole	Hole	Hole		-Cemente	(top)		ţ,	DP 4//2		Ë
.au/proxy/dip	<b>NESS DESC</b> Clay		4.00 3.00 0.20	THICKNESS (metres)	es (top)	Conc	Steel	Hole	Hole	Hole	NENT- COMP	e Ground Level;H- ;d;SL-Slot Length;/		MBERLAND LGOA 35175		MBERLAND LGOA (35175		56 GIS - Geograp
nr/gwwo				ROCK- CAT- DESC		rete					ONENT-	Hole;P-Pipe; \-Aperture;G						hic Inform
rks?GWW			120.00	S-W-L		-0.10	-0.40	120.00	5.50	0.00	DEPTH- FROM (metres)	OD-Outside   S-Grain Size						ation Syst
VID=GW10			0.30 0.30	L D- AIELD		5.60	5.60	162.00	120.00	5.50	DEPTH- TO (metres)	Diameter; ;Q-Quantity						em
08515	GEO			TEST. HOLE DEPT (metr		159	155	155	159	204	(mm)							
	MATE			es) H			145.4				(mm)							
	RIAL COMN			DURATION							INTERVAL							
6/07/2010	<b>NENT</b>		1650.00 1650.00 1320.00	I SALINITY			Uriven into Hole; Open End	Down Hole Hammer	Down Hole Hammer	Hole Hammer	DETAIL							

Page 3 of 3

2.50 4.00 56.00 71.00 72.00 72.00 77.00 118.00 118.00 135.00 135.00	4.00 56.00 71.00 72.00 72.00 77.00 118.00 119.00 139.00 139.00	1.50 52.00 15.00 1.00 41.00 41.00 16.00 4.00 4.00	Sandstone, soft Sandstone, light bronw Sandstone, grey with brown bands Sandstone, brown Sandstone, with Shale bedding Sandstone, grey with small brown bands Sandstone-Quartz Sandstone, grey Sandstone, fine Quartz
1.00 7.00 18.00	72.00 77.00 118.00 119.00	1.00 5.00 41.00 1.00	Sandstone, brown Sandstone, with Shale bedding Sandstone, grey with small brown bands Sandstone-Quartz
135.00 139.00	139.00 143.00	4.00 4.00	Sandstone, fine Quartz Sandstone-Quartz
143.00	145.00	2.00	Sandstone, fine Quartz
145.00	148.00	3.00	Sandstone, grey
148.00	151.00	3.00	Sandstone-Quartz
151.00	157.00	6.00	Sandstone, grey
157.00	157.20	0.20	Siltstone, & Quartz
157.20	162.00	4.80	Sandstone, grey

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Print Report

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

## Work Requested --- GW108642

Works Details (top)

GROUNDWATER NUMBER	GW108642
LIC-NUM	10BL165850
AUTHORISED-PURPOSES	DOMESTIC STOCK
INTENDED-PURPOSES	DOMESTIC STOCK
WORK-TYPE	Bore
WORK-STATUS	Supply Obtained
CONSTRUCTION-METHOD	Rotary - Percussion (Down Hole Hammer)
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2005-11-25
FINAL-DEPTH (metres)	162.00
DRILLED-DEPTH (metres)	162.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	WILLIAMS
GWMA	•
GW-ZONE	•
STANDING-WATER-LEVEL	- 100.00
SALINITY	
YIELD	0.50
Site Details <u>(top)</u>	
REGION 10-	SYDNEY SOUTH COAST
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING 625	3630.00
EASTING 280	486.00
LATITUDE 33	50' 5"

6/07/2010

LONGITUDE GS-MAP

150 37' 40"

REMARK	COORD-SOURCE	AMG-ZONE
	GIS - Geographic Information System	56

#### Form-A (top)

COUNTY	CUMBERLAND
PARISH	MULGOA
PORTION-LOT-DP	4//235175

#### Licensed (top)

PORTION-LOT-DP	PARISH	COUNTY	
4 235175	MULGOA	CUMBERLAND	

### Construction (top)

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

HOLE- PIF	PE- COMPONENT-	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	(mm)	ID (mm)	INTERVAL	DETAIL
د.	Hole	Hole	0.00	150.00	200			Rotary - Percussior (Down Hol Hammer)
د	Hole	Hole	150.00	162.00	150			Rotary - Percussio (Down Ho Hammer)
د د	Casing	PVC Class 9	-0.40	150.00	160	151.6		Riveted a Glued; Driven int Hole; Sea on Bottom Open Enc
Water Be	aring Zones <u>(to</u>	<u>(c</u>						
FROM-		ROCI	주 0	Ģ	TES	T-HOLI	μ	

154.00 154.00 0.00	DEPTH TO-DEPTH THICKNESS (metres) (metres) (metres)
	CAT-
0.20	₹° Γ Γ
0.50	YIELD DEPTH (metres)
2.00	DURATION SALINITY

### P

tres)	(	(	DESC	: - -	~	metres)		
8	154.00	0.00		0.20	0.50		2.00	
}								

154.00 0.00 0.20 0.50
0.20
) 0.50
2.00

etres)	(metres)	(metres)	DESC	v r r		(metres)	
4.00	154.00	0.00		0.20	0.50		2.00

	,			
ROM	0	THICKNESS	DESC (	<b>3EO-MATERIAL COMMENT</b>
00	0.30	0.30	topsoil	
>	5000	110		

18.00	0.30	0.00	FROM
23.00	18.00	0.30	ТО
5.00	17.70	0.30	THICKNESS
sandstone	shale, brown	topsoil	DESC
			GEO-MATERIAL
			COMMENT

http://is2.dnr.nsw.gov.au/proxy/dipnr/gwworks?GWWID=GW108642

6/07/2010

23.00

41.00

18.00

shales
Groundwater Works Summary

Page 3 of 3

41.00 162.00 121.00 sandstone

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# Groundwater Works Summary

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Print Report

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

# Work Requested --- GW105854

Works Details (top)

WORK-STATUS WORK-TYPE INTENDED-PURPOSES **AUTHORISED-PURPOSES GROUNDWATER NUMBER** GW105854 YIELD FINAL-DEPTH (metres) COMMENCE-DATE **OWNER-TYPE** CONSTRUCTION-METHOD LIC-NUM SALINITY STANDING-WATER-LEVEL **GW-ZONE** GWMA PROPERTY DRILLER-NAME CONTRACTOR-NAME DRILLED-DEPTH (metres) COMPLETION-DATE DOMESTIC STOCK Bore I. 10BL163242 BROWN 2005-05-04

Site Details (top)

ELEVATION GRID-ZONE AREA-DISTRICT **RIVER-BASIN** LONGITUDE LATITUDE EASTING NORTHING ELEVATION-SOURCE (Unknown) SCALE CMA-MAP REGION GS-MAP 1:25,000 56/1 212 - HAWKESBURY RIVER 33 49' 57" 280958.00 6253881.00 9030-3N 10 - SYDNEY SOUTH COAST 150 37' 59'

6/07/2010

### AMG-ZONE 56 COORD-SOURCE REMARK

### Form-A (top)

COUNTY	CUMBERLAND
PARISH	MULGOA
PORTION-LOT-DP	65 247308

### Licensed (top)

PORTION-LOT-DP	PARISH	COUNTY
65 247308	MULGOA	CUMBERLAND

# Water Bearing Zones (top)

no details

## Drillers Log (top)

no details

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Page 1 of 3

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Tuesday, July 6, 2010

Print Report

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

# Work Requested -- GW102779

# Works Details (top)

GWMA WORK-STATUS WORK-TYPE **GROUNDWATER NUMBER** GW102779 **YIELD** GW-ZONE DRILLED-DEPTH (metres) FINAL-DEPTH (metres) COMMENCE-DATE **OWNER-TYPE** CONSTRUCTION-METHOD INTENDED-PURPOSES AUTHORISED-PURPOSES LIC-NUM SALINITY STANDING-WATER-LEVEL PROPERTY DRILLER-NAME CONTRACTOR-NAME COMPLETION-DATE Rotary Air 150.00 150.00 DOMESTIC STOCK 1 NIA Bore 440.00 1999-12-08 (Unknown) DOMESTIC STOCK 10BL159455

## Site Details (top)

LATITUDE EASTING NORTHING ELEVATION-SOURCE ELEVATION SCALE GRID-ZONE CMA-MAP AREA-DISTRICT **RIVER-BASIN** REGION LONGITUDE 33 51' 14" 280409.00 6251499.00 **10 - SYDNEY SOUTH COAST** 150 37' 35"

GS-MAP

### Form-A (top)

PORTION-LOT-DP 1	PARISH N	COUNTY
_OT11 DP811925	MULGOA	CUMBERLAND

### Licensed (top)

PORTION-LOT-DP	PARISH	COUNTY	
11 811925	MULGOA	CUMBERLAND	

# 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

		<u>حـ</u>	<u>ب</u>	د_	NO HOLE-
J	ح	-			NO NO
	Casing	Casing	Hole	Hole	COMPONENT- CODE
	PVC Class 9	Steel	Hole	Hole	COMPONENT- TYPE
	-0.60	-0.60	5.30	0.00	DEPTH- FROM (metres)
	71.40	5.40	150.00	5.30	DEPTH- TO (metres)
	140	168.3	156	210	OD (mm)
		158.7			(mm)
					INTERVAL
	Screwed and Glued; Suspended in Clamps	C: 0-5.3m; Driven into Hole	Down Hole Hammer	Rotary Air	DETAIL

# •

-ROM- DEPTH	Vater		
	Bear	<u>د</u>	<u>د.</u>
TO-DEPTH T	ring Zones (	Casing	Casing
HICKNESS	(top)	PVC Clas	Steel
ROC		ů S	
Ϋ́		-0.60	-0.60
Śά		0	0
ΡÞ		71.2	5.40
YIELI		õ	U
TEST-HOLE- D DEPTH		140	168.3 158.7
DURATION SAI		Screw and G Suspe in Clar	C: 0-5. Driven Hole
INITY		ed lued; nded nps	.3m; into

ROM-	ater	
	Bea	<u>ح</u>
TO-DEPTH (metres)	ring Zones	Casing
THICKNESS (metres)	( <u>top</u> )	PVC Clas
		e S O
ő Ţ Ÿ		-0.0
⊢ ≷ လ່		ő
Γġġ		71.
YIELI		40
TEST-HOLE- D DEPTH (metres)		140
DURATION		in e
SA		Cla Cla

Drillers Log (top)

FROM TO

THICKNESS DESC

GEO-MATERIAL COMMENT

5.00

7.00 5.00 3.00

10.00 7.00

12.00

2.00 3.00 2.00 2.00 3.00

YELLOW S/S M.G. SOFT

10.00

SHALE

YELLOW S/S M.G. SOFT

3.00 0.00

SHALE CLAYS 132.00 119.00

138.00 124.00

6.00 5.00 (metres)

DESC

0.90 1.70

0.50 1.00

440.00 440.00

140.00 126.00 (metres)

FROM- TO-DEPTH THICKNESS ROCK- S- D-	Nater Bearing Zones ( <u>top)</u>
₽₽	
TEST-HOLE YIELD DEPTH	

http://is2.dnr.nsw.gov.au/proxy/dipnr/gwworks?GWWID=GW102779

WHITE GREY S/S M.G	6.00	150.00	144.00
WHITE S/S M.G	6.00	144.00	138.00
WHITE S/S M/G QUARTZ	6.00	138.00	132.00
LT GREY S/S M/G	6.00	132.00	126.00
DK. GREY S/S F/M/G	2.00	126.00	124.00
WHITE GREY S/S M/G QUARTZ	5.00	124.00	119.00
LT GEY S/S M.G	25.00	119.00	94.00
S/S CONGLOMERATE	4.00	94.00	90.00
LT GREY S/S M.G	3.00	90.00	87.00
YELLOW /BROWN/S/S M.G.	17.90	87.00	69.10
DK. GREY SHALE	0.10	69.10	69.00
LT GREY S/S M.G.	17.00	69.00	52.00
YELLOW S/S M.G SOFT	4.00	52.00	48.00
WHITE YELLOW M/G S/S	31.00	48.00	17.00
WHITE S/S M.G	5.00	17.00	12.00

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6/07/2010

# Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Tuesday, July 6, 2010

Print Report

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

# Work Requested -- GW105157

# Works Details (top)

GWMA YIELD FINAL-DEPTH (metres) **OWNER-TYPE** CONSTRUCTION-METHOD WORK-STATUS WORK-TYPE INTENDED-PURPOSES **AUTHORISED-PURPOSES** LIC-NUM GROUNDWATER NUMBER GW105157 STANDING-WATER-LEVEL GW-ZONE DRILLER-NAME CONTRACTOR-NAME DRILLED-DEPTH (metres) COMPLETION-DATE COMMENCE-DATE SALINITY PROPERTY SMITH IRRIGATION Bore 1 IRRIGATION 10BL157153 0.95 120.00 1981-01-01

## Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
<b>RIVER-BASIN</b>	212 - HAWKESBURY RIVER
AREA-DISTRICT	
CMA-MAP	9030-3N
GRID-ZONE	56/1
SCALE	1:25,000
ELEVATION	
ELEVATION-SOURCE	(Unknown)
NORTHING	6255870.00
EASTING	281042.00
LATITUDE	33 48' 53"
LONGITUDE	150 38' 4"
GS-MAP	

### Form-A (top)

PORTION-LOT-DP	PARISH I	COUNTY
LT 5 DP 260373	MULGOA	CUMBERLAND

### Licensed (top)

PORTION-LOT-DP	PARISH	COUNTY
5 260373	MULGOA	CUMBERLAND

# 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

<u>د</u>	<u>د</u>	NO HOLE-
<u></u>		NO NO
Casing	Hole	COMPONENT- CODE
P.V.C.	Hole	COMPONENT- TYPE
0.00	0.00	DEPTH- FROM (metres)
0.00	120.00	DEPTH- TO (metres)
150		OD (mm)
		(mm)
		INTERVAL
		DETAIL

# Water Bearing Zones (top)

no details

## Drillers Log (top)

no details

Warning To Clients: This raw data has been supplied to the Department of Infrastructure, Planning and Natural Resources (DtPNR) by drillers, licensees and other sources. The DIPNR does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

### Appendix C

Site Photographs



Photo 1 - View looking south along existing unsealed track within central part of proposed development area



Photo 2 – View looking north-west across Dam 9 at central western part of proposed development area

	General Site Photographs	PROJECT:	71706.01
Douglas Partners	Fernhill Estate, West Precinct	PLATE No:	1
Geotechnics 1 Environment 1 Groundwater	Fairlight Rd, Mulgoa	REV:	В
	CLIENT: Cubelic Holdings Pty Ltd	DATE:	3-Aug-10



Photo 4 – View looking north-west across existing Dam 11 to tree line near to western site boundary

	General Site Photographs	PROJECT:	71706.01
Douglas Partners	Fernhill Estate, West Precinct	PLATE No:	2
Geotechnics   Environment   Groundwater	Fairlight Rd, Mulgoa	REV:	В
	CLIENT: Cubelic Holdings Pty Ltd	DATE:	3-Aug-10



Photo 5 - Panoramic view looking north from Dam 12 across south-eastern part of proposed development area



Photo 6 - Panoramic view looking north across the central southern part of the proposed development area



Photo 7 – Panoramic view looking south along existing unsealed track in central northern part of proposed development area

	Genera	Site Photographs	PROJECT:	71706.01
<b>Douglas Partners</b>	Fernhill	Estate, West Precinct	PLATE No:	3
Geotechnics   Environment   Groundwater	Fairligh	t Rd, Mulgoa	REV:	В
	CLIENT:	Cubelic Holdings Pty Ltd	DATE:	3-Aug-10

### Appendix D

Test Pit Logs



### Sampling

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

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thinwalled sample tube into the soil and withdrawing it to obtain 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.

### **Test Pits**

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the insitu soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

### Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) 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 samples.

### **Continuous Spiral Flight Augers**

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

### Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

### **Continuous Core Drilling**

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

### Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

 In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

### 4,6,7 N=13

 In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

15, 30/40 mm

### Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

### Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

### Rock Descriptions

### **Rock Strength**

Rock strength is defined by the Point Load Strength Index (Is<sub>(50)</sub>) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 1993. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index Is <sub>(50)</sub> MPa	Approx Unconfined Compressive Strength MPa*
Extremely low	EL	⊲0.03	<0.6
Very low	VL I	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2-6
Medium	М	0.3 - 1.0	6 - 20
High	Н	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EĤ	>10	>200

\* Assumes a ratio of 20:1 for UCS to Is<sub>(50)</sub>

### **Degree of Weathering**

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description	
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.	
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable	
Moderately weathered	MW	Staining and discolouration of rock substance has taken place	
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock	
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects	
Fresh	Fr	No signs of decomposition or staining	

### **Degree of Fracturing**

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and loner sections
Unbroken	Core lengths mostly > 1000 mm

### **Rock Descriptions**

### **Rock Quality Designation**

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

RQD % = <u>cumulative length of 'sound' core sections ≥ 100 mm long</u> total drilled length of section being assessed

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

### **Stratification Spacing**

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

### Soil Descriptions

### **Description and Classification Methods**

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

### Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Туре	Particle size (mm)	
Boulder	>200	
Cobble	63 - 200	
Gravel	2.36 - 63	
Sand	0.075 - 2.36	
Silt	0.002 - 0.075	
Clay	<0.002	

The sand and gravel sizes can be further subdivided as follows:

Туре	Particle size (mm)	
Coarse gravel	20 - 63	
Medium gravel	6 - 20	
Fine gravel	2.36 - 6	
Coarse sand	0.6 - 2.36	
Medium sand	0.2 - 0.6	
Fine sand	0.075 - 0.2	

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

 Well graded - a good representation of all particle sizes

- Poorly graded an excess or deficiency of particular sizes within the specified range
- Uniformly graded an excess of a particular particle size
- Gap graded a deficiency of a particular particle size with the range

### **Cohesive Soils**

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

### **Cohesionless Soils**

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	Ĵ Î	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

### Soil Descriptions

### Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil derived from in-situ weathering of the underlying rock;
- Transported soils formed somewhere else and transported by nature to the site; or
- · Filling moved by man.

Transported soils may be further subdivided into:

- Alluvium river deposits
- Lacustrine lake deposits
- Aeolian wind deposits
- Littoral beach deposits
- Estuarine tidal river deposits
- Talus scree or coarse colluvium
- Slopewash or Colluvium transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

### Symbols & Abbreviations

### Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

### **Drilling or Excavation Methods**

C	Core Drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

### Water

$\triangleright$	Water seep
$\nabla$	Water level

### Sampling and Testing

- Auger sample A
- в Bulk sample
- D Disturbed sample
- Е Environmental sample
- U<sub>50</sub> Undisturbed tube sample (50mm)
- W Water sample
- pocket penetrometer (kPa) pp
- PID Photo ionisation detector
- PL Point load strength Is(50) MPa
- S Standard Penetration Test V
- Shear vane (kPa)

### Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

### **Defect Type**

В	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

### Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

- h horizontal
- vertical ٧
- sub-horizontal sh
- sub-vertical SV

### **Coating or Infilling Term**

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

### **Coating Descriptor**

calcite
carbonaceous
clay
iron oxide
manganese
silty

### Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

### Roughness

ро	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

### Other

fg	fragmented
bnd	band
qtz	quartz

### Symbols & Abbreviations

### Graphic Symbols for Soil and Rock

### General

$\times\!\!\!\times\!\!\!\times$	

Asphalt Road base

Concrete

Filling

### Soils



Topsoil

Peat Clay

Silty clay

Sandy clay

Gravelly clay

Shaly clay

Silt

Clayey silt

Sandy silt

Sand

Clayey sand

Silty sand

Gravel

Sandy gravel

Cobbles, boulders

Talus

### Sedimentary Rocks



Limestone

### **Metamorphic Rocks**

Slate, phyllite, schist

Quartzite

Gneiss

### **Igneous Rocks**

Granite

Dolerite, basalt, andesite

Dacite, epidote

Tuff, breccia

Porphyry



### TEST PIT LOG

Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

SURFACE LEVEL: 192.5 A EASTING: 278381 NORTHING: 6253145 DIP/AZIMUTH: 90°/--5 AHD PIT No: 1 PROJECT No: 7 DATE: 19/4/201 SHEET 1 OF 1 19/4/2010 \_\_\_ 71706



Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) piD Photo insation detector Sandard penetration test pL Point load strength Is(50) M V Shear Vane (kPa) > Water seep ¥ Water D Photo ionisation datactor Standard penetration tast Point bard sterngth Is(50) MPa Shear Vane (kPa)
 The Water level
 Water level

Date:

W о б Initials: RCB

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**Douglas Partners** Geotechnics · Environment · Groundwater

Cone Penetrometer AS1289.6.3.2

CHECKED

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REMARKS: Survey levels taken from survey plans provided by Urbis Pty Ltd

CLIENT: PROJECT: LOCATION:

### TEST **PIT LOG**

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 189.5 AHD
 PIT No:
 2

 EASTING:
 278418
 PROJECT No:
 71706

 NORTHING:
 6253277
 DATE:
 19/4/2010

RL         Description of mailurn plasticity         Strata Strata         Strata         Strata           03         Strata         Strata <th></th> <th></th> <th>₽</th> <th>PIAZIN</th> <th>AUTH:</th> <th>90°/</th> <th>ស្</th> <th>HEET 1 OF 1</th> <th>-</th>			₽	PIAZIN	AUTH:	90°/	ស្	HEET 1 OF 1	-
Image: State of the second	Denth	bescription ic		Sampli	ng & In \$	Situ Testing	er I		-
10     TOPSOL     Immunder     Do       10     0.37     SILTY CLAY- sift, comnge brown silly day, low to medium plasticity.     0     0.35       10     SHALE - extremely low strength, extremely weathered, grey shale with some instrong brown silly day, low to grey shale with some instrong brown silly day.     0     0.35       10     SHALE - extremely low strength, extremely weathered, grey shale with some instrong brown brown brown brown to strength reacted     0.35     0.4       10     Fit discontinued at 4.0m - target depth reacted	Ri (m)	Strata Grap Log	Туре	Depth	Sample	Results & Comments	Wate	blows per ( blows per (	Omm)
1     1     1     1       1     1     1       1     1 <td>TOPSOIL - firm, di rootlets, damp</td> <td>ark brown, silty clay with some</td> <td></td> <td>0.25</td> <td></td> <td></td> <td></td> <td></td> <td></td>	TOPSOIL - firm, di rootlets, damp	ark brown, silty clay with some		0.25					
18 19 19 19 19 19 19 19 19 19 19	-189 medium plasticity	orange brown silty clay, low to		0 0 0.5 4	<u> </u>		· · · · · · · · · · · · · · · · · · ·		
157 157 157 157 157 157 157 157									
A 195 197 197	-12 2 2.0 SHALE - extremely grey shale with son	low strength, extremely weathered							
4.0 Pit discontinued at 4.0m - target depth reached	187 						· · · · · · · · · · · · · · · · · · ·		
target depth reached	4.0 Pit discontinued at	+0m							
	- target depth react	red							
							··········		
RIG: Case 58 Backhoe LOGGED: AP	RIG: Case 58 Backhoe WATER OBSERVATIONS: No	free aroundwater observed	LOG	iged: /	Ą				
REMARKS: Survey levels taken from survey plans provided by Urbis Pty Ltd	REMARKS: Survey levels to	uee grounowater observed aken from survey plans provided by Urbis F	Pty Ltd	-				nd Penetrometer 1e Penetrometer	AS1289.6.3.3 AS1289.6.3.2

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# **TEST PIT LOG**

CLIENT: Owston Nominees No. 2 Pty Ltd PROJECT: Land Capability Assessment LOCATION: Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 189.0
 AHD
 PIT No:
 3

 EASTING:
 278591
 PROJECT No:
 71706

 NORTHING:
 6253273
 DATE:
 19/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
 1
 OF

	Description	;	5	Samo		1: 90°/	-  ∽ -	HEET 1 OF 1
ерth (л)	of Strata	Graphi Log	Туре	Depth	Sample	Results & Comments	Water	Dynamic Penetr (blows per 1
1	TOPSOIL - firm, dark brown, silty clay with some rootlets, damp	R						
0.23	SILTY CLAY - stiff to hard, orange brown silty clay, high plasticity	<u>77</u>	0	0.25			·	<b></b>
		<u>7</u> 72	U	0,5 0		pp>400kPa	<del>,</del> "	
	- mottled orange brown and grev from 0.8m	<u> </u>	5 5	2 2 1		:		·····
188 		7-7-7 1-7-7	0	1.0				·····
· · · · · · · ·				<b></b>				
	SHALE/SILTSTONE - extremely low to very low strength, grey and orange brown shate/stitstone with some ironstone banding		0	2.0	<u> </u>			
186 	- high strength ironstone band		D	3.0	<u></u>			
	Pit discontinued at 3.4m - practical refusal on ironstone band		<u> </u>					
185 				·				· · · · · · · · · · · · · · · · · · ·
							···	
								· · · · · · · · · · · · · · · · · · ·
RIG: Case 5	58 Backhoe	ŀ	ь	GED:	₽ _		-	••
REMARKS:	Survey levels taken from survey plans provided by L	irbis Pi	ty Ltd				⊠ Cor	nd Penetrometer ne Penetrometer

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) PD Photo ionisation detector Standard penetration test PL Point load strength (kPa) V Stear Vane (kPa) V Water level → Water level

initials: RCR Date: 3.8.10

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### TEST PIT LOG

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 196.0 AHD
 PIT No:
 4

 EASTING:
 278776
 PROJECT No:
 71706

 NORTHING:
 6253233
 DATE:
 19/4/2010

			Ē	- IAL	MU	H: 90°/		SHEET 1 OF 1
L Depth	Description			Sam	oling &	In Situ Testing	er	
96 R (m)	of	Log	Туре	Depth	Sample	Results & Comments	Wate	blows per 150mm)
, <u>, 1</u>	TOPSOIL - stiff, dark brown, silty clay with some roottets	<u>ZZ</u>	0	0.25				· · · · · · · · · · · · · · · · · · ·
0.35	SILTY CLAY - stiff to very stiff, mottled red brown and grey silty clay, low to medium plasticity	<u>777</u>	0	0.5				
	7772				·-			
	SHALE - medium strength, slightly weathered to fresh, grey shale		Ū	1.0	<b></b>			
	Pit discontinued at 1.1m							
······································				•				
							۹	
					·······		······································	
·····								
4							· · · · · · · · · · · · · · · · · · ·	
		·			<u></u>			
lG: Case t	58 Backhoe		6	GED:	Ą		ļ	
ATER OB	SERVATIONS: No free groundwater observed Survey levels taken from survey plans provided by Ur	bis Pl	√ Ltd					Sand Penetrometer AS1289.6.

SAMPLING & IN SITU TESTING LEGEND pp Pockat penetrometer (kPa) PiD Photo konisation detector S Standard penetration tast pL Point load strength 1s(50) MPa V Stear Vane (kPa) V Valter seep ¥ Watter lev Initials: RCB CHECKED

Water level

Date: 3,8.10

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

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### TEST PIT LOG

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 195.0 AHD
 PIT No:
 5

 EASTING:
 278892
 PROJECT No:
 71706

 NORTHING:
 6253156
 DATE:
 19/4/2010

195 RL Depth	Description of Strata	Graphic Log	Depth Sam	Sample 🖻 🛛 🖊	9 С H	g & In Situ Testing Results & Comments
· · · · · ·	TOPSOIL - firm to stiff, dark brown, silty clay with som rootlets, damp			0.0 0.1 0.25	0.25	0.1
0 4	SILTY CLAY - stiff to very stiff, mottled red brown and grey, silty clay, medium to high plasticity			0.0. 5.4		4 ti
194	SHALE - extremely low to very low strength, highly to moderately weathered, grey shale with some ironstone bands 1.6m: medium to high strength		0	1.0		
193 N	1.6m: medium to high strength		0	D N. 0	0 N 0	2
· · · · · · · · · · · · · · · · · · ·	Pit discontinued at 2.1m - practical refusal in medium to high strength shale					
191 1 4		<b></b>		······		,
· , , ,					······	·
lig: Case VATER OF	8 Backhoe SERVATIONS: No free proundwater observed			LOGGED:	LOGGED: AP	Logged: Ap
MARKS	SERVATIONS: No free groundwater observed E = Environmental sample Survey levels taken from survey plans provided	v Urhis Ptv	F	<b>d</b>	5	<b>ц</b>

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND p Pocket penetrometer (kPa) PID Photo ionitsation delector S Standard penetration tast PL Point load strength 1s(50) MPa V Stear Vane (kPa) V Water seep ¥ Water level

Initials: LCS

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Date:

3.8 10

# **TEST PIT LOG**

CLIENT: PROJECT; LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 181.0 AHD
 PIT No:
 6

 EASTING:
 279079
 PROJECT No:
 71706

 NORTHING:
 6253239
 DATE:
 19/4/2010

### TEST PIT LOG

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 190.5 AHD
 PIT No:
 7

 EASTING:
 278920
 PROJECT No:
 71706

 NORTHING:
 6253280
 DATE:
 19/4/2010

			Ę	/AZIn		1: 90°/	S	HEET 1 OF 1
j_ Depth	Description	phic g	_	Sampl	ng & Ir	Situ Testing	er	Dvnamic Penetrometer Tes
R (m)	of Strata	Grap Lo	Туре	Depth	Sample	Results & Comments	Wat	(blows per 0mm) 5 10 15 20
······································	TOPSOIL - firm, dark brown, silty clay with some () rootlets, damp	<u> II</u>	U D	).25				
, <u>190</u> , <u>190</u> , <u>4</u>	SILTY CLAY - stiff, mottled red brown and grey, silty clay, low to medium plasticity	<u> </u>	00 00	0.5				
			D	0.9 			·····	- 
. 1.35- 1.4-	SHALE - medium strength, slightly weathered, grey		_					
18	Pit discontinued at 1.4m - refusal on medium strength shale		- #P					
N			ur	<u> </u>	·		· · · · · · · · · · · · · · · · · · ·	~
188			······································				··	
ώ.		<u>,</u>			<u> </u>		· · · · · · · · · · · · · · · · · · ·	_
187								
4								-
<u>186</u>							<del> </del>	
RIG: Case : VATER OB	58 Backhoe \$SERVATIONS: No free groundwater observed		Log	GED:	ĄP		]	
REMARKS:	Survey levels taken from survey plans provided by t	Irbis P	ty Ltd				ດ ເ	and Penetrometer AS1289.

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Auger sample Disturbed sample Bulk sample Tube sample (\* mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (Fa) pD Photo Instatin detector S Standard penetration test PL Point load strength Is(50) MPa V Shear Vane (Fa) P Water seep \$ Water ley

checked

Water level

Date; 3.8.10

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# **TEST PIT LOG**

CLIENT: Owston Nominees No. 2 Pty Ltd PROJECT: Land Capability Assessment LOCATION: Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 180.5 AHD PIT No:
 8

 EASTING:
 279045
 PROJECT No:
 71706

 NORTHING:
 6253429
 DATE:
 19/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
 1 OF
 1

Carbon     Comparison     Comparison     Comparison       1     Comparison		176	<del>~, , ,</del>	- 178	179 N		180		RL	
Userption     Simple of statul rempt       TOPPOIL stiff dark thrown, sity day with a times of solution.     B       SILTY CLAY, stiff, rep brown, sity day with a times of solution.     B       SILTY CLAY, stiff, rep brown, sity day with a times of solution.     B       SILTY CLAY, stiff, rep brown, sity day with a times of solution.     B       SILTY CLAY, stiff, rep brown, sity day with a times of solution.     B       SILTY CLAY, stiff, rep brown, sity day with a times of solution.     B       SILTY CLAY, stiff, rep brown, sity day with a times of solution.     B       SILTY CLAY, stiff, rep brown, sity day with a times of solution.     B       SILTY CLAY, stiff, rep brown, sity day with a times of solution.     B       SILTY CLAY, stiff, rep brown, sity day with a times of solution.     B       SILTY CLAY, stiff, rep brown, sity day.     B       Silt for rep brown, sith rep brown, sity day.     B <td< td=""><td>Case 5</td><td></td><td><u>.</u></td><td><u>م</u> </td><td><b>د.</b> م</td><td></td><td>0 *</td><td></td><td>(m) mdar</td><td></td></td<>	Case 5		<u>.</u>	<u>م</u> 	<b>د.</b> م		0 *		(m) mdar	
Source     Description     Description       1     1     1     1       2     1     0     2       1     1     1     1	38 Backhoe		Pit discontinued at 3.1m - practical refusal on medium strength shale	2.9m: low to medium strength, slightly weathered	SHALE - extremely low to very low strength, extremely weathered, grey shale	- mottled red brown and grey, with a trace of ironstone	SILTY CLAY - stiff, red brown, silty clay with a trace of rootlets, medium plasticity	TOPSOIL - stiff, dark brown, silly clay with some rootlets, damp	Strata	Description
OGGED: AP	5		 	<u>, , , , , , , , , , , , , , , , , , , </u>	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	<u>, 1117177</u>	<u>97777</u> 2	$\overline{\mathcal{OP}}$	Log Туре	
Pesults & Sample Comments & Sa			 μ	Ň	) )	1.0	0.5	0.25	Depth	Sa
Vin Stell resund Comments & Water Water Water Comments Water Comments Comme	0: AP	· · · · · · · · · · · · · · · · · · ·							Sample	mpling a
Water Water Water Water Uniones Peretrometer Uniones Peretrom									Results & Comments	& In Situ Testing
by the second se						<u></u>			Water	
tooms per entrometer tooms per entrometer		4		ω Ν	· · · · · · · · · · · · · · · · · · ·		• • • • • •	<del>, ,,,,,,</del>	Dy	
								<b></b>	namic Penetrometer Te (blows per 150mm) 10 15 20	

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Auger sample Distuthed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Pockel penetrometer (*P*a) PD Photo ionisation deactor S Standard genetration test mm dia.) V Shear Vane (*P*a) V Shear Vane (*P*a) V Shear Vane (*P*a) V Shear Vane (*P*a) V Shear Vane (*P*a)

Initials: DOS Date: 3,8,10

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### TEST PIT LOG

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 185.5 AHD
 PIT No:
 9

 EASTING:
 278556
 PROJECT No:
 71706

 NORTHING:
 6253390
 DATE:
 19/4/2010

			DIP//	ZIML	ITH: 90°/	(0)	HEET 1 OF 1
Denth	Description		s	ampling	& In Situ Testing	er	
RL (m)	Of Grapt	Log	Depth	ample	Results & Comments	Wate	Dynamic Penetrometer Test (blows per 150mm)
	TOPSOIL - stiff, brown, silty clay with some rootlets, humid to damp	22					······
	SILTY CLAY - very stiff to hard, orange brown slity clay, how to medium plasticity	ZZF	0.2	<u> </u>		·	
	- some ironstone banding from 0.5m	777		0.		 _, _, _,	
, , , , ,		7777					
· · · ·		<u>[-/-/-/-</u>					<u>.</u>
<u>.184</u>	SHALE - extremely low strength, extremely weathered,					~,,	
·····	- ironstone bands between 1.6m and 2.5m						
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		<u>                                     </u>	2.0			······	Ň
2.7	SANDSTONE - low to medium strength, moderately					-	
 ຜ	Pit discontinued at 2.7m - practical refusal on medium strength sandstone					-1	ω
							· · · · · · · · · · · · · · · · · · ·
182		<u></u>				,	
* * *							
4							4
			<u>.</u>				
· · · ·				<u></u>			
	no 0))	,					
WATER OF	SERVATIONS: No free groundwater observed	_	-066t	=D: AF		□ 0	and Penetrometer AS1289 6 3 3
REMARKS:	Survey levels taken from survey plans provided by Urb	is Pty	Ltd				and Penetrometer AS1289.6.3.2

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

IG & IN SITU TESTING LEGEND pp Pocket penetrometer (APa) PID Photo ionisation delever S Standard penetration test PL Point load strength is(50) MPa V Shear Vane (APa) ▷ Water seep ▼ Water level

CHECKED

Water level

Date: 3 & 10

SAMPLING

# TEST PIT LOG

CLIENT: Owston Nominees No. 2 Pty Ltd PROJECT: Land Capability Assessment LOCATION: Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 189.0 AHD
 PIT No:
 10

 EASTING:
 278815
 PROJECT No:
 71706

 NORTHING:
 6253493
 DATE:
 19/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
 1 OF

REM.	RIG:		185 	186		·····				189 R		
ARKS:	Case 5					1. 1. 		0.39		(m)	Denth	
SERVA HONS: No free groundwater observed E = Environmental sample Survey levels taken from survey plans provided by	58 Backhoe				- refusal on medium strength shale	SHALE - low to medium strength, slightly weathered, shale Pit discontinued at 1 8m	· · · ·	SILTY CLAY - soft to firm, mottled red brown and grey, sitly clay with a trace of ironstone gravel, medium to high plasticity	TOPSOIL - firm to stiff, dark brown, silty clay with some rootlets, damp	of Strata	Description	
Urbis F			<u></u>		<u>+</u>		╶┤╌╎╌╎╌╎╌╎╌╎╌╎ ╶╎╌╎╌╎╌╎╌╎╌╎╌╎		<u>I</u> U	Grap Log	hic J	
ty Ltd	LOG					<u> </u>	<b>.</b>			Туре		밀
	GED: /						1.0	0.5	0.0 0.1	Depth	Sampli	/AZIN
	ĄÞ									Sample Comme	ing & In Situ Testin	ALITH: 90°/
										nts	9	
⊠ Ω Sa		· · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	, , <u>, , , , , , , , , , , , , , , </u>			· · · · ·	· · · · ·		Wate		<u>s</u>
ind Penetrometer AS1289.6.3. me Penetrometer AS1289.6.3.				-						blows per 150mm)		HEET 1 OF 1

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

### TEST PIT LOG

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 186.0 AHD PIT No:
 11

 EASTING:
 278939
 PROJECT No:
 71706

 NORTHING:
 6253518
 DATE:
 19/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
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			<u>:</u>			. 90 /-		
Depth	Description	ohic g	-	Sampi	ing & I	n Situ Testing	ter	Dynamic Penetrometer Test
<u>6 </u> (Э)	of Strata	Grap Lo	Туре	Depth	Sample	Results & Comments	Wate	(blows per Omm)
1	TOPSOIL - firm to stiff, dark brown, silty clay with some rootlets, damp	<u>E</u>		0.2				· · · · · · · · · · · · · · · · · · ·
	SILTY CLAY - very stiff, orange brown, silty clay with a trace of ironstone gravel, medium plasticity			0.0. 4 tů				
	SHALE - extremely low strength, extremely weathered, grey shale with some orange brown silty clay seams		U	1.0				
	1.3m: medium strength		·		·			
ب ب ب ب ب ب ب ب ب ب س ب	Pit discontinued at 1.5m - refusal on medium strength shale							
184 , , , , , , , , , , , , , , , , , , ,			<u> </u>					
	-	······································		*			······································	
								¥ · · · · ·
							· · · · · · · · · · · · · · · · · · ·	
							· · · ·	
RIG: Case	58 Backhoe		1060	SED:	P -			
WATER OE REMARKS:	<pre>SERVATIONS: No free groundwater observed E = Environmental sample Survey levels taken from survey plans provided by</pre>	Urbis P	ty Ltd					Sand Penetrometer AS1289.6 Cone Penetrometer AS1289.6

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CHECKED Date: 3.8, (O

SAMPLING & IN SITU TESTING LEGEND pp Pockel penetrometer (kPa) pD Photo ionisation deter (kPa) Sandard penetratelector mm dia.) v Shear Vane (kPa) v Shear Vane (kPa)

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

# **TEST PIT LOG**

CLIENT: Owston Nominees No. 2 Pty Ltd PROJECT: Land Capability Assessment LOCATION: Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 174.5 AHD
 PIT No:
 12

 EASTING:
 279174
 PROJECT No:
 71706

 NORTHING:
 6253552
 DATE:
 19/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
 1

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	Description		Sarr	pting &	In Situ Testing	ter	Dynamic Penetro
F (JJ	or Strata Gran	Туре	Depth	Sample	Results & Comments	Wat	5 10 5
<del> </del>	TOPSOIL - firm to stiff, dark brown, silty clay with some rootlets, damp	-	0.25				
	SILTY CLAY - very stiff, mottled orange brown and grey	D C	> 0.5				<b>r</b>
	77	<mark>ج</mark>	, 0.6		pp>400kPa	~~,	<b>ſ</b>
· · · · ·	SHALE - extremely low strength, extremely weathered, grey shale with a trace of orange brown silty clay	11111111	5				
173		<u>,,,,,,,,,,,,,,,,,,</u> ,,,		<u> </u>		······································	
1.7	1.6m: low to medium strength	<u> '''''</u>					
N	Pit discontinued at 1.7 m - practical refusal on medium strength shale						~~~~
172							N
ω	·			·			ω
171			,				
4			·····			····	
170						, , <u>, ,</u>	
· · · · · · ·						· · · · ·	
RIG: Case	58 Backhoe	Б	GGED	:AP			
NATER OE REMARKS	3SERVATIONS: No free groundwater observed Survey levels taken from survey plans provided by Linhi		i			ם אר	and Penetrometer
REMARNS	Survey levels taken from survey plans provided by Linhi	″₽₹	đ			× S	ana Denstramet

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

### TEST PIT LOG

Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 184.5 AHD
 PIT No:
 13

 EASTING:
 278656
 PROJECT No:
 71706

 NORTHING:
 6253547
 DATE:
 20/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
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		:					6		
L Depth	Description	hic g		Samplin	g & In Situ T	esting	er	Dynamic Depatron	neter Tost
(m)	of Strata	Grap Lo	Туре	Depth Sample	 ਨੂਟ	sults & nments	Wat	(blows per 15)	omm)
	TOPSOIL - soft to firm, dark brown, silty clay with some rootlets, damp	<u>B</u>	m	is ,					
184 	SILTY CLAY - very stiff, orange brown, silty day with some ironstone gravel		m	ພໍ 4ໍ ຕໍ	<u></u> ,				
183	SANDSTONE - low strength, extremely weathered, grey, fine grained sandstone						····		
2.0 2.0	- low to medium strength Pit discontinued at 2.0m - practical refusal on medium strength sandstone							دم 	
								ω	
llG: Case { VATER OB	58 Backhoe		LOGG	ED: A	יי				-
VATER OB REMARKS:	SERVA IVUNS: NO Tree groundwater observed E = Environmental sample Survey levels taken from survey plans provided by		<u>-</u> 1				⊠ □ c v	and Penetrometer <i>J</i> one Penetrometer <i>J</i>	\S1289.6.3.3 \S1289.6.3.2

**REMARKS:** E = Environmental sample Survey levels taken from survey plans provided by Urbis Pty Ltd

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Pockel panetometer (KPa) pp Pockel panetometer (KPa) pp Pockel panetometer (KPa) Standard panetano test per Valier seep Valier seep Water seep Valier seep Valier

CHECKED Initials: RCB

Water level

Date: 3.8.10

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CLIENT: PROJECT: LOCATION:

# TEST PIT LOG

CLIENT: PROJECT: LOCATION: Owston Norninees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 185.0 AHD
 PIT No:
 14

 EASTING:
 278759
 PROJECT No:
 71706

 NORTHING:
 6253597
 DATE:
 20/4/2010

 DIP/AZIMUTH:
 90°/-- SHEET
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 0F

5	<u>181</u>	· · · · ·	182		, <u> </u>	183	··· <del>··································</del>	,,	· · · ·	184		, , , ,		185 F	۲L
•	 		ω	ľ	о л	N		1.4		<u>ن</u>		0.42		E)	Depth
				Pit discontinued at 2.5m - practical refusal on medium strength sandstone	2.3m: low to medium strength with a trace of grey, fine grained sandstone			SHALE - extremely low strength, extremely weathered, grey shale				SILTY CLAY - stiff, orange brown, silty clay with some ironstone gravel and cobbles	rootlets, damp	TOPSOL - firm. dark brown. silty clay with some	Description
	 									-[-[-,	<u> - [-[-</u>	<u>77</u>	44		ohic g
•		<b>-</b>						U 					0	Туре	-
	 						• <u></u>	ζη		.0	-7.	5.5	.25	Depth	Sampli
														Comments	ng & In Situ Testing
	 4		ω	,		, , , , , , , , , , , , , , , , , , ,	· · · ·	·····	· · · ·					Wa	ter
								······						(blows per 0mm)	Dvnamic Penetrometer Test

REMARKS:

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (Pa) pD Photo ionisation deletor Standard penetration test PL Point load strength Is(60) MPa V Shear vane (Pa) V Shear vane (Pa) V Shear vane (Pa) V Shear vane (Pa)

Water level

Date: 3.8.10 Initials: RCB CHECKED

LOGGED: At

Sand Penetrometer AS1289.6.3.3 Cone Penetrometer AS1289.6.3.2

Survey levels taken from survey plans provided by Urbis Pty Ltd

WATER OBSERVATIONS: No free groundwater observed

\$ **Douglas Partners** Geotechnics - Environment - Groundwater

### TEST PIT LOG

Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 179.0 AHD PIT No:
 15

 EASTING:
 279064
 PROJECT No:
 71706

 NORTHING:
 6253652
 DATE:
 20/4/2010

	 <u>175</u>	,,,,,,,,,	76 76 Γ · · · · · · · ·		· · · · ·	177 N	, , , , , , , , , , , , , , , , , , ,	178			-r	179 RL		
	 				23	·=		<u>ь</u>	·,		0.32	(ji)	Jepth	
				Pit discontinued at 2.3m - practical refusal on medium strength shale	medium strength, slightly weathered		SHALE - extremely low to very low strength, extremely			SILTY CLAY - stiff to very stiff, orange brown silty clay, // low plasticity	TOPSOIL - firm, dark brown, silty clay with some rootlets, damp	of Strata	Description	
-	 	<del>.</del>							7-1-1-1		<u>DD</u>			
	 	·			-					~ ~ ~	<u>.</u>	Туре		
	 ·····						<u></u>			4 0		Sample	Samplin	A2IIVI
	 		<u></u> ,									Results & Comments	g & In Situ Testing	UIH: 90-/
	 	· · · · · · · · · · · · · · · · · · ·						· · · ·		······································		Wate	er	<u>v</u>
	 -											(blows per 0mm) 5 10 15 20	Duramic Density To	HEET 1 OF 1

9 **Douglas Partners** Geotechnics · Environment · Groundwater



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REMARKS:

Survey levels taken from survey plans provided by Urbis Pty Ltd

Cone Penetrometer AS1289.6.3.2 Sand Penetrometer AS1289.6.3.3 CLIENT: PROJECT: LOCATION:
CLIENT: Owston Nominees No. 2 Pty Ltd PROJECT: Land Capability Assessment LOCATION: Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 172.0 AHD
 PIT No:
 16

 EASTING:
 279206
 PROJECT No:
 71706

 NORTHING:
 6253740
 DATE:
 20/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
 1
 0F

.

WATER OBSERVATION	RIG: Case 58 Backho	 · · · · · · · · · · · · · · · · · · ·				168 169 169 Δ	168 169 4 4 4 4 4 4 4 4 4 4 4 4 4	168 169 177 169 177 177 177 177 177 177 177 17	169 170 170 170 170 170 170 170 170	168 169 170 170 170 170 170 1.9m: Iow Pit discon ractica	168 170 169 170 1.9m: low Pit discon practice tice	168 170 170 170 170 170 170 170 170	168 169 170 171 1.1 SHALE - grey shall practical SILTY O	168 169 172 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.	168 169 170 170 170 170 170 170 170 170
ONS: No free groundwater observed	Đ							al refusal on medium strength shale	v to medium strength ntinued at 1.95m al refusal on medium strength shale	v to medium strength ntinued at 1.95m al refusal on medium strength shale	extremely weathered, extremely low strength tlinued at 1.95m al refusal on medium strength shale	extremely weathered, extremely low strep le with some fine grained sandstone band intinued at 1.95m al refusal on medium strength shale	LAY - very stiff, orange brown, silty clay w nstone gravel and cobbles, low to medium extremely weathered, extremely low stren le with some fine grained sandstone band innued at 1.95m al refusal on medium strength shale	L - stiff, brown, silty clay with some rootter damp LAY - very stiff, orange brown, sity clay w nstone gravel and cobbles, low to medium extremely weathered, extremely low stren a with some fine grained sandstone band tinued at 1.95m al refusal on medium strength shale	Strata L - stiff, brown, silty clay with some rootlei damp LAY - very stiff, orange brown, silty clay w nstone gravel and cobbles, low to medium extremely weathered, extremely low strend a with some fine grained sandstone band infinued at 1.95m al refusal on medium strength shale al refusal on medium strength shale
LOG		 									is ng t. 				
gged: A		 	<u> </u>	_									0.0 4 ti	0 0 0 0 0 5 4 2 2 2 2 5 4 2 2 2 2	 ຜູ້ຊີເຜີຊີເຈັ Sample
·															Comments &
		 	4	·····				ω Ν		ω	ω	ω Ν			Wat
1 Penetrometer	•••	 										······			s (blows per 1
		 			••••						·····				150mm) 15 %

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core dniling

SAMPLING & IN SITU TESTING LEGEND P Pockel penetrometer (kPa) P Pockel penetrometer (kPa) P Pockel penetrometer (kPa) Standard penetration test P Point load strength is(50) MPa V Shaar Vane (kPa) V Shaar Vane (kPa) V Shaar Vane (kPa) V Shaar Vane (kPa) V Shaar Vane (kPa)

Initials: RCS Date: 3.8. 10

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**Douglas Partners** Geotechnics · Environment · Groundwater CHECKED

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 
 SURFACE LEVEL:
 176.0 AHD
 PIT No:
 17

 EASTING:
 279027
 PROJECT NO

 NORTHING:
 6253814
 DATE:
 20/2
 PROJECT No: 71706 DATE: 20/4/2010

**REMARKS:** 

Survey levels taken from survey plans provided by Urbis Pty Ltd

SAMPLING & IN SITU TESTING LEGEND pp Pockel penetrometer (kPa) PID Photo ionisation detector S Standard penetration test mm dia.) V Shear Vane (kPa) V Water seep ¥ Water lavel

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

 $\boxtimes$   $\Box$ Sand Penetrometer AS1289.6.3.3 Cone Penetrometer AS1289.6.3.2

CHECKED Initials: RCR Date: 3.8.60 \$

**Douglas Partners** Geotechnics · Environment · Groundwater

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 
 SURFACE LEVEL:
 173.5 AHD
 PIT No:
 18

 EASTING:
 279208
 PROJECT N

 NORTHING:
 6253859
 DATE:
 20/4

 DIP/AZIMUTH:
 90°/- SHEET 1
 C
 PROJECT No: 71706 DATE: 20/4/2010 SHEET 1 OF 1

L Depth	Description	hic g		Sam	pling &	In Situ Testing	er	2	namic Desettometer To
R (j)	of Strata	Grap Log	Туре	Deptin	Sample	Results & Comments	Wate	, vy	(blows per Omm)
	TOPSOIL - firm, brown, silty clay with some rootlets, humid to damp	X				:			
173 	SANDY CLAY - stiff, orange brown, sandy clay with some ironstone gravel, low plasticity		50 6	0.25 0.4 0.5 0.6				· · · · · · · · · · · · · · · · · · ·	
0.85	SANDSTONE - medium to high strength, slightly								
	Pit discontinued at 0.85m - refusal on medium to high strength sandstone								
172								· · · · · · · · · · · · · · · · · · ·	
→ , ,			······					N 10 10 10 10 10 10 10 10 10 10 10 10 10	
<u>171</u>									
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<u> </u>			<u></u>				<u>, u.</u>		
<del>ن</del> در ا ا ا ح									
<u> </u>									
IG: Case	58 Backhoe		ပြ	IGED	: AP				
VATER OF	BSERVATIONS: No free groundwater observed						] []	Sand P	enetr
EMARKS		1.50	₹ _td				כ	, , , , ,	•

REMARKS: Survey levels taken from survey plans provided by Urbis Pty Ltd

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND PP Cocket penetrometer (IPa) PD Photo indication dealour Standard penetration test PL Point load strength Is(30) MPa V Stear Vane (IPa) V Alter seep ¥ Water lay

Water level

CHECKED Date: 3. 8. 10 \$ **Douglas Partners** Geotechnics · Environment · Groundwater

Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

a)     of     Staa       102     SINDY CLAY - stiff to hard, orange brown, sandy clay with some forusatione gravel and cobbles, low to medium strength sandstone     Graphi       13     1.25m: Inv to medium strength sandstone     Fire grained sandstone       - practical relusal or medium strength sandstone     Fire grained sandstone	a)     a)     a)     a)     a)       a)     a)     Constraint     Constraint     Constraint       a)     SANDSTONE     Sample     Constraint     Constraint       b)     Baseliarly     Baseliarly     Constraint     Constraint       c)     SANDSTONE     Sample     Constraint     Constraint       c)     SANDSTONE     Sample     Constraint     Constraint       c)     Sample     Constraint     Constraint     Constraint       c)     Sandstore     Constraint     Constraint     Constraint       c)     Sample     Constraint     Constraint     Constraint       c)     Constraint     Sample     Constraint     Const		Description	.c		AZIN Sampli	90°/ Situ Testing		_ I ≌
22       SANDY CLAY - stiff to hard, orange brown, slivy day with some variables, bow to readily with some transitione gravel and cobbles, low to medium plastidy.         13       SANDSTONE - extramely low to very low strength, gray, include sandstone gravel and cobbles, low to medium strength sandstone         14       1.25m: low to medium strength sandstone         15       Predicontinued at 1.3m.         - pradical refusal on medium strength sandstone         - predical refusal on medium strength sandstone	22     SANDY CLAY - stiff to hard, orange brown, sandy clay with some vorsione gravel and cobbies, low to medium with some vorsione gravel and cobbies, low to medium fine grained sandstone       03     SANDSTONE - extramely low to very low strength, gray, line grained sandstone       13     Pridicentinued at 1.3m       - pradical retusal on medium strength sandstone       - pradical retusal on medium strength sandstone       - see 58 Backhoe	<u> </u>	of Strata	Graphic Log	Туре	Semale	Com	nents	Water
SANDY CLAY - stift to hard, orange brown, sandy clay with same transitione gravel and cobbles, low to medium fine grained sandstone Pit discontinued at 1.3m - practical refusal on medium strength sandstone	SANDY CLAY - stiff to hard, orange brown, sandy day with same forsione gravel and cobbies, low to medium pleaday in gravel and cobbies, low to medium fine grained sandstone.       Ine grained sandstone     Firdiscontinued at 1.3m       - practical refusal on medium strength sandstone	<u> </u>	roPSOIL - firm to stiff, brown, silty clay with some routlets, humid	X					
SANDSTONE - extremely low to very low strength, grey, Ine grained sandstone Pit discontinued at 1.3m - practical refusal on medium strength sandstone	Produce sendatione strength, gray, Fridiscontinued at 1.3m. - practical refusal on medium strength sandstone - practical refusal on medium strength sandstone - practical refusal on medium strength sandstone 		SANDY CLAY - stiff to hard, orange brown, sandy clay with some ironstone gravel and cobbles, low to medium plasticity		••				
Pit discontant survey of a sandstone - practical refusal on medium strength sandstone 	Pradical refusal on medium strength sandstone		SANDSTONE - extremely low to very low strength, grey, ine grained sandstone			<u> </u>			
- practical refusal on medium strength sandstone	- pradical refusal on medium strength sandstone	<u></u>	.25m: low to medium strength sandstone	· · · · ·					
	se 58 Backhoe LOGGED: AP	<u> </u>	- practical refusal on medium strength sandstone						
OBSERVATIONS: No free groundwater observed		Ŕ	Survey levels taken from survey plans provided by	Urbis Pl	ly Ltd				

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND PD Poole: penetrometer (RPa) D Phote instaltin detector Standard penetration test PL Point load strength Is(50) MPa D Water seep \$ Water lev

Water level

Date: 3.8.10 Initials: RCS CHECKED

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Cone Penetrometer AS1289.6.3.2

**Douglas Partners** Geotechnics · Environment · Groundwater

CLIENT: PROJECT: LOCATION:

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 177.5 AHD PIT No:
 20

 EASTING:
 279004
 PROJECT No:
 71706

 NORTHING:
 6253925
 DATE:
 20/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
 1
 0F
 1

RL Depth (m)	Description
}	TOPSOIL - stiff, brown, silty clay with some rootlets, damp
	SILTY CLAY - stiff to hard, orange brown, silty clay wit ironstone gravel, low to medium plasticity
177	
<u> </u>	
	SANDSTONE - extremely low strength, extremely weathered, grey, fine grained sandstone
1.7	1.6m: medium to high strength
· · · · · · · · · · · · · · · · · · ·	Pit discontinued at 1.7m - practical refusal on medium to high strength sandstone
4	
3: Case	8 Backhoe

**REMARKS:** 

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Auger sample Disturbed sample Bulk sample Tube sample (X mm dia.) Water sample Core drilling

Survey levels taken from survey plans provided by Urbis Pty Ltd

SAMPLING & IN SITU TESTING LEGEND pp Pockel penetrometer (kPa) PID Photo ionisation detects Standard penetration test PL Point load strength Is(50) MPa V Steat vares (kPa) V Vater seep ¥ Water level CHECKED

> Sand Penetrometer AS1289.6.3.3 Cone Penetrometer AS1289.6.3.2

Date: 3,8.10 Initials: RCR 9 **Douglas Partners** Geotechnics · Environment · Groundwater

Water level

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 177.0 AHD
 PIT No:
 21

 EASTING:
 278946
 PROJECT No:
 71706

 NORTHING:
 6254047
 DATE:
 21/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
 1 OF

□ Sand Pe		ED: AP	_066	_	Backhoe RVATIONS: No free groundwater observed	Case 58 ER OBSE
4						
∎ ∎ ₽ · I ·						
			<del></del>			
					t discontinued at 1.4m practical refusal on medium strength sandstone	
					oderately weathered, grey sandstone	<u>,</u>
···· <u>·</u> ,					ANDSTONE - low to medium strength slightly to	<u> </u>
		ۍ 	' 		5m: ironstone gravel and cobbles from 0.5m	
······					ANDY CLAY - stiff, orange brown sandy clay, low sticity	
		•	,	D	OPSOIL - firm, brown, clayey sand with some rootlets,	
Wat	Results & Comments	Sample	Dopth	Grap Lo	or Strata	(Î)
l	n Situ Testing	Sampling & I		phic g	Description	Depth

9 **Douglas Partners** Geotechnics · Environment · Groundwater

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dla.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (Pa) pD Photo instation deator S Standard penetration test PL Point load strength Is(50) MPa P Vater seep ¥ Water ley Water ley

Water level

Date: 3.8.10 Initials: RCB

CHECKED

CLIENT: Owston Nominees No. 2 Pty Ltd PROJECT: Land Capability Assessment LOCATION: Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 176.0 AHD
 PIT No:
 22

 EASTING:
 279019
 PROJECT No:
 71706

 NORTHING:
 6254154
 DATE:
 20/4/2010

 DIP/AZIMUTH:
 90°/- SHEET 1
 0F 1

Depth (m)     Strata     of       1     10PSOLL - brown, sity clay with some rootlets, hundid brown, saidy clay with some rootlets, hundid brown, saidy clay with some tronstone gravel, low     0.21     SANDY CLAY - very stift, mottled orange brown and red brown, saidy clay with some tronstone gravel, low     0     0     0.22       SANDSTOLE - skitternely weathered sandstone     Sample     0     0.23     0     0.23       1     1     Fit discontinued at 1.7m - refusal on medium strength sandstone     0     0.4     0.6     0.6	A c c c c c c c c c c c c c c c c c c c	(a)         Strata         Strata           0.2         Strata         Strata         Gr           1         10PSOL1 - brown, silly day with some tooletes, hundid         Gr         Graph           Source state         Strata         Graph         Graph           Source state         Strata         Graph         Graph           Source state         Intermediation         Graph         D         0.2           Intermediation         Intermediation         Intermediation         Graph         D         0.2           Intermediation         Intermediation         Intermediation         Intermediation         D         0.2         D         <	main         Strata         range           027         Strata         range         rang		Description	ic		Samp	ing & L	n Situ Testing	$\neg$	
0.21     SANDY CLAY - very stiff, mottled orrange brown and red brown, samaly clay with some ironstone gravel, low     D     0.25       0.3     SANDSTONE - extremely low strength, extremely     B     0.4       0.3     SANDSTONE - extremely low strength, extremely     B     0.5       17     Fin discontinued at 1.7 m     -     -       - refusal on medium strength sandstone     -     -     -	0.21     SANDY CLAY. very still, innitial orange brown, and red brown, sandy day with some ironstone gravel, low     0     0.25       0.9     SANDSTONE - extremely low strength, extremely     0     0.25       1     16m: medium to high strength     0     0.25       1     16m: medium to high strength     0     0.5       1     - refusal on medium trangth sandstone     0     0.5       2     - refusal on medium strength sandstone     0     0.5	Operation     Control Control     Con	027     SANOY CLAY - very stift, motiled orange brown and red pushicity.     0     0.3       SANOSTONE - extremely low strongth, extremely weathered sandstone     0     0.3       1.6n: medum to high strength refusal on medium strength sandstone     0     0.4	€ RL (m)	of Strata	Graph Log	Туре	Depth	Sample	Results & Comments	1	Water
0.27 SANDY CLAY - very stiff, mottled orange brown and red brown, sandy day with some ironstone gravel, low plasticity SANDSTONE - ortremely low strength, extremely B 0.5 F 0	0.21     SANDY CLAY - very stiff, motified orange brown and red plasticity     D     0.25       bown, sandy day with some fronstone gravel, low     D     0.25       SANDSTONE - antremely low strength, extremely     0.4     0.4       Veathered sandstone     1.6     0.4       Pit discontinued at 1.7m     -     -       - refusal on medium strength sandstone     0.6     0.6	0.2     SANDY CLAY, very stiff, motiled orange brown and red bown, sandy clay with some lionstone gravel, low     0     0.2       0.3     SANDSTONE - extremely low strength, extremely weathered sandstone     0     0.4       17     Filstonnfinued at 1.7m - refused on medium strength sandstone     0	021     SANDY CLAY - very stiff, motified orange trown and red     0     0.25       basicity     basicity     0.1     0.1       SANDSTONE - extremely low strength, extremely     0     0.5       Vesithed sandstone     0     0.5       1.7     Fildsoorfluid at 1.7m     0     0.5       - refusal on medium to high strength sandstone     0     0.5       1.7     Fildsoorfluid at 1.7m     0     0.5       - refusal on medium strength sandstone     0     0.5	1	TOPSOIL - brown, silty clay with some rootlets, humid	Z						
SANDSTONE - extremely low strength, extremely weathered sandstone in the transformedium to high strength - refusal on medium strength sandstone	4 3 2 2 SANDSTONE - extremely low strength, extremely weathered sandstone of the strength of the strength refusal on medium strength sandstone of the strength sandstone of th	SANDSTONE - extremely low strength, extremely     weathered sandstone     I.fm: medium to high strength     refusal on medium strength sandstone     refusal on medium strength sandstone	24XPDSTONE - extremely low strength, extremely weathered sandstone 1,7 Fit discontinuer at 1.7m - refusal on medium strength sandstome - refusal on medium strength sandstome 	0.21	SANDY CLAY - very stiff, mottled orange brown and red brown, sandy clay with some ironstone gravel, low plasticity			1.25 1.5	- <u>-</u>			
Pit discontinued at 1.7m - refusal on medium strength sandstone	4 a s	- refusal on medium strength sandstone	Pit discontinued at 1.7m - refusal on medium strength sandstone - refuses of Backhoe		SANDSTONE - extremely low strength, extremely weathered sandstone 1.6m: medium to high strength							·
			Docept: AP	د 	- refusal on medium strength sandstone							
			Cogged Ap	ω								
8 Backhoe LOGGED: AP	8 Backhoe LOGGED: AP	SERVATIONS: No free groundwater observed	Survey levels taken from survey plans provided by Urbis Pty Ltd		Survey levels taken from survey plans provided by	Urbis Pt	ty Ltd					80

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (Pa) pD Protoinisation detector S Standard penetration test pL Point load strength 1s(50) MPa V Shear Vane (Pa) D Water seep T Water level

CHECKED

Date: 3.8.10

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**Douglas Partners** Geotechnics - Environment - Groundwater

Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 
 SURFACE LEVEL:
 178.0 AHD
 PIT No:
 23

 EASTING:
 279232
 PROJECT No:
 71

 NORTHING:
 6254076
 DATE:
 20/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
 1
 OF
 1
 71706

176 177 5 Å ώ (m) 0.37 1.0 <u>د</u> ن SHALE - extremely low strength, extremely weathered, grey shale with some ironstone bands and a trace of fine grained, grey sandstone TOPSOIL - : humid Pit discontinued at 1.9m SILTY CLAY - stiff, orange brown, silty clay with some ironstone gravel, low plasticity refusal on medium to high strength shale medium to high strength firm, brown, silty clay with some rootlets, Description Strata Graphic Log s S Туре 1.08 0.7 Depth Sampling & In Situ Testing Sample Results & Comments pp>400kPa Water ώ Ň Dynamic Penetrometer Test (blows per 0mm) i di ថ 2

WATER OBSERVATIONS: No free groundwater observed

**REMARKS:** 

RIG: Case 58 Backhoe

LOGGED: AP

174

175

Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling SAMPLING G & IN SITU TESTING LEGEND PD Pocks peneintometer (kPa) PD Photo Ionisation detector Standard peneintoin tast PL Point lead strength Is(50) MPa V Steat: Vane (kPa) ▷ Water seep Ţ Water level

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Survey levels taken from survey plans provided by Urbis Pty Ltd

Date: 3.8.10 Initials: RCB CHECKED 9

**Douglas Partners** Geotechnics · Environment · Groundwater

Sand Penetrometer AS1289.6.3.3 Cone Penetrometer AS1289.6.3.2

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CLIENT: PROJECT: LOCATION:

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 167.0 AHD
 PIT No:
 24

 EASTING:
 279453
 PROJECT No:
 71706

 NORTHING:
 6254029
 DATE:
 21/4/2010

 DIP/AZIMUTH:
 90°/- SHEFT
 1 OF

Open (m)         Open (m)         Strata (m)         Strata (m)<	1	Description	ic	5	Samp	ling & I	n Situ Testing	 
Other TopSolt     Time I clay, all y clay with some rootlets.     0       Bind gloy, sity clay with a trace of saind, two to medium paidings, sity clay with a trace of saind, two to medium paidings, sity clay with a trace of saind, two to medium paidings, sity clay with a trace of saind, two to medium paidings, sity clay with a trace of saind, two to medium paidings, some paidings,	m RL	of Strata	Graph Log	Туре	Depth	Sample	Results & Comments	Water
Util To CLAY - stiff to very stiff, motified ovarige brown and give, stilly day with a trace of saind, low to medium pasticity, stilly day with a trace of saind, low to medium to SANDSTONE - extremely low sterngth, extremely weithered, grey sandstone - practical ratues on medium sterngth sandstone - practical ratues on medium sterngth sandstone     0 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	2 2 2	TOPSOIL - firm, brown, silty clay with some rootlets, damp	X	$\downarrow$		s		 
11     SAUSSTONE - ethnek low stength, extremely     0.5     ppr400ePa,       10     1.0     0.5     ppr400ePa,       110     1.0     0.5     ppr400ePa,       110     1.0     1.0     0.5       110     1.0     1.0     0.5       110     1.0     1.0     0.5       110     1.0     1.0     0.5       111     1.0     1.0     0.5       111     1.0     1.0     0.5       111     1.0     1.0     0.5       112     1.0     1.0     0.5       113     1.0     1.0     0.5       114     1.0     1.0     0.5       115     1.0     1.0     1.0       116     1.0     1.0     1.0       117     1.0     1.0     1.0       118     1.0     1.0     1.0       119     1.0     1.0     1.0       110     1.0 <td< td=""><td></td><td>SILTY CLAY - stiff to very stiff, mottled orange brown and grey, sitty clay with a trace of sand, low to medium plasticity</td><td><u>77</u></td><td></td><td>0.25</td><td></td><td></td><td><u>_</u>_</td></td<>		SILTY CLAY - stiff to very stiff, mottled orange brown and grey, sitty clay with a trace of sand, low to medium plasticity	<u>77</u>		0.25			<u>_</u> _
1.1 SAIUSTONE - extremely low strength, extremely under the strength grey and yellow brown to medium strength, grey and yellow brown - practical refusal on medium strength sandstone -				0	0.6	<u> </u>	pp>400kPa	, , , ,
1. SAUDSTIONE - extremely low strength, extremely weathered, grey sandstone relation to medium strength, grey and yelow brown reduced at 1.65m - practical refusal on medium strength sandstone - practical refusal on medium strength sandstone				U S	1.0			
1.6m: low to medium strength, grey and yellow brown     Image: Case 58 Backhoe    Case 58 Backhoe   LOGGED: AP		SANDSTONE - extremely low strength, extremely weathered, grey sandstone						
Practical refusal on medium strength sandstone  Practical refusal on medium strength sandstone  Case 59 Backhoe  LOGGED: AP		1.6m: low to medium strength grey and vellow brown	· · · · · · · · · · · · · · · · · · ·					
Case 58 Backhoe	1.65	Pit discontinued at 1,65m - practical refusal on medium strength sandstone						
Case 58 Backhoe	~							
Case 58 Backhoe	ω 					···		
Case 58 Backhoe								
Case 58 Backhoe	<u> </u>							
Case 58 Backhoe								
Case 58 Backhoe								
Case 58 Backhoe LOGGED: AP	<u></u>					·		
	ase 5	8 Backhoe			GED:	₽		
RKS: Survey levels taken from survey plans provided by Urbis Ptv Ltd	RKS:	Survey levels taken from survey plans provided by	Urbis F	ły Ltd				ן ב ב

9 **Douglas Partners** Geotechnics · Environment · Groundwater

Date: 3.8.10 Initials: PCB CHECKED

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometar (kPa) PID Photo konsation detector S Standard penetration test rmm dia.) V Sharr Vane (kPa) V Sharr Vane (kPa) Water level

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 
 SURFACE LEVEL:
 164.0 AHD PIT No:
 25

 EASTING:
 279589
 PROJECT No:
 71

 NORTHING:
 6254173
 DATE:
 21/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
 1 OF
 1
 71706

160 <u>161</u> ω 162 N 163 RL 164 4 (m) 0.19 2 0.0 Pit discontinued at 2.1m 2.0m: medium strength SANDSTONE - extremely low strength, extremely weathered, grey, fine to medium grained sandstone SILTY CLAY - stiff to very stiff, orange brown and red brown, silty clay with some ironstone gravel and a trace of sand, low to medium plasticity damp OPSOIL - firm, brown, silty clay with some rootlets, refusal on medium strength sandstone Description Strata Graphic Log σ σm m Туре 0.3 0.4 5 0.2 Depth Sampling & In Situ Testing Sample Results & Comments Water ż Dynamic Penetrometer Test (blows per 150mm) ÷ · 5 .20

RIG: Case 58 Backhoe

REMARKS:

WATER OBSERVATIONS: No free groundwater observed

LOGGED: AP

E = Environmental sample Survey levels taken from survey plans provided by Urbis Pty Ltd

Cone Penetrometer AS1289.6.3.2 Sand Penetrometer AS1289.6.3.3

9 **Douglas Partners** Geotechnics · Environment · Groundwater





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Auger sample Disturbed sample Buik sample Tube sample (x mm dia.) Water sample Core drilling

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 172.5 AHD
 PIT No:
 26

 EASTING:
 279397
 PROJECT No:
 71706

 NORTHING:
 6254270
 DATE:
 21/4/2010

 DIP/AZIMUTH:
 90°/- SHEET
 1 OF

	Description	с 	ļ	Sam	pling &	In Situ Testing		
RL (m)	Strata	Graph Log	Туре	Depth	ample	Results & Comments	Water	Dynamic Penetro (blows per
	TOPSOIL - firm, brown, silty clay with some rootlets, damp	Ø.			s			
0.25	SILTY CLAY - stiff to very stiff, orange brown, silty clay with a trace of ironstone gravel, medium plasticity	<u> </u>	0	0.25			,	
172			0	0.5				
	SHALE - medium strength, slightly weathered to fresh,							
· · · · · ·	Pit discontinued at 1.0m - refusal on medium strength shale							
<u>171</u>		<del>,</del>						
,							·····	
					<u> </u>		· · · · · · · · · · · · · · · · · · ·	
170								
· · · · · · · · · · · · · · · · · · ·								
			<u> </u>				·	
					<b>_</b>			
4   								
· · · ·			- <b>-</b>	<del></del>				
168							·····	
								••••••
	58 Backton		<u> </u>	; ;	; [			
WATER OF	SERVATIONS: No free groundwater observed		Ę	Č	2		ပ လ	ind Penetrometer
REMARKS:	Survey levels taken from survey plans provided by I	÷ ; 0	! t	-			C g	Ind Peteriometer

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetromatar (kPa) PID Proto consention detector S Standard penetration test PL Point constanting test PL Point car strength (kPa) V Stear Vane (kPa) V Water seep F Water lavel

Date:

3.8.10

Initials: RCB CHECKED

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**Douglas Partners** Geotechnics - Environment - Groundwater

Partners

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 
 SURFACE LEVEL:
 177.5 AHD
 PIT No:
 27

 EASTING:
 279271
 PROJECT No:
 71

 NORTHING:
 6254208
 DATE:
 20/4/2010

 DIP/AZIMUTH:
 90°/- SHEET 1 OF 1
 71706

173 174 175 176 177 RL ŵ (m) 0.27 ₽. 4 i. Pit discontinued at 2.4m - refusal on medium strength shale 2.0m: medium strength SHALE - extremely low strength, extremely weathered, grey shale SILTY CLAY - very stiff to hard, orange brown, silty clay with a trace of ironstone gravel, medium plasticity TOPSOIL - firm to stiff, brown, silty clay with some rootlets, damp Description Strata Graphic Log Туре Depth Sampling & In Situ Testing Sample Results & Comments Water 2 4 ú Dynamic Penetrometer Test (blows per 150mm) ð • ភ ٠N

RIG: Case 58 Backhoe

REMARKS:

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

IG & IN SITU TESTING LEGEND PD Protest penetrometer (Pa) PD Protocionisation disclor S Standard penetration test PL Point load strength 1s(50) MPa V Shear Varie (Pa) P Water seep Water level

SAMPLING

LOGGED:

₽

Cone Penetrometer AS1289.6.3.2 Sand Penetrometer AS1289.6.3.3

WATER OBSERVATIONS: No free groundwater observed Survey levels taken from survey plans provided by Urbis Pty Ltd

3 **Douglas Partners** Geotechnics - Environment - Groundwater Partners



Water leve

Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 177.0 AHD
 PIT No:
 28

 EASTING:
 279144
 PROJECT No:
 71706

 NORTHING:
 6254218
 DATE:
 20/4/2010

 DIP/AZIMUTH:
 90°/- SHEET 1
 0F
 1

Ğ	 173	174	175	,, ,,	· · ·	176	· · · · · · ·		<u>17 R</u>	!L
)	 			1.7	1. 			0.37	(m)	Depth
	,		Pit discontinued at 1.7m - refusal on low to medium strength sandstone	1.65m: low to medium strength	SANDSTONE - extremely low to very low strength, extremely weathered, grey, fine grained sandstone		SANDY CLAY - stiff to very stiff, orange brown, sandy clay with some ironstone gravel and cobbles, low to medium plasticity	humid	or Strata	12
								H)	Gran	lc g
ī į					0	U	D	D	Туре	
ř.					1.5	1.0	0.5	0.25	Depth	1
		*******	· · · · · · · · · · · · · · · · · · ·						Sample	e
									Results & Comments	
	 					,			Wa	te
	 4	ω	N						(blows per On	Dynamic Penetro

v≤c∞o>

Auger sample Disturbed sample Buik sample Tube sample Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Protein penetrometer (Pa) S Standard penetration test mm dia.) PL Point foad strength Is(50) MPa V Steart Vana (KPa) V Steart vana (KPa) V Water seep ¥ Water Ie.

Initials: RCB Date: 3.8.10

CHECKED

Water level

CLIENT: PROJECT: LOCATION:

\$ **Douglas Partners** Geotechnics · Environment · Groundwater

CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 169.0 AHD
 PIT No:
 29

 EASTING:
 279435
 PROJECT No:
 71706

 NORTHING:
 6254141
 DATE:
 20/4/2010

 DIP/AZIMUTH:
 90°/- SHEET 1
 0F 1

0.4 SILTY CLAY - stiff to very stiff, slity day with a trace of sand and ironstone gravel, medium to high plasticity 13 SHALE - medium strength, slightly weathered, grey Pit discontinued at 1.4m - refusal on medium strength shale - refusal on medium strength shale	<ul> <li>SILTY CLAY - stiff to very stiff, sith sand and ironstone gravel, medium strength, slightly shale</li> <li>Pit discontinued at 1.4m</li> <li>refusal on medium strength shale</li> <li>e 58 Backhoe</li> </ul>	1 <del>63</del> RL Dept
SILTY CLAY - stiff to very stiff, slity day with a trace of sand and ironstone gravel, medium to high plasticity Pit discontinued at 1.4m - refusal on medium strength shale	3 SHALE - medium strength, slightly Pit discontinued at 1.4m - refusal on medium strength shal	>
1.4 SHALE - medium strength, slightly weathered, grey Pit discontinued at 1.4m - refusal on medium strength shale	Pit discontinued at 1.4m - refusal on medium strength shall e 58 Backhoe	د 4
	e 58 Backhoe	
ŵ 4	e 58 Backhoe	N
	e 58 Backhoe	
	e 58 Backhoe	4
	e 58 Backhoe	· · · · · ·
	ie 58 Backhoe	

\$ **Douglas Partners** Geolechnics · Environment · Groundwater



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CLIENT: PROJECT: LOCATION: Owston Nominees No. 2 Pty Ltd Land Capability Assessment Fairlight Road, Mulgoa (Western Precinct)

 SURFACE LEVEL:
 191.5 AHD
 PIT No:
 30

 EASTING:
 278832
 PROJECT No:
 71706

 NORTHING:
 6253386
 DATE:
 21/4/2010

RIG: NAT			190 N		191		R	Ľ	}
Case ER OE		21	· -	- 	0.36		(m)	Depth	
58 Backhoe 3SERVATIONS: No free groundwater observed	- refusal on medium trength shale	2.0m: medium strength	SHALE - extremely low strength, extremely weathered, grey shale with some orange brown silty clay seams		SILTY CLAY - stiff, mottled red brown and grey, silty clay with a trace of ironstone gravel, low to medium	TOPSOIL - firm, dark brown, silty clay with some rootlets, damp	of Strata	Description	
						DD-	Grap Lo	hic 9	
5					0	U	Туре		
GED					0,5	0.25	Depth	Samp	IZA/e
: AP		-	·				Sample	ling &	MUT
		-					Results & Comments	In Situ Testing	H: 90°/
]							Wat	er	60
		4					(blows per 150mm) 5 10 15 20	Dynamic Benetrometer Test	SHEET 1 OF 1

\$ **Douglas Partners** Geotechnics · Environment · Groundwater

Initials: RCB Date: 3,8,10

CHECKED

 $\boxtimes$ Cone Penetrometer AS1289.6.3.2

REMARKS:

Survey levels taken from survey plans provided by Urbis Pty Ltd

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Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Proteip penetromater (Pa) ID Photo ionisation detector Standard penetration test mm dia.) P Point load strength Is(50) MPa V Shaar Vane (Rea) V Shaar Vane (Rea) V Mater seep ¥ Water level

#### Appendix E

Laboratory Reports and

Chain-of-Custody Documentation



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

## CERTIFICATE OF ANALYSIS 40738

Client: 96 Hermitage Rd NSW 2114 West Ryde **Douglas Partners** 

Attention: Adam Podnar

Date completed instructions received: Date samples received: No. of samples: Your Reference: Sample log in details:

07/05/10 07/05/10 28 Soils, 13 Waters 71706, Mulgoa

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

Report Details:

NATA accreditation number 2901. This document shall not be reproduced except in full Date of Preliminary Report: Date results requested by: Issue Date: 9/06/10 Not issued 14/05/10

Accredited for compliance with ISO/IEC 17025. This document is issued in accordance with NATA's accreditation requirements.

Tests not covered by NATA are denoted with \*.

Results Approved By:

Laboyhtory Manager Jacinta/Hurst

Envirolab Reference: Revision No:

R 00 40738

GioVanni Agosti Technical Manager

Kluin

Morgen

Approved Signatory Matt Mansfield M. Sartjell

Rhian Morgan Metals Supervisor

Page 1 of 30

<b>Client Reference:</b>
71706, Mulgoa

																]
Your Reference	Our Reference:	vTPH & BTEX in Soil	Surrogate aaa-Trifluorotoluene	o-Xylene	m+p-xylene	Ethylbenzene	Toluene	Benzene	vTPH C6 - C9	Date analysed	Date extracted	l ype of sample	Your Reference	Our Reference:	vTPH & BTEX in Soil	
	UNITS		 %	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg					UNITS		
TP2102-03	40738-11		91	<1.0	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil	TP5 0.0-0.1	40738-1		
	40738-13		91	<1.0	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil	TP5 0.4-0.5	40738-2		
	40738-15		 93	<1.0	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil	TP10 0.0-0.1	40738-5		
	40738-17		96	<1.0	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil	TP13 0.2-0.3	40738-7		
	40738-10		88	<1.0	<2.0	<1.0	<0.5	^0.5	<25	11/5/10	11/5/10	Soil	TP16 0.2-0.3	40738-9		

1									T							-							<u> </u>				1
outrogate ada- i filiuofotoidene	o-Xylene	m+p-xylene	Ethylbenzene	Toluene	Benzene	vTPH C6 - C9	Date analysed	Date extracted	Type of sample	I ,	r our reference	Our Reference:	vTPH & BTEX in Soil	Surrogate aaa-Triftuorotoluene	o-Xylene	m+p-xylene	Ëthylbenzene	Toluene	Benzene	vTPH C6 - C9	Date analysed	Date extracted	Type of sample	Your Reference	Our Reference:	vTPH & BTEX in Soil	
8	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	,	1				UNITS		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	,	•			UNITS		-
105	<u>4.0</u>	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil		TP124 0.2-0.3	40738-21		89	<1.0	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil	TP21 0.2-0.3	40738-11		-
105	<1.0	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil		TP132 0.2-0.3	40738-23		105	<1.0	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil	TP25 0.2-0.3	40738-13		
85	<1.0	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil	0.0-0.1	Dam 1 Spillwav	40738-36		86	<1.0	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil	TP104 0.2-0.3	40738-15		
86	<1.0	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil	0.2-0.3	Dam 1 Snillway	40738-37		96	<1.0	<2.0	<1.0	<0.5	<0.5	~25	11/5/10	11/5/10	Soil	TP110 0.2-0.3	40738-17		
107	92%	93%	92%	91%	88%	[NA]	11/5/10	11/5/10	Soil		Trip Spike	40738-38		75	<u>~1.0</u>	<2.0	<1.0	<0.5	<0.5	<25	11/5/10	11/5/10	Soil	TP123 0.2-0.3	40738-19		



Page 2 of 30

40738 R 00

Envirolab Reference: Revision No:

**Client Reference:** 71706, Mulgoa

Surrogate aaa-Trifluorotoluene	o-Xylene	m+p-xylene	Ethylbenzene	Toluene	Benzene	Date analysed	Date extracted	Type of sample	Your Reference	Our Reference:	VTPH & BTEX in Soil
%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ı	-			UNITS	
99	<1.0	<2.0	<1.0	<0.5	<0.5	11/5/10	11/5/10	Soil	Trip Blank	40738-39	

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ACCREDITED FOR TECHNICAL COMPETENCE

Envirolab Reference: Revision No:

40738 R 00

Page 3 of 30

Client	
Reference:	
71706,	
Mulgoa	

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TPH C29 - C36 S <i>urrogate</i> o-Terphenyl	TPH C15 - C28	TPH C10 - C14	Date analysed	Date extracted	Type of sample	Your Reference	Our Reference:	sTPH in Soil (C10-C36)		Surrogate o-Terphenyl	TPH C29 - C36	TPH C15 - C28	TPH C <sub>10</sub> - C <sub>14</sub>	Date analysed	Date extracted	Type of sample	Your Reference	Our Reference:	sTPH in Soil (C10-C36)		Surrogate o-Terphenyl	TPH C29 - C36	TPH C15 - C28	TPH C10 - C14	Date analysed	Date extracted	Type of sample	Your Reference	Our Reference:	sTPH in Soil (C10-C36)
mg/kg %	mg/kg	mg/kg	,	•			UNITS			%	mg/kg	mg/kg	mg/kg	ı	1			UNITS			%	mg/kg	mg/kg	mg/kg	ı	•			UNITS	
<100 132	<100	<50	11/5/10	11/5/10	Soil	TP124 0.2-0.3	40738-21			131	<100	<100	<50	11/5/10	11/5/10	Soil	TP21 0.2-0.3	40738-11			135	<100	<100	<50	11/5/10	11/5/10	Soil	TP5 0.0-0.1	40738-1	
<100 133	<100	<50	11/5/10	11/5/10	Soil	TP132 0.2-0.3	40738-23			129	<100	<100	<50	11/5/10	11/5/10	Soil	TP250.2-0.3	40738-13			134	<100	<100	<50	11/5/10	11/5/10	Soil	TP5 0.4-0.5	40738-2	
<100 124	<100	<50	11/5/10	11/5/10	Soil	Dam 1 Spillway 0.0-0.1	40738-36			133	<100	<100	<50	11/5/10	11/5/10	Soil	TP104 0.2-0.3	40738-15			136	<100	<100	<50	11/5/10	11/5/10	Soil	TP100.0-0.1	40738-5	
<100 133	<100	<50	11/5/10	11/5/10	Soil	Dam 1 Spillway 0.2-0.3	40738-37			129	<100	<100	<50	11/5/10	11/5/10	Soil	TP1100.2-0.3	40738-17			134	<100	<100	<50	11/5/10	11/5/10	Soil	TP13 0.2-0.3	40738-7	
L					L <u>(</u>				J	129	<100	<100	<50	11/5/10	11/5/10	Sail	TP123 0.2-0.3	40738-19			134	<100	<100	<50	11/5/10	11/5/10	Soil	TP16 0.2-0.3	40738-9	

Envirolab Reference: Revision No: 40738 R 00

Page 4 of 30



# Client Reference: 71706, Mulgoa

																							1			
Surrogate TCLMX	Methoxychlor	Endosulfan S <b>ul</b> phate	Endrin Aldehyde	pp-DDT	Endosulfan II	pp-DDD	Endrin	Dieldrin	pp-DDE	Endosulfan I	alpha-chlordane	gamma-Chlordane	Heptachlor Epoxide	Aldrin	delta-BHC	Heptachlor	beta-BHC	gamma-BHC	alpha-BHC	HCB	Date analysed	Date extracted	Type of sample	Your Reference	Our Reference:	Organochlorine Pesticides in soil
%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ı				UNITS	
124	-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0,1	<0,1	<0.1	<0.1	-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP5 0.0-0.1	40738-1	
131	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<b>0</b> .1	<0.1	<0.1	<0,1	<0.1	<0,1	<0.1	10/5/10	10/5/10	Soil	TP5 0.4-0.5	40738-2	
117	-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<del>6</del> 0.1	10/5/10	10/5/10	Soil	TP11 0.2-0.3	40738-3	
121	< <u>0</u> .1	<0.1	<b>~0</b> .1	<0.1	-0,1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP110.4-0.5	40738-4	
122	<0.1	<0.1	<0.1	<0.1	<del>0</del> .1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0,1	<0.1	<0.1	<0.1	<0.1	<0.1	<0 <u>.</u> 1	<0.1	10/5/10	10/5/10	Soil	TP100.0-0.1	40738-5	

Envirolab Reference: 40738 Revision No: R 00



Page 5 of 30

Client Reference:	
71706, Muigoa	

													_							_		- ,				
Surrogate TCLMX	Methoxychlor	Endosulfan Sulphate	Endrin Aldehyde	pp-DDT	Endosulfan II	pp-DDD	Endrin	Dieldrin	pp-DDE	Endosulfan I	alpha-chlordane	gamma-Chlordane	Heptachlor Epoxide	Aldrin	delta-BHC	Heptachlor	beta-BHC	gamma-BHC	alpha-BHC	HCB	Date analysed	Date extracted	Type of sample	Your Reference	Our Reference:	Organochlorine Pesticides in soil
%	ma/ka	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ſ	•			UNITS	
120	<u>^0</u> .1	<0.1	<0.1	<0.1	<0.1	<0,1	<u>~0.1</u>	<0.1	<0.1	<0.1	<0.1	<0,1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<b>.</b> 0.1	10/5/10	. 10/5/10	Soil	TP100.4-0.5	40738-6	
117	< <u>.</u>	<0.1	<0.1	<0.1	<0.1	<0.1	<u>-0.</u> 1	<0.1	<0.1	<0.1	<0.1	<0.1	-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0 <u>.</u> 1	10/5/10	10/5/10	Soil	TP130.2-0.3	40738-7	
126	< <u>0</u> .1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-0.1	<0.1	<0,1	<b>6</b> ,1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP130.4-0.5	40738-8	
113	< <u>0</u> .1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-0.1	<0.1	<0.1	<b>~</b> 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP160.2-0.3	40738-9	
119	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0,1	<0.1	-0.1	-0.1	<0.1	-0.1	<0.1	<0,1	<u>6</u>	<0.1	10/5/10	10/5/10	Soil	TP160.4-0.5	40738-10	



Page 6 of 30

ACCREDITED FOR TECHNICAL COMPETENCE

Client	
Reference:	
71706, Mulgoa	

Surrogate TCLMX	Methoxychlor	Endosulfan Sulphate	Endrin Aldehyde	pp-DDT	Endosulfan II	DDD-dd	Endrin	Dieldrin	pp-DDE	Endosulfan I	alpha-chlordane	gamma-Chlordane	Heptachlor Epoxide	Aldrin	delta-BHC	Heptachlor	beta-BHC	gamma-BHC	alpha-BHC	HCB	Date analysed	Date extracted	Type of sample	Your Reference	Our Reference:	Organochlorine Pesticides in soil
%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg					UNITS	
115	<0,1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP21 0.2-0.3	40738-11	
116	<0.1	<0.1	<0,1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0,1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP21 0.4-0.5	40738-12	
119	<0.1	<0.1	<0.1	<0.1	<0_1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0,1	<0.1	<u>6</u> .1	<b>~</b> 0,1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP250.2-0.3	40738-13	
120	<u>6</u> .1	<0.1	<0.1	<0.1	<0.1	<del>6</del> .1	-0.1	<0.1	<0.1	<0.1	<b>~</b> 0.1	<0.1	<0.1	<0.1	<b>6</b> .1	<0.1	<0.1	< <u>0</u> .1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP25 0.4-0.5	40738-14	
120	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-0.1	<0 <u>.</u> 1	<0.1	<u>6.1</u>	<0.1	<0.1	-0,1	<0.1	-0 <u>.</u> 1	<del>.</del> 0,1	10/5/10	10/5/10	Soil	TP104 0.2-0.3	40738-15	



Page 7 of 30

Envirolab Reference: 40738 Revision No: R 00

Client
Reference:
71706,
Mulgoa

_																										
Surrogate TCLMX	Methoxychlor	Endosulfan Sulphate	Endrin Aldehyde	pp-DDT	Endosulfan II	pp-DDD	Endrin	Dieldrin		Endosulfan I	alpha-chlordane	gamma-Chlordane	Heptachlor Epoxide	Aldrin	delta-BHC	Heptachlor	beta-BHC	gamma-BHC	alpha-BHC	HCB	Date analysed	Date extracted	Type of sample	Your Reference	Our Reference:	Organochlorine Pesticides in soil
%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ı	•			UNITS	
120	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP104 0.4-0.5	40738-16	
122	<0.1	<0.1	<0.1	<0.1	-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<b>-0</b> .1	-0.1	<0.1	10/5/10	10/5/10	Soil	TP1100.2-0.3	40738-17	
115	<0.1	<0.1	<0,1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-0,1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP1100.4-0.5	40738-18	
107	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0,1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP1230.2-0.3	40738-19	
120	<u>6</u> .1	<0.1	<0.1	<0.1	<0.1	<0.1	<u>6</u> .1	<0.1	<0.1	<0 <u>.</u> 1	<0.1	<0.1	<0.1	<0.1	<u>6</u> ,1	<0.1	<0.1	. <u>6</u>	<0.1	<0.1	10/5/10	10/5/10	Soil	TP1230.4-0.5	40738-20	





Page 8 of 30

<b>Client Reference</b>	
71706,	
Mulgoa	

Surrogate TCLMX	Methoxychlor	Endosulfan Sulphate	Endrin Aldehyde	pp-DDT	Endosulfan II	pp-DDD	Endrin	Dieldrin	pp-DDE	Endosulfan I	alpha-chlordane	gamma-Chlordane	Heptachlor Epoxide	Aldrin	delta-BHC	Heptachlor	beta-BHC	gamma-BHC	alpha-BHC	HCB	Date analysed	Date extracted	Type of sample		Your Reference	Our Reference:	Organochlorine Pesticides in soil
%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	1	,				UNITS	
122	-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0,1	10/5/10	10/5/10	Soil		TP124 0.2-0.3	40738-21	
115	<0.1	<0.1	<0.1	<0,1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	.A	<0.1	10/5/10	10/5/10	Soil		TP124 0.4-0.5	40738-22	
124	<0.1	<0.1	-0.1	<0.1	-0.1	<0.1	<0.1	<0.1	-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<u>_0.1</u>	<0.1	10/5/10	10/5/10	Soil		TP1320.2-0.3	40738-23	
124	<0.1	<0.1	<del>6</del> ,1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-0.1	-0.1	<0.1	<0.1	<0.1	-0.1	<0.1	<0.1	-0.1	10/5/10	10/5/10	Soil		TP132 0.4-0.5	40738-24	
118	<0.1	-0 <u>.</u> 1	<0.1	.0.1	<0,1	<0.1	<u>6</u> .1	<0.1	<u>6</u> .1		<0.1	<0,1	-0.1	6.1		<0.1	^0.1	<0.1	-0.1	<0.1	10/5/10	10/5/10	Soil	0.0-0.1	Dam 1	40738-36	

Envirolab Reference: Revision No:

40738 R 00

Page 9 of 30



# Client Reference: 71706, Mulgoa

Surrogate TCLMX	Methoxychlor	Endosulfan Sulphate	Endrin Aldehyde	pp-DDT	Endosulfan II 🕤	pp-DDD	Endrin	Dieldrin	pp-DDE	Endosulfan I,~	alpha-chlordane	gamma-Chlordane	Heptachlor Epoxide	Aldrin	delta-BHC	Heptachlor	beta-BHC	gamma-BHC	alpha-BHC	HCB	Date analysed	Date extracted	Type of sample		Your Reference	Our Reference:	Organochlorine Pesticides in soil
%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	I	1				UNITS	
116	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<u>, 0</u>	<0.1	<0.1	<0.1	<0,1	<0.1	<0,1	10/5/10	10/5/10	Soil	0.2-0.3	Dam 1	40738-37	



Page 10 of 30



| Ethion | Bromophos-ethyl                            | Fenitrothion  | Chlorpyriphos  | Ronnel  | Chlorpyriphos-methyl   | Dimethoate   | Diazinon   | Date analysed  | Date extracted   | Type of sample   
   | Your Reference  
   
   
   | Organophosphorus Pesticides   
   
   
   
  |  | Ethion  | Bromophos-ethyl  | Fenitrothion  | Chlorpyriphos  | Ronnel  | Chlorpyriphos-methyl   | Dimethoate   | Diazinon  
  | Date analysed  | Date extracted   | Type of sample  | Your Reference  | Organophosphorus Pesticides<br>Our Reference: | Surrogate TCLMX  | Ethion  
   
  | Bromophos-ethyl  
   | Fenitrothion  
   | Chlorpyriphos  | Ronnel   
  | Chlorpyriphos-methyl  | Dimethoate   | Díazinon  | Date analysed  | Date extracted   | Type of sample  | Your Reference  | Organophosphorus Pesticides<br>Our Reference: |
|--------|--|---|--|---|--|--|--|--|--
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| mg/kg  | mg/kg                                      | mg/kg   | mg/kg  | mg/kg   | mg/kg  | mg/kg  | mg/kg  | ŀ  |  |  
   |   
   
   
   | UNITS   
   
   
   
  | 70   | mg/kg   | mg/kg  | mg/kg   | mg/kg  | mg/kg   | mg/kg  | mg/kg  | mg/kg     
  | ,  | 1  |   |   | UNITS   | %  | mg/kg   
   
  | mg/kg  
   | mg/kg   
   | mg/kg  | mg/kg  
  | mg/kg   | mg/kg  | mg/kg   |  | P  |   |   | UNITS   |
| <0.1   | <0,1                                       | <0.1  | <0.1   | <0.1  | <0.1   | <0.1   | <0.1   | 10/5/10  | 10/5/10  | Soil   
   | TP210.2-0.3   
   
   
   | 40738-11  
   
   
   
  | 021  | <0.1  | <0.1   | <0.1  | <0.1   | <0.1  | <0.1   | <0.1   | <0.1      
  | 10/5/10  | 10/5/10  | Soil  | TP100.4-0.5   | 40738-6                                       | 124  | <0.1  
   
  | <del>6</del> .1  
   | <0.1  
   | <0.1   | <0.1   
  | <0.1  | <0.1   | <0.1  | 10/5/10  | 10/5/10  | Soil  | TP5 0.0-0.1   | 40738-1                                       |
| <0.1   | <0.1                                       | <0.1  | <0.1   | <0.1  | <0.1   | <0.1   | <0.1   | 10/5/10  | 10/5/10  | Soil   
   | TP21 0.4-0.5  
   
   
   | 40738-12  
   
   
   
  | 117  | <0.1  | <0.1   | <0.1  | <0.1   | <0.1  | <0.1   | <0.1   | <0.1      
  | 10/5/10  | 10/5/10  | Soil  | TP13 0.2-0.3  | 40738-7                                       | 131  | <0.1  
   
  | <0.1   
   | <0.1  
   | <u>6</u> .1  | <0.1   
  | <0.1  | <0.1   | <u>6</u> .1   | 10/5/10  | 10/5/10  | Soil  | TP5 0.4-0.5   | 40738-2                                       |
| <0,1   | -0.1                                       | <0.1  | <0,1   | <0.1  | <0.1   | <0.1   | <0.1   | 10/5/10  | 10/5/10  | Soil   
   | TP25 0.2-0.3  
   
   
   | 40738-13  
   
   
   
  | 021  | <0.1  | <0 <u>.</u> 1  | <0 <u>.</u> 1   | <0.1   | <0.1  | <0.1   | <0.1   | <0.1      
  | 10/5/10  | 10/5/10  | Soil  | TP130.4-0.5   | 40738-8                                       | 117  | <0.1  
   
  | -0.1   
   | <0 <u>.</u> 1   
   | <u>6</u> .1  | <0.1   
  | <0.1  | <0.1   | <0.1  | 10/5/10  | 10/5/10  | Soil  | TP110.2-0.3   | 40738-3                                       |
| <0.1   | <0.1                                       | <0.1  | <0.1   | <0.1  | <0.1   | <0.1   | <0.1   | 10/5/10  | 10/5/10  | Soil   
   | TP25 0.4-0.5  
   
   
   | 40738-14  
   
   
   
  | Ī  | 44.2  | <0.1   | <0.1  | <0.1   | <0.1  | <0.1   | <0.1   | <0.1      
  | 10/5/10  | 10/5/10  | Soil  | TP16 0.2-0.3  | 40738-9                                       | 121  | <0.1  
   
  | <0.1   
   | <0.1  
   | <u>6</u> .1  | <0.1   
  | <0.1  | <b>6</b> .1  | <0.1  | 10/5/10  | 10/5/10  | Soil  | TP11 0.4-0.5  | 40738-4                                       |
| <0.1   | <0.1                                       | <0.1  | <0.1   | <0.1  | <0.1   | <0.1   | <0.1   | 10/5/10  | 10/5/10  | Soil   
   | TP104 0.2-0.3   
   
   
   | 40738-15  
   
   
   
  |  | 440   | <0.1   | -0.1  | <0.1   | <0.1  | <0.1   | <0.1   | <0.1      
  | 10/5/10  | 10/5/10  | Soil  | TP16 0.4-0.5  | 40738-10                                      | 122  | <0.1  
   
  | <u>6</u> .1  
   | <0.1  
   | <0.1   | <0.1   
  | <u>0</u> .1   | <0.1   | <0.1  | 10/5/10  | 10/5/10  | Soil  | TP100.0-0.1   | 40738-5                                       |
|        | Ethion mg/kg <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 | Bromophos-ethyl         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Fenitrothion         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Chlorpyriphos         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Ronnel         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Chlorpyriphos-methyl         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Dimethoate         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Diazinon         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Date analysed         -         10/5/10         20.1 | Date extracted         -         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10         10/5/10       
 10/5/10         10/1         10/1         10/ | Type of sample          Soil         Soil <td>Your Reference          TP210.2-0.3         TP210.4-0.5         TP250.2-0.3         TP250.4-0.5         TP1040.2-0.3           Date extracted         -         10/5/10         10/5/10         Soil         Soil<!--</td--><td>Organophosphorus Pesticides         UNITS         40738-11         40738-12         40738-13         40738-13         40738-13         40738-13         40738-13         40738-14         40738-15           Your Reference:        </td><td>Organophosphorus Pesticides         UNITS         40738-11         40738-12         40738-13         40738-13         40738-15           Our Reference:          TP210.2-0.3         TP210.4-0.5         TP250.2-0.3         TP301.0         TO105/10         T015/10         T015/10         T015/10         T015/10</td><td>Ethion         mg/kg         &lt;0.1         &lt;0.1</td><td>Bromophos-ethyl         mg/kg         &lt;0.1         &lt;0.1</td><td>Fenitrothion         mg/kg         &lt;0.1         &lt;0.1</td><td>Chlorpyriphos         mg/kg         &lt;0.1         &lt;0.1</td><td>Ronnel         mg/kg         &lt;0.1         &lt;0.1</td><td>Chlorpyriphos-methyl         mg/kg         &lt;0.1         &lt;0.1</td><td>Dimethoate         mg/kg         &lt;0.1         &lt;0.1</td><td>Diazinon         mg/kg         &lt;0.1         &lt;0.1</td><td>Date analysed         ·         10/5/10         40.1</td><td>Date extracted         ·         105/10         105/</td><td>Type of sample          Soil         Soil</td><td>Your Reference<br/>Type of sample        </td><td>Organophasphorus Pesitides         UNITS         10738-6         40738-7         40738-7         40738-7         40738-7           Our Reference:         Your Reference:         IP100.4-05         TP100.2-03         TP210.2-03         Soli         Soli</td><td>Surragete TCMX         %         124         131         117         121         122           Organnphosphonus Pesticides<br/>Your Reference:<br/>Your Reference:<br/>Type disapple         UNITS         40738-6         10738-6         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-7         40738-7<!--</td--><td>Etnion         mg/kg         4.0.1         <t< td=""><td>Eromophos-elityi         mg/kg         cl.1         cl.1<td>Fenitorhion         mg/kg         4.11         4.0.1</td><td>Chichpyliphos         mg/kg         4.11         4.01     
   4.01         4.01</td><td>Romel         mg/kg         4,1</td><td>Choopyriphos-methyl         rmg/kg         -4,1</td><td>Dimensione         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Chiopynphos         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Pennoh         mg/ng         4.1</td><td>Diamon         mg/dg         4.11</td><td>Differensity         (105/10</td><td>Date exitación         · . · . (105/10         (105/10&lt;</td><td>Type of sample          Sol         Sol</td><td>Your Releence        </td></td></t<></td></td></td> | Your Reference          TP210.2-0.3         TP210.4-0.5         TP250.2-0.3         TP250.4-0.5         TP1040.2-0.3           Date extracted         -         10/5/10         10/5/10         Soil         Soil </td <td>Organophosphorus Pesticides         UNITS         40738-11         40738-12         40738-13         40738-13         40738-13         40738-13         40738-13         40738-14         40738-15           Your Reference:        </td> <td>Organophosphorus Pesticides         UNITS         40738-11         40738-12         40738-13         40738-13         40738-15           Our Reference:          TP210.2-0.3         TP210.4-0.5         TP250.2-0.3         TP301.0         TO105/10         T015/10         T015/10         T015/10         T015/10</td> <td>Ethion         mg/kg         &lt;0.1         &lt;0.1</td> <td>Bromophos-ethyl         mg/kg         &lt;0.1         &lt;0.1</td> <td>Fenitrothion         mg/kg         &lt;0.1         &lt;0.1</td> <td>Chlorpyriphos         mg/kg         &lt;0.1         &lt;0.1</td> <td>Ronnel         mg/kg         &lt;0.1         &lt;0.1</td> <td>Chlorpyriphos-methyl         mg/kg         &lt;0.1         &lt;0.1</td> <td>Dimethoate         mg/kg         &lt;0.1         &lt;0.1</td> <td>Diazinon         mg/kg         &lt;0.1         &lt;0.1</td> <td>Date analysed         ·         10/5/10         40.1        
40.1         40.1</td> <td>Date extracted         ·         105/10         105/</td> <td>Type of sample          Soil         Soil</td> <td>Your Reference<br/>Type of sample        </td> <td>Organophasphorus Pesitides         UNITS         10738-6         40738-7         40738-7         40738-7         40738-7           Our Reference:         Your Reference:         IP100.4-05         TP100.2-03         TP210.2-03         Soli         Soli</td> <td>Surragete TCMX         %         124         131         117         121         122           Organnphosphonus Pesticides<br/>Your Reference:<br/>Your Reference:<br/>Type disapple         UNITS         40738-6         10738-6         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-7         40738-7<!--</td--><td>Etnion         mg/kg         4.0.1         <t< td=""><td>Eromophos-elityi         mg/kg         cl.1         cl.1<td>Fenitorhion         mg/kg         4.11         4.0.1</td><td>Chichpyliphos         mg/kg         4.11         4.01</td><td>Romel         mg/kg         4,1</td><td>Choopyriphos-methyl         rmg/kg         -4,1</td><td>Dimensione         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Chiopynphos         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Pennoh         mg/ng         4.1
        4.1         4.1</td><td>Diamon         mg/dg         4.11</td><td>Differensity         (105/10</td><td>Date exitación         · . · . (105/10         (105/10&lt;</td><td>Type of sample          Sol         Sol</td><td>Your Releence        </td></td></t<></td></td> | Organophosphorus Pesticides         UNITS         40738-11         40738-12         40738-13         40738-13         40738-13         40738-13         40738-13         40738-14         40738-15           Your Reference: | Organophosphorus Pesticides         UNITS         40738-11         40738-12         40738-13         40738-13         40738-15           Our Reference:          TP210.2-0.3         TP210.4-0.5         TP250.2-0.3         TP301.0         TO105/10         T015/10         T015/10         T015/10         T015/10 | Ethion         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Bromophos-ethyl         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Fenitrothion         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Chlorpyriphos         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Ronnel         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1        
<0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Chlorpyriphos-methyl         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Dimethoate         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Diazinon         mg/kg         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1 | Date analysed         ·         10/5/10         40.1 | Date extracted         ·         105/10         105/ | Type of sample          Soil         Soil | Your Reference<br>Type of sample              | Organophasphorus Pesitides         UNITS         10738-6         40738-7         40738-7         40738-7         40738-7           Our Reference:         Your Reference:         IP100.4-05         TP100.2-03         TP210.2-03         Soli         Soli | Surragete TCMX         %         124         131         117         121         122           Organnphosphonus Pesticides<br>Your Reference:<br>Your Reference:<br>Type disapple         UNITS         40738-6         10738-6         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-6         40738-7         10738-7         40738-7 </td <td>Etnion         mg/kg         4.0.1 
       4.0.1         4.0.1         4.0.1         <t< td=""><td>Eromophos-elityi         mg/kg         cl.1         cl.1<td>Fenitorhion         mg/kg         4.11         4.0.1</td><td>Chichpyliphos         mg/kg         4.11         4.01</td><td>Romel         mg/kg         4,1</td><td>Choopyriphos-methyl         rmg/kg         -4,1</td><td>Dimensione         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Chiopynphos         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Pennoh         mg/ng         4.1</td><td>Diamon         mg/dg         4.11</td><td>Differensity         (105/10</td><td>Date exitación         · . · . (105/10         (105/10&lt;</td><td>Type of sample          Sol         Sol</td><td>Your Releence       
</td></td></t<></td> | Etnion         mg/kg         4.0.1 <t< td=""><td>Eromophos-elityi         mg/kg         cl.1         cl.1<td>Fenitorhion         mg/kg         4.11         4.0.1</td><td>Chichpyliphos         mg/kg         4.11         4.01</td><td>Romel         mg/kg         4,1</td><td>Choopyriphos-methyl         rmg/kg         -4,1</td><td>Dimensione         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Chiopynphos         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Pennoh         mg/ng         4.1</td><td>Diamon         mg/dg         4.11</td><td>Differensity         (105/10</td><td>Date exitación         · . · . (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10        
(105/10         (105/10&lt;</td><td>Type of sample          Sol         Sol</td><td>Your Releence        </td></td></t<> | Eromophos-elityi         mg/kg         cl.1         cl.1 <td>Fenitorhion         mg/kg         4.11         4.0.1</td> <td>Chichpyliphos         mg/kg         4.11         4.01</td> <td>Romel         mg/kg         4,1</td> <td>Choopyriphos-methyl         rmg/kg         -4,1</td> <td>Dimensione         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Chiopynphos         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Pennoh         mg/ng         4.1</td> <td>Diamon         mg/dg         4.11</td> <td>Differensity         (105/10</td> <td>Date exitación         · . · . (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10         (105/10        
(105/10         (105/10&lt;</td> <td>Type of sample          Sol         Sol</td> <td>Your Releence        </td> | Fenitorhion         mg/kg         4.11         4.0.1 | Chichpyliphos         mg/kg         4.11         4.01 | Romel         mg/kg         4,1 | Choopyriphos-methyl         rmg/kg         -4,1 | Dimensione         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Chiopynphos         mg/ng         4.1         4.1         4.1         4.1         4.1         4.1           Pennoh         mg/ng         4.1 | Diamon         mg/dg         4.11 | Differensity         (105/10 | Date exitación         · . · . (105/10         (105/10
        (105/10         (105/10< | Type of sample          Sol         Sol | Your Releence                                 |

**Client Reference:** 

71706, Mulgoa

Envirolab Reference: Revision No:

40738 R 00

Page 11 of 30

Client
Reference:
71706,
Mulgoa

Surrogate TCLMX	Ethion mg	Bromophos-ethyl mg	Fenitrothion mg	Chlorpyriphos mg	Ronnel mg	Chlorpyriphos-methyl mg	Dimethoate mg	Diazinon mg	Date analysed	Date extracted -	Type of sample		Your Reference	Our Reference: UNI	Organophosphorus Pesticides	Surrogate TCLMX %	Ethion mg/	Bromophos-ethyl mg/	Fenitrothion mg/	Chlorpyriphos mg/	Ronnel mg/	Chlorpyriphos-methyl mg/	Dimethoate mg/	Diazinon mg/	- Date analysed	Date extracted -	Type of sample	Your Reference	Our Reference: UNI	Organophosphorus Pesticides
o`	ľkg	/kg	/kg	/kg	/kg	/kg	/kg	ľkg					1	ST			ĸ	<u>ہ</u>		Ŕġ	ß	ka	κ <u>α</u>	<u>k</u> a 					TS	
122	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil		P124 0.2-0.3	40738-21		120	<b>-0</b> .1	.^0.	. <u>6</u>	<u></u> .1	-0.1	<u>0.1</u>	<u>6</u> .1	<u>6</u>	10/5/10	10/5/10	Soil	>104 0.4-0.5	40738-16	
115	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	_	TP124 0.4-0.5	40738-22		122	<0.1	<0.1	<0.1	<0.1	<0,1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP1100.2-0.3	40738-17	
124	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil		TP1320.2-0.3	40738-23		115	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	TP1100.4-0.5	40738-18	
124	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil		TP132 0.4-0.5	40738-24		107	<0.1	<0.1	<0.1	<0.1	<b>6</b> .1	< <u>0</u> .1	~0.1	<0.1	10/5/10	10/5/10	Soil	TP123 0.2-0.3	40738-19	
118	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10/5/10	10/5/10	Soil	Spillway 0.0-0.1	Dam 1	40738-36		120	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<u>&lt;0.</u> 1	<0.1	10/5/10	10/5/10	Soil	TP123 0.4-0.5	40738-20	

Envirolab Reference: Revision No: 40738 R 00

Surrogate TCLMX

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Page 12 of 30

	Client Reference:	71706, Mulgoa
Organophosphorus Pesticides		
Our Reference:	UNITS	40738-37
Your Reference		Dam 1
		Spillway 0.2-0.3
Type of sample		Soil
Date extracted	1	10/5/10
Date analysed	•	10/5/10
Diazinon	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Fenitrothion	mg/kg	6.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	-0.1
Surrogate TCLMX	%	116

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Page 13 of 30



Envirolab Reference: Revision No:

Client
Reference:
71706,
Mulgoa

Acid Extractable metals in soil	Zinc	Nickel	Mercury	Lead	Copper	Chromium	Cadmium	Arsenic	Date analysed	Date digested	Type of sample	Your Reference	Our Reference:	Acid Extractable metals in soil
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	·				UNITS	
	15	g	<0.1	33	13	31	<0.5	7	11/05/10	11/05/10	Soil	TP5 0.0-0.1	40738-1	
	σ	ω	-0.1	28	17	21	<0.5	ю	11/05/10	11/05/10	Soil	TP5 0.4-0.5	40738-2	
	сл	Ch	<0.1	24	œ	31	<0.5	00	11/05/10	11/05/10	Soil	TP110.2-0.3	40738-3	
	თ	Сл	<0.1	29	g	36	<0.5	ø	11/05/10	11/05/10	Soil	TP11 0.4-0.5	40738-4	
	8	7	<0.1	30	12	30	<0.5	თ	11/05/10	11/05/10	Soil	TP100.0-0.1	40738-5	

Acid Extractable metals in soil Our Reference:	2=1	Zinc	Nickel	Mercury	Lead	Copper	Chromium	Cadmium	Arsenic	Date analysed	Date digested	Type of sample	Your Reference	Our Reference:	Acid Extractable metals in soil
UNITS		ma/ka	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	1	,			UNITS	
40738-11		ויט	5	<0.1	27	ດ	36	<0.5	6	11/05/10	11/05/10	Soil	TP100.4-0.5	40738-6	
40738-12		ω	4	<0.1	19	2	30	<0.5	СЛ	11/05/10	11/05/10	Soil	TP130.2-0.3	40738-7	
40738-13	•	ω	IJ.	<0.1	19	_	41	<0.5	თ	11/05/10	11/05/10	Soil	TP130.4-0.5	40738-8	
40738-14	-		ω	<0,1	18	4	23	<0.5	- СЛ	11/05/10	11/05/10	Soil	TP160.2-0.3	40738-9	
40738-15		ω	4	<0,1	19	N	35	<0 <u>.</u> 5	თ	11/05/10	11/05/10	Soil	TP160.4-0.5	40738-10	

Zinc	Nickel	Mercury	Lead	Copper	Chromium	Cadmium	Arsenic	Date analysed	Date digested	Type of sample	Your Reference	Our Reference:	Acid Extractable metals in soil	
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ı	r			UNITS		-
2	2	< <u>0</u> .1	13	7	25	<0.5	Q	11/05/10	11/05/10	Soil	TP210.2-0.3	40738-11		
-	7	<0.1	თ	7	თ	<0.5	4	11/05/10	11/05/10	Soil	TP21 0.4-0.5	40738-12		
2	N	<0.1	18	7	30	<0.5	4	11/05/10	11/05/10	Soil	TP250.2-0.3	40738-13		
ω	G	<0.1	17		41	<0.5	сл	11/05/10	11/05/10	Soil	TP250.4-0.5	40738-14		
თ	ω	<0.1	26	4	60	<0.5	10	11/05/10	11/05/10	Soil	TP104 0.2-0.3	40738-15		

Envirolab Reference: Revision No: 40738 R 00

Page 14 of 30



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Date analysed	lype of sample	T	Your Reference	Our Reference:	Acid Extractable metals in soil		Zinc	Nickel	Mercury	Lead	Copper	Chromium	Cadmium	Arsenic	Date analysed	Date digested	Type of sample				Acid Extractable metals in soil Our Reference:		Zinc	Nickel	Mercury	Lead	Copper	Chromium	Cadmium	Arsenic	Date analysed	Date digested	Type of sample	Your Reference	Our Reference:	Acid Extractable metals in soil	C
<b>F</b> 1				UNITS		-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ł	Ł					UNITS	-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ı				UNITS		ient Referenc
11/05/10	UQ1	0.2-0.3	Dam 1	40738-37			55	21	<0.1	20	28	12	<0.5	11	11/05/10	11/05/10	Soil		17 124 0.2-0.0	TP124 0 2-0 3	40738-21	-	9	4	<0.1	21	10	50	<0,5	9	11/05/10	11/05/10	Soil	TP104 0.4-0.5	40738-16		e: 71706, M
	_Ш						70	26	<0.1	22	34	12	<0.5	7	11/05/10	11/05/10	Soil		11-124 0.4-0.2	TP104 0 4-0 5	40738-22		30	œ	<0.1	19	18	24	<0.5	9	11/05/10	11/05/10	Soil	TP110 0.2-0.3	40738-17		Mulgoa
							25	14	<0.1	28	9	43	<0.5	1	11/05/10	11/05/10	Soil		1 F 1 QE Q.E-0.0	TP1320 2-0 3	40738-23		12	4	<0.1	14	13	10	<0.5	ω	11/05/10	11/05/10	Soil	TP1100.4-0.5	40738-18		
							24	12	<0.1	27	16	37	<0.5	13	11/05/10	11/05/10	Soil			TP13204-05	40738-24		15	ហ	<0.1	18	16	15	<0,5	œ	11/05/10	11/05/10	Soil	TP123 0.2-0.3	40738-19		
							56	16	<0.1	32	24	19	<0,5	ω	11/05/10	11/05/10	Soil	0.0-0.1	Spillway	Dam 1	40738-36		11	ω	<0.1	14	19	ດ	<0.5	4	11/05/10	11/05/10	Soil	TP1230.4-0.5	40738-20		

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NICAL		TA	ø

Page 15 of 30

Envirolab Reference: Revision No: 40738 R 00

Zinc	Nickel	Mercury	Lead	Copper	Chromium	Cadmium	Arsenic	Date analysed	Date digested	Type of sample			Your Reference	Our Reference:	Acid Extractable metals in soil	
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	F	•					UNITS		
42	13	<0.1	22	22	17	<0.5	7	11/05/10	11/05/10	Soil	0.2-0.3	Spillway	Dam 1	40738-37		

Page 16 of 30



Envirolab Reference: 40738 Revision No: R 00

Client
Reference:
71706,
Mulgoa

Moisture	Date analysed	Date prepared	Type of sample		Your Reference	Our Reference:	Moisture
%	1					UNITS	
9.3	10/5/10	10/5/10	Soil	Spillway 0.2-0.3	Dam 1	40738-37	
0.10	10/5/10	10/5/10	Soil		Trip Blank	40738-39	



Envirolab Reference: Revision No:

40738 R 00

Page 17 of 30

**Client Reference:** 71706, Mulgoa

· · · · · · · · · · · · · · · · · · ·	Trace Analysis		Asbestos ID in soil	Sample Description	Date analysed	Type of sample	Our Reference:	Asbestos ID - soils
	P		F		•		UNITS	
	Respirable fibres not detected	reporting limit of 0.1g/kg	No asbestos found at	Approx 35g Clay Soil	12/5/10	Soil	40738-2 TP5 0 4-0 5	
	Respirable fibres not detected	reporting limit of 0.1g/kg	No asbestos found at	Approx 35g Clay Soil	12/5/10	Soil	40738-4 TP11 0 4-0 5	
	Respirable fibres not detected	reporting limit of 0.1g/kg	No asbestos found at	Approx 30g Soil	12/5/10	Soil	40738-6 TP10.0.4-0.5	
	Respirable fibres not detected	reporting limit of 0.1g/kg	No asbestos found at	Approx 35g Soil	12/5/10	Soil	40738-7 TP13.0.2-0.3	
	Respirable fibres not detected	reporting limit of 0.1g/kg	No asbestos found at	Approx 30g Soil	12/5/10	Soil	40738-9 TP160.2-0.3	

Sample Description	Date analysed	Type of sample		Your Reference	Our Reference:	Asbestos ID - soils			Trace Analysis				Asbestos ID in soil		Sample Description	Date analysed	Type of sample	Your Reference	Our Reference:	Asbestos ID - soils
·					UNITS				1				1		ı	T			UNITS	
Approx 35g Soil	12/5/10	Soil		TP124 0.2-0.3	40738-21		detected	fibres not	Respirable	of 0.1g/kg	reporting limit	found at	No asbestos	Soil	Approx 35g	12/5/10	Soil	TP21 0.2-0.3	40738-11	
Approx 35g Soil	12/5/10	Soil		TP1320.2-0.3	40738-23		detected	fibres not	Respirable	of 0.1g/kg	reporting limit	found at	No asbestos	Soil	Approx 35g	12/5/10	Soil	TP250.2-0.3	40738-13	
Approx 35g Soil	12/5/10	Soil	Spillway 0.0-0.1	Dam 1	40738-36		detected	fibres not	Respirable	of 0.1g/kg	reporting limit	found at	No asbestos	Soil	Approx 35g	12/5/10	Soil	TP104 0.2-0.3	40738-15	
Approx 35g Soil	12/5/10	Soil	Spillway 0.2-0.3	Dam 1	40738-37		detected	fibres not	Respirable	of 0.1g/kg	reporting limit	found at	No asbestos	Soil	Approx 35g	12/5/10	Soil	TP1100.2-0.3	40738-17	
	<u> </u>	<u> </u>				]	detected	fibres not	Respirable	of 0.1g/kg	reporting limit	found at	No asbestos	Soil	Approx 35g	12/5/10	Soil	TP1230.2-0.3	40738-19	

Asbestos ID in soil

4

No asbestos found at reporting limit of 0. 1g/kg

No asbestos found at reporting limit of 0.1g/kg

No asbestos found at reporting limit of 0.1g/kg

No asbestos found at reporting limit of 0. 1g/kg

Trace Analysis

.

Respirable fibres not detected

Respirable fibres not detected

Respirable fibres not detected

Respirable fibres not detected

40738 R 00

Page 18 of 30

ACCREDITED FOR IATA

**Revision No:** Envirolab Reference:

<b>Client Reference:</b>	
71706, Mulgoa	

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UNITS         40738-40         40738-41            Trip Spike         Trip Blank            Trip Spike         Trip Blank           -         14/05/2010         14/05/2010           -         14/05/2010         14/05/2010           µg/L         103%         <1.0           µg/L         119%         <1.0           µg/L         1120%         <1.0           µg/L         120%         <1.0           %         81         82           %         108         84	Surrogate 4-BFB	Surrogate toluene-d8	S <i>urrogate</i> Dibromofluoromethane	o-xylene	m+p-xylene	Ethylbenzene	Toluene	Benzene	Date analysed	Date extracted	Type of sample	Your Reference	Our Reference:	BTEX in Water
40738-40         40738-41           Trip Spike         Trip Blank           Water         Water           14/05/2010         14/05/2010           14/05/2010         14/05/2010           81%         <1.0	%	%	%	μg/L	J∕Ĝrl	J/Bri	μg/L	-1/блі	ı	,			UNITS	
40738-41 Trip Blank Water 14/05/2010 <1.0 <1.0 <1.0 <1.0 <1.0 <2.0 <1.0 82 83	108	81	84	120%	117%	119%	103%	81%	14/05/2010	14/05/2010	Water	Trip Spike	40738-40	
	84	83	82	<1.0	<2.0	<1.0	<1.0	<1.0	14/05/2010	14/05/2010	Water	Tríp Blank	40738-41	



Envirolab Reference: Revision No:

40738 R 00

Page 19 of 30

Chromium-Dissolved	Cadmium-Dissolved	Arsenic-Dissolved	Date analysed	Date prepared	Type of sample	Your Reference	Our Reference:	HM in water - dissolved	Zinc-Dissolved	Nickel-Dissolved	Mercury-Dissolved	Lead-Dissolved	Copper-Dissolved	Chromium-Dissolved	Cadmium-Dissolved	Arsenic-Dissolved	Date analysed	Date prepared	Type of sample	Your Reference	Our Reference:	HM in water - dissolved		Zinc-Dissolved	Nickel-Dissolved	Mercury-Dissolved	Lead-Dissolved	Copper-Dissolved	Chromium-Dissolved	Cadmium-Dissolved	Arsenic-Dissolved	Date analysed	Date prepared	Type of sample	Your Reference	Our Reference:	HM in water - dissolved	Clien
μg/L	hð\r	J/g/L	·	,			UNITS		µg/L	μg/L	µg/L	μg/L	hg/L	μg/L	J/Bri	μg/L	1	ı			UNITS			1/Brt	hð/r	µg/L	μg/L	μg/L	µg/L	hð/r	hâ/r	ı	•			UNITS		t Referenc
4	<0.1	7	10/5/10	10/5/10	Water	W12-D	40738-35		9	7	<0.5	4	7	7	<0.1	4	10/5/10	10/5/10	Water	M3-N	40738-30			N	4	<0.5	7	4	2	<0.1	4	10/5/10	10/5/10	Water	W1-U	40738-25		e: 71706, I
									Cī	7	<0.5	4	4	4	<0.1	4	10/5/10	10/5/10	Water	W9-D	40738-31		ŧ		7	<0.5	4	2	4	<0.1	7	10/5/10	10/5/10	Water	W1-D	40738-26		Mulgoa
									15	4	<0.5	4	7	7	<0.1	7	10/5/10	10/5/10	Water	W10	40738-32	i		2	7	<0.5	7	7	7	<0.1	4	10/5/10	10/5/10	Water	W2	40738-27		
									20	7	<0.5	ω	4	7	<0.1	7	10/5/10	10/5/10	Water	W11	40738-33			22	4	<0.5	4	4	4	<u>6</u> .1	4	10/5/10	10/5/10	Water	W7	40738-28		
									4	4	<0.5	15	4	4	<0.1	4	10/5/10	10/5/10	Water	W12-U	40738-34			41	Δ ¦	<0.5	<u>^</u>	<u> </u>	<u>^</u>	<0.1	4	10/5/10	10/5/10	Water	W8	40738-29		

ACCREDITED FOR TECHNICAL COMPETENCE NATA

Page 20 of 30

40738 R 00

Mercury-Dissolved

нд/г нд/г нд/г

ω <u>Δ</u> <u>δ</u> <u>Δ</u> <u>Δ</u>

Nickel-Dissolved

Zinc-Dissolved

Copper-Dissolved

Lead-Dissolved

Envirolab Reference: Revision No:

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Client
Reference:
71706,
Mulgoa

			 					T				7
Your Reference	Our Reference:	Miscellaneous Inorganics	Magnesium - Dissolved	Calcium - Dissolved		Hardness	Date analysed	Date prepared	Type of sample	Your Reference	Our Reference:	Miscellaneous Inorganics
	UNITS		mg/L	mg/L	<u>ال</u>	mgCaCO3	•				UNITS	
N-6M	40738-30		12	7.2	·	67	10/05/10	10/05/10	Water	V1-U	40738-25	
C-6M	40738-31		12	7.4		70	10/05/10	10/05/10	Water	W1-D	40738-26	
W10	40738-32		15	8.2		81	10/05/10	10/05/10	Water	W2	40738-27	
W11	40738-33		1.6	1.1		9	10/05/10	10/05/10	Water	W7	40738-28	
W12-U	40738-34		2.1	1.5		12	10/05/10	10/05/10	Water	W8	40738-29	
_	_		<u> </u>									

		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
1.3	5.7	1.3	1.4	mg/L	Magnesium - Dissolved
 0.9	2.3	0.9	1.0	mg/L	Calcium - Dissolved
 . <b>C</b> O	29	7	ω	mgCaCO3 /L	Hardness
10/05/10	10/05/10	10/05/10	10/05/10	•	Date analysed
 10/05/10	10/05/10	10/05/10	10/05/10		Date prepared
 Water	Water	Water	Water		Type of sample
 W11	W10	M9-D	N-6M		Your Reference
 40738-33	40738-32	40738-31	40738-30	UNITS	Our Reference:
					Miscellaneous Inorganics

					1			
Magnesium - Dissolved	Calcium - Dissolved	Hardness	Date analysed	Date prepared	Type of sample	Your Reference	Our Reference:	<b>Miscellaneous Inorganics</b>
mg/L	mg/L	mgCaCO3 /L	ı	1			UNITS	
7.0	2.0	34	10/05/10	10/05/10	Water	W12-D	40738-35	

Envirolab Reference: Revision No: 40738 R 00

Page 21 of 30



GC.16 GC.2 GC.2 GC.2
с. <del>5</del>
GC.8
Metals.20 ICP-AES
Metals.21 CV-AAS
LAB.8
ASB.1
Metals.22 ICP-MS



Envirolab Reference: Revision No:

40738 R 00

Page 22 of 30

**Client Reference:** 71706, Mulgoa

23 of 30	Page			Z		40738 R 00	erence:	Envirolab Ref Revision No:
[NR]	[NR]	<0.1    <0.1	40738-9	<u>6</u> .1	GC-5	0.1	mg/kg	pp-DDT
[RN]	[NR]	<0.1    <0.1	40738-9	<0.1	9C-2	0.1	mg/kg	Endosulfan II
135%	LCS-1	<0.1    <0.1	40738-9	-0.1	GC-5	0.1	mg/kg	DDD-dd
94%	LCS-1	<0.1    <0.1	40738-9	<u>6</u> .1	GC-5	0.1	mg/kg	Endrin
111%	LCS-1	<0.1    <0.1	40738-9	<0.1	GC-5	. 0.1	mg/kg	Dieldrin
114%	LCS-1	<0.1    <0.1	40738-9	<0.1	GC-5	0.1	mg/kg	pp-DDE
[NR]	[NR]	<0.1    <0.1	40738-9	-0,1	GC-5	0.1	mg/kg	Endosulfan I
[NR]	[NR]	<0.1    <0.1	40738-9	-0 <u>.</u> 1	GC-5	0.1	mg/kg	alpha-chlordane
[NR]	[NR]	<0.1  <0.1	40738-9	~0.1	GC-5	0.1	mg/kg	gamma-Chlordane
104%	LCS-1	<0.1    <0.1	40738-9	<0.1	60-5	0.1	mg/kg	Heptachlor Epoxide
104%	LCS-1	<0.1    <0.1	40738-9	-0.1	GC-5	0.1	mg/kg	Aldrin
[NR]	[NR]	<0.1    <0.1	40738-9	6. .1	GC-5	0.1	mg/kg	delta-BHC
97%	LCS-1	<0.1   <0.1	40738-9	<u></u>	60-5	0.1	mg/kg	Heptachlor
132%	LCS-1	<0.1  <0.1	40738-9	<0.1	GC-5	0.1	mg/kg	beta-BHC
[NR]	[NR]	<0.1  <0.1	40738-9	<0.1	GC-5	0.1	mg/kg	gamma-BHC
107%	LCS-1	<0.1    <0.1	40738-9	<u>6</u> ,1	GC-5	0.1	mg/kg	alpha-BHC
[NR]	[NR]	<0.1 ]] <0.1	40738-9	0.1	GC-5	0.1	mg/kg	HCB
10/5/10	LCS-1	10/5/10    10/5/10	40738-9	10/5/10			١	Date analysed
10/5/10	LCS-1	10/5/10    10/5/10	40738-9	10/5/10				Date extracted
		Base II Duplicate II %RPD						Organochlorine Pesticides in soil
Spike % Recovery	Spike Sm#	Duplicate results	Duplicate Sm#	Blank	METHOD	PQL	UNITS	QUALITY CONTROL
								o-Terphenyl
129%	LCS-1	134    130    RPD: 3	40738-9	135	GC.3		%	Surrogate
82%	LCS-1	<100    <100	40738-9	<100	GC.3	100	mg/kg	TPH C29 - C36
86%	LCS-1	<100    <100	40738-9	<100	GC.3	100	ma/ka	TPH C15 - C28
75%	LCS-1	<50    <50	40738-9	< <u>50</u>	GC 3	50	ma/ka	TPH C <sub>40</sub> - C <sub>14</sub>
11/5/10	LCS-1	11/5/10    11/5/10	40738-9	11/5/10			1	Date analysed
11/5/10	1CS-1	11/5/1011 11/5/10	40738-9	11/5/10				Date extracted
		Base II Duplicate II %RPD						sTPH in Soil (C10-C36)
Spike % Recoverv	Spike Sm#	Duplicate results	Duplicate Sm#	Blank	METHOD	POL	UNITS	QUALITY CONTROL
o o o	r C 4		407 30-2 1	201	G C I B		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	aaa-Trifluorotoluene
80%		<1.0  <1.0	40738-21	<1.0	GC,16	 د-	mg/kg	o-Xylene
88%	LCS-1	<2.0    <2.0	40738-21	<2.0	GC.16	N	mg/kg	m+p-xylene
83%	LCS-1	<1.0    <1.0	40738-21	<1.0	GC.16	<u>د</u>	mg/kg	Ethylbenzene
102%	LCS-1	<0.5    <0.5	40738-21	<0,5	GC.16	0.5	mg/kg	Toluene
118%	LCS-1	<0.5    <0.5	40738-21	<0.5	GC.16	0.5	mg/kg	Benzene
96%	LCS-1	<25    <25	40738-21	<25	GC.16	25	mg/kg	VTPH C6 - C9
11/5/10	LCS-1	11/5/10    11/5/10	40738-21	11/5/10			•	Date analysed
11/5/10	LCS-1	11/5/10    11/5/10	40738-21	11/5/10			-	Date extracted
		Base II Duplicate II %RPD						vTPH & BTEX in Soil
Spike % Recovery	Spike Sm#	Duplicate results	Duplicate Sm#	Blank	METHOD	PQL	UNITS	QUALITY CONTROL
> : N	· · · · ·			- !				



Page 24 of 30



Envirolab Reference: 40738 Revision No: R 00

Organochlorine Pesticides in soil						Base    Duplicate    %RPD		
Endrin Aldehyde	mg/kg	0.1	GC-5	<0.1	40738-9	<0.1 [] <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	GC-5	<b>~</b> 0.1	40738-9	<0.1    <0.1	LCS-1	93%
Methoxychlor	mg/kg	0.1	GC-5	<0.1	40738-9	<0.1    <0.1	[NR]	[NR]
Surrogate TCLMX	%		GC-5	120	40738-9	113    121    RPD: 7	LCS-1	115%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike %
Organophosphorus Pesticides						Base II Duplicate II %RPD		vernneik
Date extracted				10/5/10	40738-9	10/5/10    10/5/10	LCS-1	10/5/10
Date analysed	•			10/5/10	40738-9	10/5/10    10/5/10	LCS-1	10/5/10
Diazinon	, mg/kg	0.1	GC.8	<0.1	40738-9	<0.1    <0.1	[NR]	[NR]
Dimethoate	mg/kg	0.1	GC.8	<0.1	40738-9	<0.1    <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	0.1	GC.8	<del>-</del> 0.1	40738-9	<0.1    <0.1	[NR]	[NR]
Ronnel	mg/kg	0.1	GC.8	<0,1	40738-9	<0.1    <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	GC.8	<0.1	40738-9	<0.1    <0.1	LCS-1	129%
Fenitrothion	mg/kg	0.1	GC.8	<0.1	40738-9	<0.1    <0.1	LCS-1	125%
Bromophos-ethyl	mg/kg	0.1	GC.8	<0.1	40738-9	<0.1    <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	GC.8	<0.1	40738-9	<0.1    <0.1		100%
		2					02500 0mt	Child of
Acid Extractable metals in soil						Base II Duplicate II %RPD		Recovery
Date digested	,			11/05/1 0	40738-9	11/05/10    11/05/10	LCS-2	11/05/10
Date analysed	I			11/05/1 0	40738-9	11/05/10    11/05/10	LCS-2	11/05/10
Arsenic	mg/kg	4	Metals.20 ICP-AES	<4	40738-9	5    7    RPD: 33	LCS-2	110%
Cadmium	mg/kg	0.5	Metals.20 ICP-AES	<0.5	40738-9	<0.5    <0.5	LCS-2	111%
Chromium	mg/kg	<u>ب</u>	Metals.20 ICP-AES	2	40738-9	23    33    RPD: 36	LCS-2	111%
Copper	mg/kg		Metals.20 ICP-AES	2	40738-9	4    4    RPD: 0	LCS-2	114%
Lead	mg/kg		Metals.20 ICP-AES	7	40738-9	18    22    RPD: 20	LCS-2	111%
Mercury	mg/kg	0.1	Metals.21 CV-AAS	<0.1	40738-9	<0.1  <0.1	LCS-2	101%
Nickel	mg/kg	<b>_</b> }	Metals.20 ICP-AES	7	40738-9	3    4    RPD: 29	LCS-2	113%
Zinc	mg/kg		Metals.20 ICP-AES	2	40738-9	3    4    RPD: 29	LCS-2	111%

QUALITY CONTROL

UNITS

Pop

Blank

Duplicate results

Spike Sm#

Spike % Recovery

Client Reference:

71706, Mulgoa

Client Reference: 71706, Mulgoa

QUALITY CONTROL     UNITS     PQL     METHOD     Blank       Asbestos ID - soils     -					
UNITS PQL METHOD Blank	QUALITY CONTROL	Date analysed	Asbestos ID - soils	QUALITY CONTROL	
PQL METHOD Blank PQL METHOD Blank	UNITS	ı		UNITS	
METHOD Blank	Pop			PQL	
Blank [NT]	METHOD			METHOD	
	Blank	[TN]		Blank	

Chromium-Dissolved	Cadmium-Dissolved	Arsenic-Dissolved	Date analysed	Date prepared	HM in water - dissolved	QUALITY CONTROL	Surrogate 4-BFB	Surrogate toluene-d8	Dibromofluoromethane	Surrogate	o-xylene	m+p-xylene	Ethylbenzene	Toluene	Benzene	Date analysed	Date extracted	BTEX in Water	QUALITY CONTROL
µg/L	µg/L	µg/L	ı	•		UNITS	%	%		%	μg/L	µg/L	Ч/b́н	1/6ri	µg/L	ı	ı		UNITS
	0.1	<u> </u>				PQL						2	•	د	ب				PQL
Metals.22 ICP-MS	Metals.22 ICP-MS	Metals.22 ICP-MS				METHOD	GC.16	GC.16		GC.16	GC.16	GC. 16	GC.16	GC.16	GC.16				METHOD
4	<0.1	4	10/5/10	10/5/10		Blank	86	126		111	<u>~1.0</u>	<2.0	<1.0	<1.0	<1.0	14/05/2 010	14/05/2 010		Blank
40738-25	40738-25	40738-25	40738-25	40738-25		Duplicate Sm#	[NT]	[FN]		[IN]	[NT]	[N]	[TN]	[NT]	[TN]	[NT]	[NT]		Duplicate Sm#
2  <1	<0.1    <0.1	4    4	10/5/10    10/5/10	10/5/10    10/5/10	Base II Duplicate II %RPD	Duplicate results	[IN]	[FN]		[TN]	[NT]	[NT]	[NT]	[TN]	[TN]	[TN]	[TN]	Base II Duplicate II %RPD	Duplicate results
LCS-W1	LCS-W1	LCS-W1	LCS-W1	LCS-W1		Spike Sm#	LCS-W1	LCS-W1		LCS-W1	LCS-W1	LCS-W1	LCS-W1	LCS-W1	LCS-W1	LCS-W1	LCS-W1		Spike Sm#
93%	98%	97%	10/5/10	10/5/10		Spike % Recovery	96%	89%		106%	111%	90%	111%	93%	93%	14/05/2010	14/05/2010		Spike % Recovery

Envirolab Reference: 40738 Revision No: R 00 Mercury-Dissolved

µg/L

0.5

Metals.21 CV-AAS

<sup>~0,5</sup>

40738-25

<0.5 || <0.5

LCS-W1

100%

Lead-Dissolved

hg/L

---

Metals.22 ICP-MS

7

40738-25

₹ || ~1

LCS-W1

103%

Nickel-Dissolved

µg/L

Metals.22 ICP-MS

7

40738-25

2 || 2 ||

LCS-W1

%06

Zinc-Dissolved

μg/L

Metals.22 ICP-MS

7

40738-25

2 || 1 || RPD: 67

LCS-W1

91%

Copper-Dissolved

hô/r

-

Metals.22 ICP-MS

7

40738-25

<u>∼</u> || ~1

LCS-W1

%06

Page 25 of 30

**Client Reference:** 71706, Mulgoa

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared				10/05/1 0	40738-25	10/05/10    10/05/10	LCS-W6	10/05/10
Date analysed	ł			10/05/1 0	40738-25	10/05/10    10/05/10	LCS-W6	10/05/10
Hardness	mgCaCO 3/L	-	Metals.20 ICP-AES	7	40738-25	67    67    RPD: 0	[NR]	[NR]
Calcium - Dissolved	mg/L	0.03	Metals.20 ICP-AES	<0.03	40738-25	7.2    7.2    RPD: 0	LCS-W6	88%
Magnesium - Dissolved	mg/L	0.03	Metals.20 ICP-AES	<0.03	40738-25	12    12    RPD: 0	LCS-W6	84%
QUALITY CONTROL	UNITS		Dup. Sm#		Duplicate	Spike Sm#	Spike % Recovery	
sTPH in Soil (C10-C36)				Base + [	Duplicate + %RPE			<u> </u>
Date extracted			10738-21	11/5	5/10    11/5/10	LCS-2	11/5/10	
Date analysed			10738-21	11/5	5/10    11 <i>/5/</i> 10	LCS-2	11/5/10	
TPH C10 - C14	mg/kg		10738-21		<50    <50	LCS-2	78%	
TPH C15 - C28	mg/kg		10738-21		100    <100	LCS-2	89%	
Surrogate o-Tembenyl	"mg/kg		10738-21 10738-21	130	100    <100 1 131    RPD: 1	LCS-2	04 <i>%</i> 132%	
QUALITY CONTROL	UNITS		Dup. Sm#		Duplicate	Spike Sm#	Spike % Recovery	
Organochlorine Pesticides in soil				Base + [	Duplicate + %RPf			L
Date extracted			10738-21	10/5	5/10    10/5/10	LCS-2	10/5/10	
Date analysed	1		10738-21	10/5	5/10    10/5/10	LCS-2	10/5/10	_
HOB	mg/kg		40738-21		<0.1    <0.1	[NR]	[NR]	
alpha-BHC	mg/kg		40738-21		<0.1    <0.1	LCS-2	101%	
gamma-BHC	mg/kg		40738-21		<0.1    <0.1	[NR]	[NR]	
beta-BHC	mg/kg		40738-21		<0.1    <0.1	LCS-2	129%	
Heptachlor	mg/kg		40738-21	•	<0.1    <0.1	LCS-2	77%	
delfa-BHC	mg/kg		40738-21		<0.1    <0.1	[NR]	[NR]	
Aldrin	mg/kg		40738-21		<0.1    <0.1	LCS-2	85%	
Heptachlor Epoxide	mg/kg		40738-21		<0.1    <0.1	LCS-2	94%	
gamma-Chlordane	mg/kg		40738-21		<0.1    <0.1	[NR]	[NR]	
alpha-chlordane	mg/kg		40738-21		<0.1    <0.1	[NR]	[NR]	
Endosulfan I	mg/kg		40738-21		<0.1    <0.1	[NR]	[NR]	
pp-DDE	mg/kg		40738-21		<0.1    <0.1	LCS-2	119%	
Dieldrin	mg/kg	<u> </u>	40738-21		<0.1    <0.1	LCS-2	95%	
Endrin	mg/kg		40738-21		<0.1    <0.1	LCS-2	84%	
000-dd	mg/kg		40738-21		<0.1    <0.1	LCS-2	105%	
Endosulfan 11	ng/kg		40738-21		<0.1  <0.1	ĮNRJ	[NR]	
pp-DDT	mg/kg		40738-21		<0.1    <0.1	[NR]	[NR]	
Endrin Aldehyde	mg/kg		40738-21		<0.1  <0.1	[NR]	[NR]	

Page 26 of 30



Envirolab Reference: Revision No: 40738 R 00

									1		T											1					1		1
Zinc	Nickel	Lead	Copper	Chromium	Cadmium	Arsenic	Date analysed	Date digested	Acid Extractable metals in soil	QUALITY CONTROL	Surrogate TCLMX	Ethion	Bromophos-ethyl	Fenitrothion	Chlorpyriphos	Ronnel	Chlorpyriphos-methyl	Dimethoate	Diazinon	Date analysed	Date extracted	Organophosphorus Pesticides	QUALITY CONTROL	Surrogate TCLMX	Methoxychlor	Endosulfan Sulphate	Organochlorine Pesticides in soil	QUALITY CONTROL	
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ı	ı		UNITS	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ı	1		UNITS	%	mg/kg	mg/kg		UNITS	
40738-21	40738-21 40738-21	40738-21	40738-21	40738-21	40738-21	40738-21	40738-21	40738-21		Dup. Sm#	40738-21	40738-21	40738-21	40738-21	40738-21	40738-21	40738-21	40738-21	40738-21	40738-21	40738-21		Dup. Sm#	40738-21	40738-21	40738-21		Dup. Sm#	Client Reference
55    54    RPD: 2	<0.1    <0.1 21    22    RPD: 5	20    24    RPD: 18	28    28    RPD: 0	12    12    RPD: 0	<0.5    <0.5	11    12    RPD: 9	11/05/10    11/05/10	11/05/10    11/05/10	Base + Duplicate + %RPD	Duplicate	122    119    RPD: 2	<0.1    <0.1	<0.1    <0.1	<0.1    <0.1	<0.1    <0.1	<0.1    <0.1	<0.1    <0.1	<0.1    <0.1	<0.1    <0.1	10/5/10    10/5/10	10/5/10    10/5/10	Base + Duplicate + %RPD	Duplicate	122    119    RPD: 2	<0.1    <0.1	<0.1    <0.1	Base + Duplicate + %RPD	Duplicate	ce: 71706, Mulgoa
LCS-3	LCS-3	LCS-3	LCS-3	LCS-3	LCS-3	LCS-3	LCS-3	LCS-3		Spike Sm#	LCS-2	LCS-2	[NR]	LCS-2	LCS-2	[NR]	[NR]	[NR]	[NR]	LCS-2	LCS-2		Spike Sm#	LCS-2	[NR]	LCS-2		Spike Sm#	
107%	100%	107%	110%	107%	107%	106%	11/05/10	11/05/10		Spike % Recovery	111%	%66	[NR]	82%	95%	[NR]	[NR]	[NR]	[NR]	10/5/10	10/5/10		Spike % Recovery	116%	[NR]	79%		Spike % Recovery	

Envirolab Reference: 40738 Revision No: R 00

ACCREDITED FOR TECHNICAL COMPETENCE .

Page 27 of 30

Page 28 of 30



Envirolab Reference: 40738 Revision No: R 00

		<b>Client Reference</b>	ce: 71706, Mulgoa		
QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared		[NT]	[NT]	40738-26	10/5/10
Date analysed	•	[TN]	[NT]	40738-26	10/8/10
Arsenic-Dissolved	μg/L	[NT]	[NT]	40738-26	82%
Cadmium-Dissolved	J/Brt	[NT]	[TN]	40738-26	96%
Chromium-Dissolved	μg/L	[TN]	[NT]	40738-26	110%
Copper-Dissolved	μg/L	[NT]	[NT]	40738-26	101%
Lead-Dissolved	hð/r	[NT]	[NT]	40738-26	110%
Mercury-Dissolved	jug/L	[TN]	[NT]	40738-26	114%
Nickel-Dissolved	Ъ/р	[TN]	[TN]	40738-26	101%
Zinc-Dissolved	hð/L	[TN]	[NT]	40738-26	112%
QUALITY CONTROL	UNITS	Dup. Sm#	Duplicate	Spike Sm#	Spike % Recovery
Miscellaneous Inorganics			Base + Duplicate + %RPD		
Date prepared	1	40738-35	10/05/10    10/05/10	40738-34	10/05/10
Date analysed	•	40738-35	10/05/10    10/05/10	40738-34	10/05/10
Hardness	mgCaCO ₃/L	40738-35	34    34    RPD: 0	[NR]	[NR]
Calcium - Dissolved	mg/L	40738-35	2.0    2.0    RPD: 0	40738-34	95%
Magnesium - Dissolved	mg/L	40738-35	7.0    7.1    RPD: 1	40738-34	93%
QUALITY CONTROL	UNITS	Dup. Sm#	Duplicate	Spike Sm#	Spike % Recovery
sTPH in Soil (C10-C36)			Base + Duplicate + %RPD		
Date extracted	•	[TN]	[TN]	40738-23	11/5/10
Date analysed	I	[TN]	[TN]	40738-23	11/5/10
TPH C10 - C14	mg/kg	[NT]	[NT]	40738-23	77%
TPH C15 - C28	mg/kg	[TN]	[NT]	40738-23	92%
TPH C29 - C36	mg/kg	[NT]	[NT]	40738-23	89%
Surrogate o-Terphenyl	%	[FN]	[TN]	40738-23	124%
QUALITY CONTROL	UNITS	Dup. Sm#	Duplicate	Spike Sm#	Spike % Recovery
Organochlorine Pesticides in soil			Base + Duplicate + %RPD		
Date extracted	•	[TN]	ELN	40738-23	10/5/10
Date analysed	ı	[IN]	[TN]	40738-23	10/5/10
HCB	mg/kg	[IN]	[IN]	[NR]	[NR]
alpha-BHC	mg/kg	[IN]	[TN]	40738-23	113%
gamma-BHC	mg/kg	[IN]	[LN]	[NR]	[NR]
beta-BHC	mg/kg	[LN]	[IN]	40738-23	113%
Heptachlor	mg/kg	[NT]	[IN]	40738-23	105%
delta-BHC	mg/kg	[TN]	[TN]	[NR]	[NR]
Aldrin	mg/kg	[TN]	[IN]	40738-23	113%
Heptachlor Epoxide	mg/kg	[TN]	[IN]	40738-23	117%
gamma-Chlordane	mg/kg	[IN]	[TN]	[NR]	[NR]
alpha-chlordane	mg/kg	[TN]	[IN]	[NR]	[NR]

		Client Reference	ce: 71706, Mulgoa		
QUALITY CONTROL Organochlorine Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Endosulfan I	mg/kg	[NT]	[TN]	[NR]	[NR]
pp-DDE	mg/kg	[NT]	[TN]	40738-23	130%
Dieldrin	mg/kg	[NT]	[NT]	40738-23	127%
Endrin	mg/kg	[NT]	[TN]	40738-23	110%
pp-DDD	mg/kg	[NT]	[NT]	40738-23	120%
Endosulfan II	mg/kg	[NT]	[N]	[NR]	[NR]
pp-DDT	mg/kg	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	[TN]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	[NT]	[NT]	40738-23	112%
Methoxychlor	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	40738-23	115%
QUALITY CONTROL	UNITS	Dup. Sm#	Duplicate	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil			Base + Duplicate + %RPD		
Date digested	1	[NT]	[NT]	40738-23	11/05/10
Date analysed	·	[NT]	[NT]	40738-23	11/05/10
Arsenic	mg/kg	[NT]	[TN]	40738-23	95%
Cadmium	mg/kg	[NT]	[TN]	40738-23	85%
Chromium	mg/kg	[TN]	[NT]	40738-23	85%
Соррег	mg/kg	[TN]	[NT]	40738-23	104%
Lead	mg/kg	[NT]	[NT]	40738-23	86%
Mercury	mg/kg	[NT]	[NT]	40738-23	98%
Nickel	mg/kg	[NT]	[TN]	40738-23	88%
Zinc	mg/kg	[NT]	[NT]	40738-23	84%

Page 29 of 30

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Envirolab Reference: 40738 Revision No: R 00

### Report Comments:

organics and filtered and acidified for metals. Water received in Plastic bottle - on receipt was transferred to glass for

INS: Insufficient sample for this test Asbestos was analysed by Approved Identifier: procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Asbestos was authorised by Approved Signatory: Envirolab recommends supplying 30-40g of sample in it's own container. Asbestos: A portion of the supplied sample was sub-sampled for asbestos according to Envirolab NT: Not tested Matt Mansfield Matt Mansfield PQL: Practical Quantitation Limit <: Less than

Quality Control Definitions

RPD: Relative Percent Difference

NA: Test not required

LCS: Laboratory Control Sample

NR: Not requested

>: Greater than

selected should be one where the analyte concentration is easily measurable. Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples Blank: This is the component of the analytical signal which is not derived from the sample but from reagents

LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix 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:

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

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

SVOC and speciated phenols is acceptable. Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for Surrogates: 60-140% is acceptable for general organics and 10-140% for

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Revision No:

Envirolab Reference:

40738 R 00

Page 30 of 30

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TPS     D-O.1     I     S     I     I       TP5     0.4-0.5     2     I     I     I       TP11     0.2-0.3     3     I     I     I       TP11     0.4-0.5     4     I     I     I       TP10     0-0-1     5     I     I     I       TP10     0-0-1     5     I     I     I       TP10     0-4-0.5     6     I     I     I       TP10     0-4-0.5     6     I     I     I       TP13     0-2-0.3     7     I     I     I       TP13     0-2-0.3     7     I     I     I       TP15     0-2-0.3     9     I     I     I       TP16     0-4-0.5     10     I     I     I	Sample ID	Sample Depth	Lab ID	Sampling Date	S - soil W - water	Container	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	втех/ трн	OCPs/ OPPs	PCBs	РАН	Phenols	VOCs	Other Schood	Not	es	
TP 5       0.4-0.5       2       1       1       1       1         TP 11       0.2-0.3       3       1       1       1       1       1       1         TP 11       0.4-0.5       4       1	TPS	0-0.1			S		<b> </b>																<u> </u>	
TP 11       0.2-0-3       3	TP5	0.4-0.5	2				1														f1			
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TP10       0-0-1       5       1<	TPII	0.4-0.5	4													1+					}			
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P13     0.4-0.5     8     /       -P16     0.2-0.3     9     -       -P16     0.4-0.5     10     -	°P13	0.2-0.3	7				<u> </u>														<b>┝</b> ]			
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P16 0.4-0.5 10	-P16	0.2-0.3	9																		+1			
	P16	0.4-0.5	10				<b> </b>	! 						[		+1		_						
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Project Name: Project No: Project Mgr:	Mulsoa 	To: Attn:	Envirolab Services 12 Ashley Street, Chatswood NSW 2068 Tania Notaras
Email: Date Required:	adam.podnar@douglaspartners.com.au Std turnaround Lab Quote No		Phone: 02 9910 6200 Fax: 02 9910 6201 Email: tnotaras@envirolabservices.com.au
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				e Type										Anal	ytes						
Sample ID	Sample Depth	Lab ID	Sampling Date	S - soil W - water	Container	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	ВТЕХ/ ТРН	OCPs/ OPPs	PCBs	РАН	Phenols	VOCs	Other School School Sch	Notes
TP25	0.2-0-3	13		Ş										· · · · · · · · · · · · · · · · · · ·						1	
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Lab Report	No												- 1						F	hone:	(02) 9809 0666
Send Resu	its to: Do	ouglas	Partr	ners /	Addres	ss:	96 He	ermite	ige R	oad, \	Nest	Ryde	e 211	4					F	ax:	(02) 9809 4095
Relinquishe	d by:		S	igned:					Date	e & Tir	me: ·			F	Received	By:	91	6	_	Da	ate & Time: $7/5/10$
Relinquishe	d by:		Si	gned:			Date	& Tin	ne:			F	Received	By:	1			Da	te & Time:		

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Mulgoa	
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	666 775
adam.podnar@	douglaspartners.com.au
Std turnaround	Lab Quote No
	Mulge G 

To: Envirolab Services 12 Ashley Street, Chatswood NSW 2068 Attn: Tania Notaras Phone: 02 9910 6200 Fax: 02 9910 6201 Email: tnotaras@envirolabservices.com.au

				Sampl e Type							ľ			Anal	lytes						
Sample ID	Sample Depth	Lab ID	mpling te	- sol <del>l</del> – water	ntainer	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	атех/ ТРН	OCPs/ OPPs	CBs	РАН	henols	/ocs	Other کویس	Notes
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### CHAIN OF CUSTODY

Project Name: Project No:		To:	Envirolab Services
Project Mgr:	Mob. Phone: 0438 666 775	Attn:	Tania Notaras
Email: Date Required:	adam.podnar@douglaspartners.com.au Std turnaround Lab Quote No		Phone: 02 9910 6200 Fax: 02 9910 6201 Email: tnotaras@envirolabservices.com.au

				Sampl e Type										Anal	ytes						
Sample ID	Sample Depth	Lab ID	Sampling Date	S - soil W – water	Container	As	Cd	Cr	Си	Pb	Hg	Ni	Zn	ВТЕХ/ ТРН	OCPs/ OPPs	PCBs	РАН	Phenols	VOCs	Other Sapsaysy	Notes
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Geott weir Authorising geoff.weir@la	6	itrix spike recovery p: xoratory duplicate lcs: noratory triplicate crm D relative % difference mb	Typically 2-5 x Method Dete (MDL)	:: GC/MS, or confirmatory colu	Pesticides 7 days water, 14 de Metals 6 months general eler Mercury 28 days	More VOC's 14 days water / soil VAC's 7 days water or 14 day VAC's 14 days soil SVOC's 7 days water, 14 day:	re-extracted & reported when RPD values exceed acceptant Refer to LabMark Preservatio	1 in first 5-10, then 1 every 1	1 in first 5-20, then 1 every 20 1 per analytical batch addition per target organic me		ts of sample results, DQFs, meth O compliance relates specifical sfer of report womership from La ed where full payment has not c	Adam Podnar na SOIL	E048274 Douglas Partners Mulgoa	CERTIFICATE OF AN	CAL CHEMISTS	RATORIES	
Chemist (NATA signato abmark.com.au	Den:	pending laboratory control samp r. certified reference mate r. method blank	ction Limit Uncertainț	Accuracy:	vents ANALYTE	s soil	: duplicate ce criteria Precision: n & THT	0 samples	0 samples Accuracy: sthod	QUALITY C	nod descriptions, laboratory ly to QA/QC results as perfi abmark to the client shall or accured within the agreed se			ALYSIS - ENVIRON	Australian/ the APLA mutual re- calibration	Accredited	
y) Autho jeremy		bcs: batch le bmb: batch rial	r: spike, lcs:	spike, les, crm surrogate:	CONTROL SPECIFIC ACCE	RPD (metals): 0- duplicate lab 0- RPD: 0-	anion/cation bal: + + method blank: no duplicate lab 0-	د <del>م</del>	spike, lcs, crm g surrogate: pl	ONTROL	definitions, and inte rrmed as part of the ly occur once full & ttlement period.	Date Receiv Date Repor	Cover Page plus Sample	MENTAL DIV	national standards, NATA is a 2 mutual recognition arranger ognition of the equivalence and inspection reports.	Accreditate for compliance with ISO/IEC tests, culturations and/or in fur fits document are t	
y truong orising Chemist (NATA signatory y.truong@labmark.com.au	. Jui	h specific les h specific mb	measurement calculated from historical analyte specific control charts	analyte specific recovery data <3xsd of historical mean	EPTANCE CRITERIA (ASAC)	-100% (<5xEQL) -50% (>10xEQL), 0-75% (5-10xEQL) -100% (<5xEQL)	H- 10% (0-3 meq/l), H- 5% (>3 meq/l) of detected >95% of the reported EQL -30% (>10xEQL), 0-75% (5-10xEQL)	nova - 13000 iecovery hhenoxy acid herbicides, organotin 50% - 130% recovery	seneral analytes 70% - 130% recovery shenol analytes 50% - 130% recovery organophosphorous pesticide analytes	ITERIA (GAC)	ernationally recognised NATA sample analysis, and may provide an & final payment has been settled and	ved: 20/05/2010 rted: 27/05/2010	e Results	<b>ISION</b>	a signatory to Class five criteria cover premis ment for the utilised for research, analysis are of testing, testing of biological material, so animal, plant and human products.	AUSTRALIAN QUARANTINE AND INSPECTION SERVICE AND INSPECTION SERVICE SYDNEY License No. N0356. C 17025. The Quarantine Approved Premise measurements certerine 3.1 for quantum measurements certerine 1.3 for quantum measurements containment level 1 (QCD) feasible	AQIS

Telephone: (02) 9476 6533 \* Fax: (02) 9476 8219 Form QS0144, Rev. 1 : Dato Issued 06/02/08

ENVIRONMENTAL LABORATORIES

CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



## Laboratory Report: E048274

Cover Page 2 of 4

# NEPC GUIDELINE COMPLIANCE - DQO

### 1. GENERAL

- Α Results relate specifically to samples as received. Sample results are surrogate recovery data. not corrected for matrix spike, lcs, q
- В EQL's are matrix dependant and may be increased due to sample dilution or matrix interference
- C. Laboratory QA/QC samples are specific to this project.
- D Inter-laboratory proficiency results are available upon request. NATA accreditation details available www.nata.asn.au. at
- щ extraction. VOC spikes & surrogates added to samples during extraction, SVOC spikes & surrogates added prior to
- т recovery data <20%, then the relevant results for that compound are considered not reliable. Recovery data outside GAC limits shall be investigated and compared to ASAC (historical mean +/- 3sd). If
- Ģ Anomolous QC data is examined in conjunction with other QC samples and a final decision whether to accept or reject results is provided by the professional judgement of the senior analyst. The USEPA-CLP National Functional Guidelines are referred to for specific recommendations. Recovery data (ms, surrogate, crm, lcs) outside ASAC limits shall initiate an investigative action
- H. not requiring sample preparation (eg. VOCs in water, etc) may report a common extraction and analysis date. Extraction (preparation) date refers to the date that sample preparation was initiated. Note that certain methods
- Ľ LabMark shall maintain an official copy of this Certificate of Analysis for all tracable reference purposes.

# CHAIN OF CUSTODY (COC) & SAMPLE RECEIPT NOTICE (SRN) REQUIREMENTS

Ņ

- A. SRN issued to client upon sample receipt & login verification.
- μ Preservation & sampling date details specified on COC and SRN, unless noted.
- Ω Sample Integrity & Validated Time of Sample Receipt (VTSR) Holding Times verified (preservation may extend holding time, refer to preservation chart).

# 3. NATA ACCREDITED METHODS

- Þ to subcontracted test reports for NATA accreditation status) NATA accreditation held for each in-house method and sample matrix type reported, unless noted below (Refer
- B, documents. Corporate Accreditation No. 13542. NATA accredited in-house laboratory methods are referenced from NEPC, ASTM, modified USEPA / APHA
- Ω Subcontracted analyses: Refer to Sample Receipt Notice and additional DQO comments.

This document is issued in accordance with NATA's accreditation requirements.

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# CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



## Laboratory Report: E048274

Cover Page 3 of 4

4

# QA/QC FREQUENCY COMPLIANCE TABLE SPECIFIC TO THIS REPORT

Matrix:	SOIL						
Page:	Method:	Totals:	#d	%d-ratio	#t	#s	%s-ratio
	BTEX by P&T	1	0	0%	0	0	0%
1	Volatile TPH by P&T (vTPH)	1	0	0%	0	0	0%
2	Petroleum Hydrocarbons (TPH)	1	0	0%	0	0	0%
ω	Organochlorine Pesticides (OC)	2	0	0%	0	Q	0%
4	<b>Organophosphorus</b> Pesticides (OP)	2	0	0%	0	0	0%
5	Acid extractable metals (M7)	2	0	0%	0	0	0%
6	Acid extractable metals - mercury	2	0	0%	0	0	0%
7	Moisture	2	ł	ł	ł	ł	ł

### GLOSSARY:

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number
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%d-ratio #t #s %s-ratio NEPC guideline for laboratory duplicates is 1 in 10 samples (min 10%). number of triplicate extractions/analyses performed. number of spiked samples analysed. USEPA guideline for laboratory matrix spikes is 1 in 20 samples (min 5%).

### Ś ADDITIONAL COMMENTS SPECIFIC TO THIS REPORT

below. A. All tests were conducted by LabMark Environmental Sydney, NATA accreditation No. 13542, unless indicated

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LabMark Environmental Laboratories ABN 30 008 127 802
\* SYDNEY: Unit 1, 8 Leighton Place Asquith NSW 2077
\* Telephone: (02) 9476 6533
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\* Telephone: (03) 9538 2277
\* Fax: (03) 9538 2278

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1 : Date ed 06/02/08

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Laboratory Report: E048274

Cover Page 4 of 4



ENVIRONMENTAL LABORATORIES

O

- CIRSAVACE FEX

Laboratory QA/QC data shall relate specifically to this report, and may provide an indication of site specific sample result quality. LabMark <u>DOES</u> <u>NOT</u> report <u>NON-RELEVANT BATCH OA/QC</u> data. Acceptance of this self assessment certificate does not preclude any requirement for a QA/QC review by a accredited contaminated site EPA auditor, when and wherever necessary. Laboratory QA/QC self assessment references available upon request.

6 Labrark	Labora	tory Repor	t No: E	2048274		Page	e: 1 of 7		Final	tificato
	Client	Name:	Γ	Oouglas Partr	ners	plus	cover page		Cer	inicate
ENVIRONMENTAL LABORATORIES	Contac	et Name:	A	dam Podnar		Date	e: 27/05/10		of Ana	alysis
	Client	Reference:	N	/Iulgoa 7170	6	This re	eport supercedes	reports issued or	1: N/A	
Laboratory Identification		262867	lcs	mb		 				· · · ·
Sample Identification		40738-1	QC	QC						
Depth (m)			<b></b> .							
Sampling Date recorded on COC		7/5/10			-					
Laboratory Extraction (Preparation) Date		24/5/10	24/5/10	24/5/10						
Laboratory Analysis Date		24/5/10	24/5/10	24/5/10		 				
Method : E029.2/E016.2 BTEX by P&T	EQL									
Benzene	0.2	<0.2	97%	<0.2						
Toluene	0.5	<0.5	94%	<0.5						
Ethylbenzene	0.5	<0.5	90%	<0.5						
meta- and para-Xylene		<1	93%	<1						
ortho-Xylene	0.5	<0.5	93%	<0.5						
(DER (Sum (2) 4 molto)		01%	107%	107%						
CDFB (Surr @ 4 mg/kg)		9170	10770	10770						
Method : E029.2/E016.2 Volatile TPH by P&T (vTPH) C6 - C9 Fraction	<b>EQL</b> 10	<10	104%	<10						

Comments:

E029.2/E016.2: 8-10g soil extracted with 20ml methanol. Analysis by P&T/GC/FID/MSD. E029.2/E016.2: 8-10g soil extracted with 20ml methanol. Analysis by P&T/GC/MSD.

	Labora	atory Repor	t No: E	048274		Page	e: 2 of 7		Final	4:6:
	Client	Name:	Γ	Oouglas Partr	iers	plus	cover page	-	Cer	tificate
ENVIRONMENTAL LABORATORIES	Contac	et Name:	A	dam Podnar		Date	e: 27/05/10		of An	alysis
	Client	Reference:	N	/lulgoa 7170	5	 This r	eport supercedes	reports issued or	n: N/A	
Laboratory Identification		262867	lcs	mb		 				
Sample Identification		40738-1	QC	QC						
Depth (m)				·						
Sampling Date recorded on COC		7/5/10				 				
Laboratory Extraction (Preparation) Date		24/5/10	24/5/10	24/5/10						
Laboratory Analysis Date		25/5/10	25/5/10	25/5/10						
Method : E006.2 Petroleum Hydrocarbons (TPH) C10 - C14 Fraction C15 - C28 Fraction C29 - C36 Fraction Sum of TPH C10 - C36	EQL 50 100 100 	<50 <100 <100 	 84% 	<50 <100 <100 						

Comments:

E006.2: 8-10g soil extracted with 20ml DCM/Acetone/Hexane (10:45:45). Analysis by GC/FID.

	Labora	atory Repor	t No: I	E048274		Page	e: 3 of 7		Final	
	Client	Name:	I	Douglas Partr	ners	plus	cover page		Cert	ificate
ENVIRONMENTAL LABORATORIES	Conta	et Name:	I	Adam Podnar		Date	e: 27/05/10		of Ana	lysis
	Client	Reference:	1	viulgoa 7170	6	This r	eport supercedes	reports issued or	n: N/A	
Laboratory Identification		262867	262868	lcs	mb					
Sample Identification		40738-1	40738-3	QC	QC					
Depth (m)										
Sampling Date recorded on COC		7/5/10	7/5/10							
Laboratory Extraction (Preparation) Date		24/5/10	24/5/10	24/5/10	24/5/10					
Laboratory Analysis Date		25/5/10	25/5/10	24/5/10	24/5/10					
Organochlorine Pesticides (OC) a-BHC Hexachlorobenzene b-BHC g-BHC (Lindane)	EQL 0.05 0.05 0.05 0.05	<0.05 <0.05 <0.05 <0.05	<0.05 <0.05 <0.05 <0.05 <0.05	94% 99% 96% 96%	<0.05 <0.05 <0.05 <0.05					
d-BHC Heptachlor Aldrin Heptachlor epoxide	0.05 0.05 0.05 0.05	<0.05 <0.05 <0.05 <0.05	<0.05 <0.05 <0.05 <0.05	99% 95% 95%	<0.05 <0.05 <0.05 <0.05					
Endosulfan I cis-chlordane Dieldrin 4,4-DDE Endrin Endosulfan II 4,4-DDD Endosulfan sulphate 4,4-DDT Methoxychlor	0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05	<0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.2 <0.2 <0.2 82%	<0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.2 <0.2 78%	94% 107% 79% 105% 96% 88% 92% 103% 90% 95% 81%	<0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.2 <0.2 <0.2					

Comments:

E013.2: 8-10g soil extracted with 20ml DCM/Acetone/Hexane (10:45:45). Analysis by GC/dual ECD.

LabMark Pty Ltd ABN 27 079 798 397 SYDNEY: Unit 1, 8 Leighton Place Asquith NSW 2077 Telephone: (02) 9476 6533 Fax: (02) 9476 8219 MELBOURNE: 116 Moray Street, South Melbourne VIC 3205 Telephone: (03) 9686 8344 Fax: (03) 9686 7344 Form QS0145, Rev. 0 : Date Issued 10/03/05

611 ash Marrie	Labora	tory Repor	t No: E	048274			Page	e: 4 of 7		Final
	Client	Name:	D	ouglas Partn	ers		plus	cover page		Certificate
ENVIRONMENTAL LABORATORIES	Contor	t Nome	Δ	dam Podnar			Date	e: 27/05/10		of Analysis
	Contac		21				This n	enort supercedes	reports issued or	r N/A
	Chent	Reference:	IV	luigoa /1/00	) 	····		sport supervedes		
Laboratory Identification		262867	262868	lcs	mb				• • • • • •	
Sample Identification		40738-1	40738-3	QC	QC					
Depth (m)										
Sampling Date recorded on COC		7/5/10	7/5/10							
Laboratory Extraction (Preparation) Date		24/5/10	24/5/10	24/5/10	24/5/10					
Laboratory Analysis Date		27/5/10	27/5/10	27/5/10	27/5/10					
Method : E014.2										
Organophosphorus Pesticides (OP)	EQL									
Dichlorvos	0.5	<0.5	<0.5	116%	<0.5					
Mevinphos (Phosdrin)	0.5	<0.5	<0.5	122%	<0.5					
Demeton (total)	1	<1	<1	120%	<1					
Ethoprop	0.5	<0.5	<0.5	118%	<0.5					
Monocrotophos	0.5	<0.5	<0.5	129%	<0.5					
Phorate	0.5	<0.5	<0.5	122%	<0.5					
Dimethoate	0.5	<0.5	<0.5	113%	<0.5					
Diazinon	0.5	<0.5	<0.5	112%	<0.5					
Disulfoton	0.5	<0.5	<0.5	115%	<0.5					
Methyl parathion	0.5	<0.5	<0.5	114%	<0.5					
Ronnel	0.5	<0.5	<0.5	108%	<0.5					
Fenitrothion	0.5	<0.5	<0.5	112%	<0.5					
Malathion	0.5	<0.5	<0.5	106%	<0.5					
Chlorpyrifos	0.5	<0.5	<0.5	110%	<0.5					
Fenthion	0.5	<0.5	<0.5	114%	<0.5					
Parathion	0.5	<0.5	<0.5	103%	<0.5			•		
Stirofos	0.5	<0.5	<0.5	115%	<0.5					
Prothiofos	0.5	<0.5	<0.5	110%	<0.5					
Azinophos methyl	0.5	<0.5	<0.5	122%	<0.5					
Coumaphos	0.5	<0.5	<0.5	115%	<0.5					
TPP (Surr @ 2mg/kg)		91%	98%	92%	120%					

Comments:

E014.2: 8-10g soil extracted with 20ml DCM/Acetone/Hexane (10:45:45). Analysis by GC/MSD.

61 Losbarane	Labora	atory Repor	t No: 🤳	E048274			Pag	e: 5 of 7		Final	
	Client	Name:	]	Douglas Partr	ners		plus	cover page		Cer	tificate
ENVIRONMENTAL LABORATORIES	Contac	t Name:		Adam Podnar			Date	e: 27/05/10		of An	alysis
	Client	Reference:	]	Mulgoa 7170	6		This r	eport supercedes	reports issued or	n: N/A	
Laboratory Identification		262867	262868	crm	lcs	mb					
Sample Identification		40738-1	40738-3	QC	QC	QC					
Depth (m)								1			
Sampling Date recorded on COC		7/5/10	7/5/10								
Laboratory Extraction (Preparation) Date		24/5/10	24/5/10	24/5/10	24/5/10	24/5/10			1		
Laboratory Analysis Date		25/5/10	25/5/10	24/5/10	24/5/10	24/5/10					
Method : E022.2 Acid extractable metals (M7) Arsenic	EQL 1	5	4	96%	100%	<1					
Cadmium	0.1	<0.1	<0.1	109%	117%	<0.1					
Chromium	1	19	25	101%	107%	<1					
Copper	2	11	6	106%	108%	<2					
Nickel		5	2	72%	105%	<1					
Lead		24	15	91%	1106%	<2					
Zinc	5	11	<>	109%	11/%	<>					

Comments:

E022.2: 0.5g digested in nitric/hydrochloric acid. Analysis by ICP-MS.

	Labora	atory Repor	t No:	E048274			Pag	e: 6 of 7		Final	
	Client	Name:	]	Douglas Partr	ners		plus	cover page		Cer	tificate
ENVIRONMENTAL LABORATORIES	Contac	et Name:		Adam Podnar			Dat	e: 27/05/10		of An	alysis
	Client	Reference:	]	Mulgoa 7170	6		This 1	eport supercede:	s reports issued o	on: N/A	
Laboratory Identification		262867	262868	crm	lcs	mb					
Sample Identification		40738-1	40738-3	QC	QC	QC					
Depth (m)											
Sampling Date recorded on COC		7/5/10	7/5/10								
Laboratory Extraction (Preparation) Date		24/5/10	24/5/10	24/5/10	24/5/10	24/5/10				ł	
Laboratory Analysis Date		25/5/01	25/5/01	24/5/10	24/5/10	24/5/10					
Method : E026.2 Acid extractable metals - mercury Mercury	<b>EQL</b> 0.05	0.21	0.18	88%	102%	<0.05					

Comments:

E026.2: 0.5g digested with nitric/hydrochloric acid. Analysis by CV-ICP-MS or FIMS.

@LabMark	Labora	atory Repor	t No:	E048274		Pag	e: 7 of 7		Final	· ~ .
	Client	Name:		Douglas Partr	ers	. plus	cover page		Cer	tificate
ENVIRONMENTAL LABORATORIES	Contac	t Name:		Adam Podnar		Date	e: 27/05/10		of Ana	alysis
	Client	Reference:		Mulgoa 7170	б	This r	eport supercedes	reports issued or	n: N/A	
Laboratory Identification		262867	262868							
Sample Identification		40738-1	40738-3							
Depth (m)						:				
Sampling Date recorded on COC		7/5/10	7/5/10							
Laboratory Extraction (Preparation) Date		24/5/10	24/5/10							
Laboratory Analysis Date		25/5/10	25/5/10							
Method : E005.2 Moisture Moisture	EQL 	17	16							

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

Sample Matrix: Date Sampled ( Project Number: Project Name: **Client Address: Contact Email: Contact Name: Client Fax: Client Phone:** Surcharge: Purchase Order: CoC Serial Number: - Not provided -**Client Name:** LabMark shall responsibly dispose of spent customer soil and water samples which includes the disintegration of the sample label. A sample disposal fee of \$1.00 is applicable on all samples received by the laboratory regardless of whether they have undergone analytical testing. Sample disposal of environmental samples received by the laboratory regardless of whether they have undergone after laboratory receipt, unless otherwise requested in writing by the client. Samples requested to be held in non-refrigerated storage shall incur \$5.00/ sample/ 3 months. Additional refrigerated storage shall incur \$30/ sample/ 3 months. Combination prices apply only if requested. Transfer of report ownership from LabMark to the client shall occur once full and final payment has been settled and Client TAT Request Date: Date Preliminary Report Due: Date Sample Receipt Notice issued: Date Samples Received: Environmental Laboratories (S) L. a Konvaczy Ex Sample Condition: **Reporting Requirements:** Preservation: Holding Times: Comments: verified. All report copies may be retracted where full payment does not occur within the agreed settlement period Important Notes: Analysis Quality, Service, Support comments: (earliest date): SOI 71706 Mulgoa - Not provided -96 Hermitage Road West Ryde NSW 2114 adam.podnar@douglaspartners.com.au due date) No surcharge applied (results by 6:30pm on Adam Podnar 02 98094095 02 9809 0666 Douglas Partners **Client Details** Security seals not used . Sample container & chemical preservation suitable COC received with samples. Report number and lab ID's defined on COC. Samples received in good order . Samples received with cooling media: Ice bricks . Samples received chilled. Date received allows for sufficient time to meet Technical Holding Times Sampling dates not provided - THT calculated from 7/5/09 unless otherwise instructed. Electronic Data Download required: No Chemical preservation of samples satisfactory for requested analytes. 20/05/2010 28/05/2010 28/05/2010 20/05/2010 07/05/2010 Email: Fax: Phone: Email: **Quotation Number:** AQIS Entry Permit: AQIS Approval: APVMA License: TGA GMP License: NATA Accreditation: **Reporting Contact:** Sample Receipt Contact: Ros Schacht Laboratory Address: Laboratory Report: Laboratory Reference Information Please have this information ready Notice (SRN) Sample Receipt when contacting Labmark. 200521534 (Sydney) Invoice Number: 10EA9595 Asquith NSW 2077 Unit 1, 8 Leighton Pl. NO356 (Sydney) 6105 (Sydney) 185-336 (Sydney) Ros.Schacht@labmark.com.au 61 2 9476 8219 61 2 9476 6533 Not provided, standard prices apply E048274 13542 Leanne Boag leanne.boag@labmark.com.au Report Time : 6:29:14PM for **E048274** 

Report Date : 20/05/2010

Subcontracted Analyses:

Thank you for choosing Labmark to analyse your project samples Additional information on www.labmark.com.au

Form QS0012, Rev 13: Date Issued 14/12/08.

Thank you for choosing Labmark to analyse your project samples. Additional information on www.labmark.com.au

Quality, Service, Support

ENVIRONMENTAL LABORATORIES

Sample

Report Date : 20/05/2010 Report Time : 6:29:14PM

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Notice (SRN)

for **E048274** 

Receipt

The table below represents LabMark's understanding and interpretation of the customer supplied sample COC request (refer to SRN comments section on first page for external subcontracting method details). Please confirm that your COC request has been entered correctly. Due to THT and TAT requirements, testing shall commence immediately as per this table, unless the customer intervenes with a correction prior to testing.

	262868 07/05	262867 07/05	No. Date	
			Depth	GRID RI
Totals:	40738-3	40738-1	Client Sample ID	
		•	BTEX by P&T	
2		-	Acid extractable metals - mercury	$\mathbf{I}$
2	•	•	Acid extractable metals (M7)	1
2	•	•	Moisture	{
2	•	•	Organochlorine Pesticides (OC)	1
2	•	•	Organophosphorus Pesticides (OP)	
2	•	•	PREP Not Reported	1
-		•	Petroleum Hydrocarbons (TPH)	1
-		•	Volatile TPH by P&T (VTPH)	₽
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'PREP Not Reported' refers to an internal laboratory instruction - client confirmation of this parameter is not required.



Report Date : 20/05/2010 Report Time : 6:29:14PM

Quality, Service, Support

Sample Receipt Notice (SRN) for E048274

	262868 07/05	262867 07/05	No. Date Depth	
Totals:	40738-3	40738-1	Client Sample ID	
2	٠	٠	M8 - M7-T_S	
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	-			Requ
-				ested
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Thank you for choosing Labmark to analyse your project samples. Additional information on www.labmark.com.au Form QS0012, Rev 13: Date Issued 14/12/08.

Project Project Project Email: Date Re	Name: No: Mgr: equired:	f		<u>М</u> , М	ob. F ada	Samı Samı Phone Im.po	pler: : 04 dnar	38 66 @do L	AP 6 77 ugla: .ab C	5 spart Quote	ners. No.	.com	au.			To: Attn:	Envir 12 A Tania Phor Ema	rolab shley a Not ne: 02 il: tno	Serv Stre aras 9910 taras	ices et, C 0 620 s@er	hatswoo 0 Fax: 0 wirolabs	od NSW 2068 02 9910 6201 services.com.au	Envirola (INVIII) Chatswood Ph Job No: 2407 Date received: 7/5/14 Time received: 7/5/14 Time received: 7/5/14 Received by: 7+1; C Temp: Cool Amblent
Sample ID	Sample Depth	Lab ID	Sampling Date	S - soil <sup>a</sup> g	M – water	Container tvne	As	Cd	Cr	Cu	Pb	Hg	NI	Zn	Ana BTEX/ TPH	ytes SCPs/ OPPs	PCBs	PAH	Phenols	VOCs	ther کطهطها Other	Not	econing: htereseason Securily: Thises Broken H es
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### Appendix F

Quality Assurance/ Quality Control Procedures and Results



### QA/QC PROCEDURES AND RESULTS

### FIELD QUALITY ASSURANCE AND QUALITY CONTROL

The field QC procedures for sampling as prescribed in Douglas Partners *Field Procedures Manual* were followed at all times during the contamination assessment and are summarised below.

### Replicate Samples

The field QC comprised the collection of replicate samples during the course of sampling. Two blind replicate soil samples were analysed as inter-laboratory QA/QC samples. Relative Percentage Differences (RPD) was calculated as an assessment of the result consistency (see below).

### Relative Percentage Difference

A measure of the consistency of results for field samples is derived by the calculation of relative percentage differences (RPDs) for replicate samples. Laboratory reports state that a RPD of  $\pm$  30-50% is considered acceptable. Laboratory results also note that the RPDs should be ignored where results are less than 5 times the PQL. Comparative laboratory results of original and replicate sample are shown below in Table 1.

Sample ID	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	BTEX /TPH	OCP/OPP
TP5/0-0.1	7	<0.5	31	13	33	<0.1	9	15	<pql< td=""><td><pql< td=""></pql<></td></pql<>	<pql< td=""></pql<>
262867	5	<0.1	19	11	24	0.21	5	11	<pql< td=""><td><pql< td=""></pql<></td></pql<>	<pql< td=""></pql<>
PQL	<4/<1	<0.5/<0.1	<1	<1/<2	<1/ <2	<0.1/<0.05	<1	<1/<5		
Difference	2	0	12	2	9	0.11	4	4	0	0
RPD (%)	33	0	48	17	32	71	57	31	0	0

### Table 1a: Comparative Results of Replicate Soil Sample Analysis - Inter-Laboratory Soil Samples

The majority of the calculated RPD values were within the acceptable range. RPDs for mercury and Nickel were above 50% however results were less than 5 times the PQL, in addition, numerically, the difference in the Nickel and mercury samples is not large.

Sample ID	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	OCP/OPP
TP11/0.2-0.3	8	<0.5	31	8	24	<0.1	5	5	<pql< td=""></pql<>
262868	4	<0.1	25	6	15	0.18	2	<5	<pql< td=""></pql<>
PQL	<4/<1	<0.5/<0.1	<1	<1/<2	<1/ <2	<0.1/<0.05	<1	<1/<5	
Difference	4	0	6	2	9	0.08	3	0	0
RPD (%)	67	0	21	29	46	57	86	0	0

Table 1b: Comparative Results of Replicate Soil Sample Analysis - Inter-Laboratory Soil Samples



The majority of the calculated RPD values were within the acceptable range. RPDs for arsenic, mercury and nickel were above 50% however results were less than 5 times the PQL, in addition, numerically, the difference in the arsenic, nickel and mercury samples is not large.

### LABORATORY QA/QC PROCEDURES

The following QA/QC procedures were conducted by the laboratory.

### Reagent Blank

This sample is prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus. The laboratory results for reagent blanks for soil analyses indicated concentrations of all analytes to be below laboratory detection limits. These results are included in the laboratory report in Appendix E.

### Spike Recovery

This is a sample replicate prepared by adding a known amount of analyte prior to analysis, and then treated exactly the same as all other samples. The recovery result indicates the proportion of the known concentration of the analyte that is detected during analysis. These results are included in the laboratory reports in Appendix E. The spike recovery rates are compared with limits as specified in Envirolab Services Quality Control System, and any exceedances are highlighted in the report. The spike recovery results are acceptable range. On this basis, it is considered that the spike recovery results are acceptable.

### Surrogate Recovery

This sample is prepared by adding a known amount of surrogate, which behaves similarly to the analyte, prior to analysis to each sample. The recovery result indicates the proportion of the known concentration of the surrogate that is detected during analysis. The surrogate recovery rates are compared with limits as specified in Envirolab Services and any exceedances are highlighted in the report. As no exceedances and no comments were noted on the report, it is considered that the results indicate that the analytical results are not significantly affected by matrix interference.

### Duplicates

These are additional portions of a sample which are analysed in exactly the same manner as all other samples. The duplicate sample results are included in the laboratory results in Appendix E.

In overall terms, therefore, the data quality objectives have been attained and the quality of the investigation data is considered acceptable.