

LOT 1, DP 1268778

Preliminary Contamination Report

Job No.: B21829

Submitted to:

The Treadstone Company

PO Box 5336

South Turrumurra

NSW 2074

Attn: Angus Scott

Report No.: B21829

The Treadstone Company – Lot 1, DP 1268778

REVISION CONTROL

Revision	Date	Details	Prepared By
00	1/09/2023	Draft	D O'Donnell
01	27/08/2023	Draft	Craig Davies

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Appendix A – Historical Title Deed Search
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1 INTRODUCTION

1.1 Background

The Treadstone Company (hereafter known as the Client) are proposing to redevelop the subject site for residential purposes. Macquarie Geotechnical were instructed by the Client to undertake a preliminary contamination desk study.

The comments and opinions expressed in this report are based on the desk study sources encountered and on the results of tests carried out during previous investigations in the field and in the laboratory. There may, however, be special conditions prevailing on the site which have not been disclosed by this investigation and which have not been considered by this report.

1.2 Objective and Scope of Investigation

The objective of the desk study review was to obtain information on the character and properties of the ground beneath the site, potential risks posed by contamination, and to allow a preliminary assessment of these ground conditions with reference to the potential impact on the proposed development.

The scope of works for the investigation was mutually developed with the Client within an agreed budget and comprised a desk study review of available historical maps, environmental data, geological maps, historical reports, further desk study information and reporting.

1.3 Limitations of Report

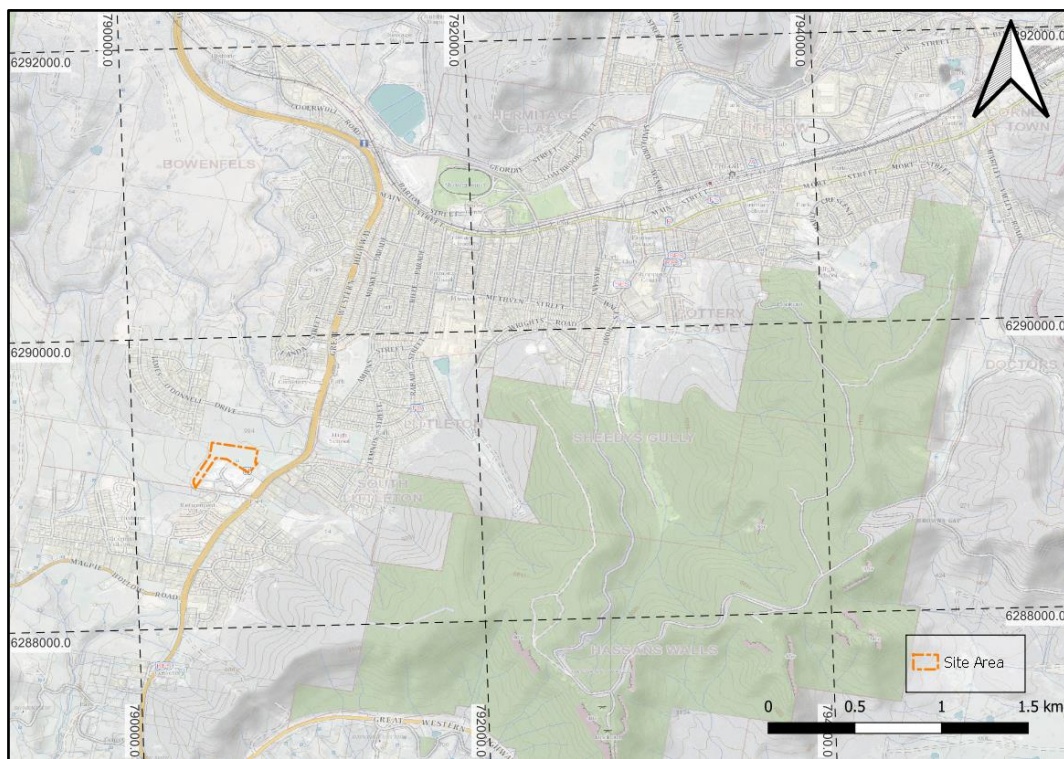
This report represents the findings of the brief relating to the proposed end use detailed in Section 1.0 above. The brief did not require an assessment of the implications for any other end use or structures, nor is the report a comprehensive site characterisation and should not be construed as such.

2 DESK STUDY

The information presented in this section was obtained from desk-based research of sources as detailed in the text, including historical maps, geological maps, groundwater bore data, asbestos hazard maps, Aerometrex, ICSM, ASRIS and CSIRO. Any further reports/data/records are included as subsequent appendices as referenced in the text.

2.1 Site Location and Description

The site is located on the western side of the A32 (Great Western Highway), approximately 3km south-west of Lithgow CBD. The Grid Reference of the centre of the site is (MGA Zone 55) 790603, 6289188 and the postcode is 2790. A Site Location Plan is presented as Insert 1 below.



Insert 1: Site Location Plan

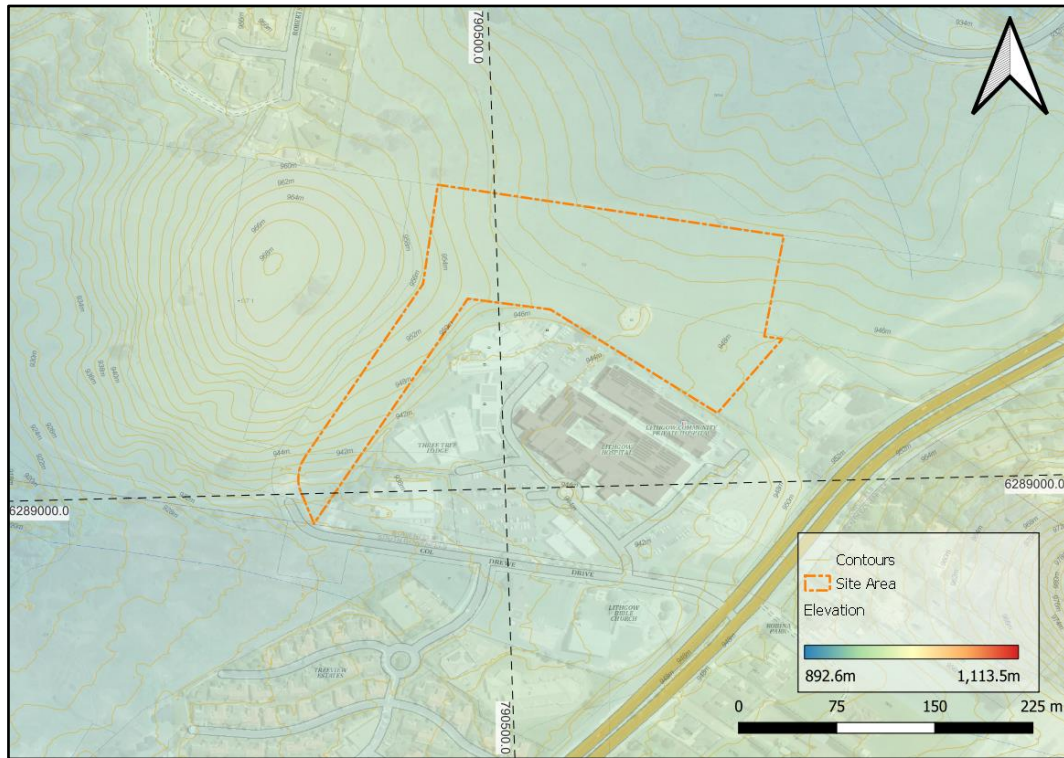
The site comprises an irregular shaped parcel of land of around 315m length (northeast to southwest) and 270m width (east to west), occupying an area of around 4.03ha. It is presently occupied by agricultural land.

It is bounded by:

- To the north: by residential properties and communities of Bowenfels and Lithgow.
- To the east: the Great Western Highway (A32) and residential community of South Littleton.
- To the south: Lithgow Hospital, Three Tree Lodges, The University of Notre Dame (Australia) and Treeview Estates Retirement Village.

- To the west: open green space.

We are not aware of an available topographic survey for the currently, however, recent maps available from the Intergovernmental Committee on Surveying and Mapping (ICSM) indicate the site is undulating. Based on this, and visual observations, we consider that the elevation of the site is likely to be of the order of 945 to 955mAHD.



Insert 2: Elevation Maps (ICSM, 2023)

2.2 Site Identification

Macquarie Geotechnical carried out a historical title deed search on 18th August 2023. Copies of the Certificate of Titles are presented within Appendix A. A summary of the site identification information is presented within the Table 1 below.

Table 1.0 - Summary of Site identification Information

Local Government Authority:	Lithgow City Parish Of Lett County Of Cook
Current Zoning:	R1 – General Residential
Title Identification:	Title Diagram: DP1268778, Folio: 1/1268778
Current Land use:	Open Green Space

2.3 Site History

2.3.1 Published Historical Maps

The site history has been assessed from a review of available historical maps available from the National Library of Australia. Extracts from the historical maps are presented as Inserts and the salient features are summarised in Table 2 below.




Table 2: Review of Historical Maps

Date	On-Site	In Vicinity of Site	Map Extract
1 st November 1897	No development identified. Site appears to be owned/occupied by Patrick Coulahan.	No significant development is noted locally Castleleigh Inn is located approximately 150 to the southeast, Mudgee road is 250m to the east.	
5 th May 1965	No development identified.	Lithgow Cemetery noted approximately 340m to the northeast	
4 th August 1971	No development identified.	Mudgee Road is now termed Great Western Highway. The residential area of South Littleton is now present.	
Notes to Table 2: 1. Features may have been present on site between the dates of the individual mapping, and it should be appreciated that these cannot be identified from the map review.			

2.3.2 Aerial Photography

Further information on the history of the site has been established by reference to aerial photographs held by the NSW Government.

Table 3: Review of Aerial Photography

Date	Salient Features	Aerial Image Extract	
1965	No development identified on site. Several small outbuildings are present surrounding the site.		
1974	Agricultural activity noted on site. Several outbuildings appear to be present.		
1978	No significant changes noted.		




1988	No significant changes noted.	
1993	No significant changes noted.	
1998	Construction of the Lithgow Hospital on the southern borders of the site. A small pond is noted within the site.	
1998 – Present	No significant changes noted.	See Appendix B for recent aerial photography.

Table 4: Summary of Geology

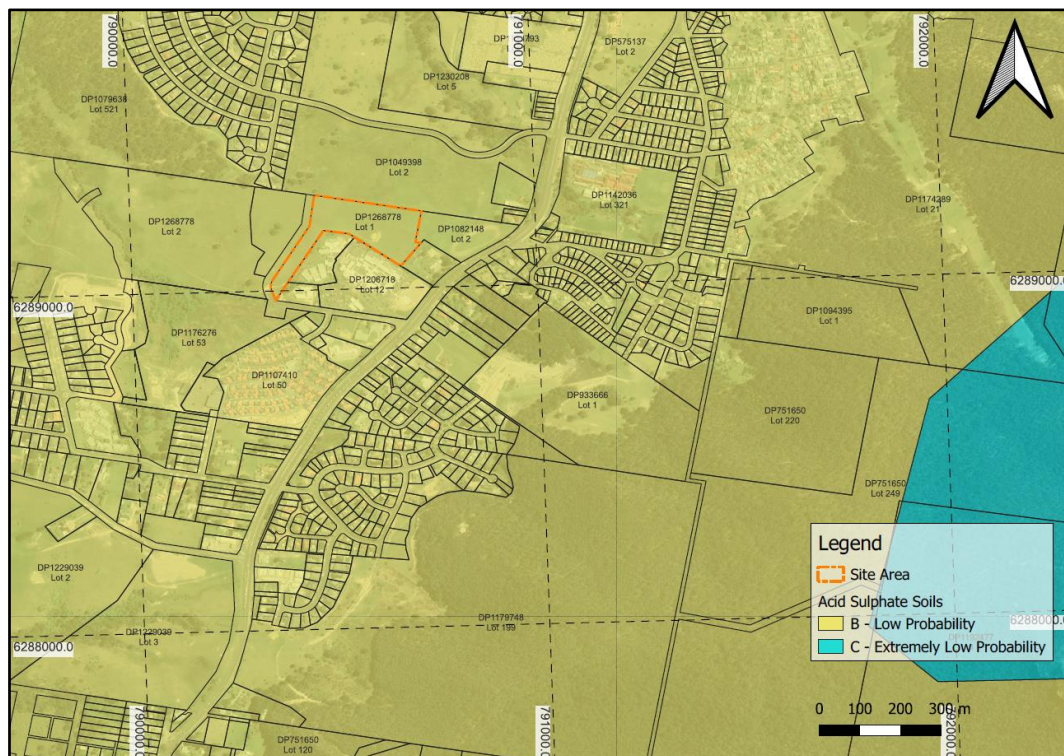
Geological Symbol	Unit Name	Lithology
Cba	Bathurst Suite	Granites, monzogranite.
Pshb	Berry Siltstone	Mid to dark grey siltstone, grades up sequence to very fine-grained sandstone, highly fossiliferous, sporadic dropped pebbles.

2.6 Groundwater Bores

There are no recorded groundwater bores within 500m of the site boundary.

2.7 Acid Sulphate Maps

Reference is made to the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Atlas of Australian Acid Sulphate Soils and presented in Insert 4 below.



Insert 4: Acid Sulphate Risk Map

The acid sulphate risk map indicates an extremely low probability of acid sulphate soils at the site.

2.8 Naturally Occurring Asbestos Maps

Reference is made to the NSW Department of Primary Industry Naturally Occurring Asbestos Hazard Maps which indicates no known geological units containing Naturally Occurring Asbestos (NOA) at the site.

2.9 Environmental Setting

2.9.1 Land Use

The site has been used for agricultural purposes, with livestock present for the majority of the time.

2.9.2 Recent Chronological List of Site Uses

No Information available prior to being used to hold livestock.

2.9.3 Inventory of site chemical sources and waste usage area / storage information

No known chemical sources, waste usage areas, or storage information.

2.9.4 Possible Contaminant Sources

No information readily available.

2.9.5 Product / Spill Reporting History

No information readily available.

2.9.6 Manufacturing History

No manufacturing processes have been undertaken at the site.

2.9.7 Disposal Locations

No known disposal locations.

2.9.8 Complaint History

No known complaint history within the site boundary.

2.9.9 Local Site History or Local Literature About the Site

No known reported literature available about the site.

2.9.10 Sewer Services on Site

No sewer services available on the site.

2.9.11 On-Site Bulk Liquid Storage

No evidence of any past or recent above ground or underground bulk liquid (e.g. fuels/oils) storage on site.

2.9.12 On-Site Bulk Materials and Waste Storage

No evidence of recent materials or waste storage on the site.

3 PRELIMINARY GEO-ENVIRONMENTAL RISK ASSESSMENT

3.1 Phase One Conceptual Site Model

3.1.1 Background

The Phase One Conceptual Site Model lists the potential sources of geo-environmental risk, the receptors at risk (both human and non-human), and any feasible pathways between the two. These are discussed in the following sections.

3.1.2 Potential Soil Contamination Sources

The desk study review has identified no significant evidence of any prior development or former contaminative use on the site. Therefore, we have not established the presence of any potential sources of contamination. Notwithstanding this, on any site, the presence of pockets of fill, which could contain elevated levels of soil contaminants cannot be fully discounted. In particular, on agricultural land such as the site, former hollows may have been infilled in the past with unknown materials and can be a source of contamination.

From the available information, we consider that the following features on site could prove sources of diffuse and point source contamination that could impact on the development, environment, or site users:

- Historical development - point source.
- Fill – general diffuse contamination.
- Agricultural activity – use of pesticides.
- Material from historic demolition – historic demolition arisings can often contain asbestos containing materials (ACM) - point source.

3.1.3 Potential Contaminants Present

The potential contaminants associated with the above potential sources have been identified from various guidelines.

Based on this guidance and our experience, we consider that the following contaminants could be present on the site:

- heavy metals and semi-metals.
- pesticides.
- asbestos.

3.1.4 Potential Receptors

As discussed in Section 1, the proposed site development will comprise residential properties with private gardens, landscaping and vehicle parking areas.

The site is located 300m from the Good Luck Hollow River at its closest point.

Given the above, we consider that the most vulnerable receptors with regards to any contamination or is likely to be as follows.

- Future residents, the critical receptors being young children playing in private garden areas.
- Construction and maintenance workers.
- Buried concrete (foundations, drainage etc.).
- The water quality in the Good Luck Hollow.
- The groundwater.

3.1.5 Potential Migration Pathways

Based on the Conceptual Site Model discussed in the previous sections, the following are considered the most likely migration pathways with regard to any contamination present beneath the site.

Site Users:

- Ingestion of soils and inhalation of dust in garden areas.
- Ingestion of soils and inhalation of dust in landscaping areas.
- Ingestion of edible plants and dust associated with such plants.
- Dermal contact with contaminated soils.
- Exposure to asbestos containing materials within the shallow soils.

Construction and Maintenance Workers:

- Exposure to asbestos containing materials within the existing buildings.
- Exposure to asbestos containing materials within the shallow soils.
- Ingestion of soils and inhalation of dust across site.
- Dermal contact with contaminated soils.

Groundwater:

- Leaching of mobile contaminants into the water-bearing strata within the bedrock.

River Good Luck Hollow:

- Leaching of mobile contaminants to the groundwater beneath the site, and then on to the nearby surface water course.
- Surface run-off of contaminated leachate to adjacent stream/river.

Buildings:

- Sulphate attack on buried concrete (foundations, drainage etc.).

From the site history, the site appears to have been open green space for at least 120 years and over this time, infiltration has been able to leach any mobile contaminants present from the shallow soils. Once

the site is developed, and hard surfacing is constructed this is likely to reduce any leaching of any mobile contaminants that may be present.

4 PREVIOUS CONTAMINATION INVESTIGATION

A previous contamination investigation was undertaken by Macquarie Geotechnical during 2006. There were no signs of visible contamination, no odours present within the excavated soils and no sensitive local environments were identified. A copy of this report is presented as Appendix C.

A statistical based analysis was undertaken to remove any sampling bias during this investigation. Samples were returned to an accredited laboratory for specific contamination testing, including Metals and Organo Pesticides.

Results were compared against the EPA guideline levels. The guideline values used were the HIL A Standard residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake which includes children's day care centres, preschools, and primary schools. The testing indicated that there were no contamination hot spots within the current Lot boundary. One sample was found to have elevated levels of Lead however this is located outside of the current site area.

This outlier may be associated with historical developments off site including a hospital and several farm buildings used for agricultural purposes. The near surface soils are anticipated to be fine-grained in the upper portions of weathered strata and will likely limit any lateral migration of contamination from off site sources.

A summary of the laboratory results is presented in Table 5 below.

Table 5: Summary of Laboratory Results

Determinand	Range Recorded	HIL-A	Source of Guideline Value	Exceedances
Metals and Semi-metals				
Arsenic	<1.00-4.00mg/kg	100mg/kg	NEPC	None of 10.
Cadmium	<0.10-0.40mg/kg	20mg/kg		None of 10.
Chromium	5.00-14.00mg/kg	100mg/kg		None of 10.
Copper	8.00-35.00mg/kg	7000mg/kg		None of 10.
Nickel	1.00-21.00mg/kg	400mg/kg		None of 10.
Lead	5.00-490.0mg/kg	300mg/kg		1 of 16
Zinc	17.0-270.0mg/kg	8000mg/kg		None of 10.
Organo-Chlorine Pesticides				
Aldrin	<0.05 - mg/kg	7mg/kg	NEPC	None of 7.
Dieldrin	<0.05 - mg/kg	7mg/kg		None of 7.
DDT	<0.02 - mg/kg	260mg/kg		None of 7.
Heptachlor	<0.05 - mg/kg	7mg/kg		None of 7.
Ethoprop	<0.05 - mg/kg	10mg/kg		None of 7.

Diazin	<0.05 - mg/kg	10mg/kg		None of 7.
Fenthion	<0.02 - mg/kg	200mg/kg		None of 7.
Parathion	<0.05 - mg/kg	10mg/kg		None of 7.

Notes to Table 5:

1. Assessment for HIL A Standard residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake which includes children's day care centres, preschools and primary schools.

5 PRELIMINARY ASSESSMENT OF CONTAMINATION RISKS

The following recommendations are based on interpretations made from the relatively limited site investigation data obtained to-date. If at any stage of the construction works, contamination or a potential for such contamination is identified that is different to that presented within this report, all of the following should be reviewed, and the advice of a geo-environmental specialist sought immediately.

5.1 Risks to Health

7.1.1 Asbestos

No evidence of asbestos was detected at the site. Although no evidence has been identified in the investigation, on any historic farmland such as the site, it cannot be discounted that former hollows in the site surface may have been infilled in the past, and asbestos containing materials (ACM) may have been included in the backfill materials. If any suspected asbestos containing materials (ACM) are identified during development, the advice of a suitably qualified specialist should be sought immediately. Any identified ACM would need to be removed from site by a licensed specialist contractor.

5.1.1 Site End Users

Assuming a residential end use the identified levels of soil contamination at the site are not considered to pose a risk to future site users. Therefore, no specific remedial measures are considered necessary for the development.

If any evidence of Made Ground or other contaminated soils is identified during development, further geo-environmental specialist advice should be sought.

5.1.2 Risk to Construction and Maintenance Workers

Short term (acute) risks to construction and maintenance workers are generally poorly understood within the industry, certainly when compared to the volume of research undertaken on long term risks. However, we anticipate that the levels of contamination at the site are not likely to pose a severe acute risk to construction workers or future maintenance workers.

Notwithstanding the above, we recommend that construction workers adopt careful handling of soils and good standards of personal hygiene should be adopted to reduce the risk of possible ingestion and skin contact.

5.1.3 General Public/Neighbouring Properties

We do not anticipate any significant risks to the general public from the development of the site. However, careful dust control measures should be adopted during construction to minimise the risk (and nuisance) to the general public and neighbouring residents.

6 CONCLUSION & RECOMMENDATIONS

The preliminary desk study and historical investigation has not identified any potentially significant sources of contamination or evidence to show any historical changes in regard to the land usage – the preliminary investigation indicates that as long as the findings of this report are implemented then the site may be considered low risk for a proposed end use as a residential development.

If at any point contaminants are suspected during earthworks associated with the development, then it is important to contact Macquarie Geotechnical to undertake further review and advice.

LIMITATIONS OF PRELIMINARY ENVIRONMENTAL INVESTIGATION

Scope of Services

This report has been prepared for the Client in accordance with the Services Engagement Form (SEF), between the Client and Macquarie Geotechnical.

Reliance on Data

Macquarie Geotechnical has relied upon data and other information provided by the Client and other individuals. Macquarie Geotechnical has not verified the accuracy or completeness of the data, except as otherwise stated in the report. Recommendations in the report are based on the data.

Macquarie Geotechnical will not be liable in relation to incorrect recommendations should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed.

Environmental Conclusions

This report is based on a preliminary Desk Top investigation. Unless further advice is obtained this report cannot be applied to an adjacent site, nor can it be used when the nature of any proposed development is changed.

The conclusions are based upon the reliance of data and therefore merely indicative of the environmental condition of the site at the time of preparing the report.

Time Dependence

This report is based on conditions, which existed at the time of subsurface exploration. Construction operations at or adjacent to the site, and natural events such as floods, or groundwater fluctuations, may also affect subsurface conditions, and thus the continuing adequacy of a geotechnical report.

Macquarie Geotechnical should be kept apprised of any such events, and should be consulted for further geotechnical advice if any changes are noted.

Avoid Misinterpretation

A geotechnical engineer or engineering geologist should be retained to work with other design professionals explaining relevant geotechnical findings and in reviewing the adequacy of their plans and specifications relative to geotechnical issues.

No part of this report should be separated from the Final Report.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendations and should make their own enquiries and obtain independent advice in relation to such matters

Macquarie Geotechnical assumes no responsibility and will not be liable to any other person or organisations for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisations arising from matters dealt with or conclusions expressed in the report.

Other limitations

Macquarie Geotechnical will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

Other Information

For further information reference should be made to "Guidelines for the Provision of Geotechnical Information in Construction Contracts" published by the Institution of Engineers Australia, 1987.



Order number: 80782673
Your Reference: Mac Geo
18/08/23 11:38



NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE

18/8/2023 11:38AM

FOLIO: 1/1268778

First Title(s): OLD SYSTEM

Prior Title(s): 1/1082148

Recorded -----	Number -----	Type of Instrument -----	C.T. Issue -----
11/11/2020	DP1268778	DEPOSITED PLAN	FOLIO CREATED EDITION 1
12/3/2021	AQ866072	TRANSFER	EDITION 2

*** END OF SEARCH ***

PRINTED ON 18/8/2023

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* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register.

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NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 1/1268778

SEARCH DATE -----	TIME ----	EDITION NO -----	DATE ----
18/8/2023	11:35 AM	2	12/3/2021

LAND

LOT 1 IN DEPOSITED PLAN 1268778
AT BOWENFELS
LOCAL GOVERNMENT AREA LITHGOW CITY
PARISH OF LETT COUNTY OF COOK
TITLE DIAGRAM DP1268778

FIRST SCHEDULE

LITHGOW CITY COUNCIL (T AQ866072)

SECOND SCHEDULE (1 NOTIFICATION)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Appendix B - Aerial Imagery

Imagery Date: 31/01/2011



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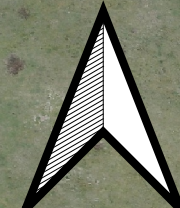
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DP1268778
Lot 2

6289000.0

6289000.0

Lot A



6289200.0

6289200.0

6289000.0

6289000.0

DP1176276
Lot 53

DP1029666
Lot 101

DP1029666
Lot 100

DP867802
Lot 1

DP1206718
Lot 12

DP1068159
Lot 2

DP1268778
Lot 1

DP1049398
Lot 2

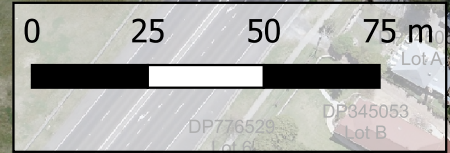
DP1082148
Lot 2

DP1045308
Lot 252

DP22288
Lot 3

DP345053
Lot B

DP776529
Lot 1



Imagery Date: 14/06/2022



6 July, 2006

Civil & Forensic Pty Ltd
PO Box 632
Bathurst NSW 2795

Attention: Alan Brown

**Preliminary Environmental Site Assessment – Animal Loading Area & Yards,
“Sweetbriar” Great Western Highway, Lithgow**

Executive Summary

Background

At your request Macquarie Geotechnical Pty Ltd has undertaken a preliminary environmental assessment at the above mentioned site.

We understand that as a result of historical use of the site there is a likelihood of site contamination and Lithgow City Council requires an environmental investigation as part of the Development Application.

Objectives of the investigation

The objectives of this assessment were;

- to identify the presence of Organo-phosphate pesticides and Organo-chlorine pesticides,
- to identify the presence and concentration levels of heavy metals (arsenic, chromium, cadmium, copper, lead, mercury and zinc), and
- to recommend any remediation plans or further investigations based on levels of contamination identified at the site.

Summary of Conclusions & Recommendations

Macquarie Geotechnical concludes the following;

- One laboratory sample exceeded the relevant EPA guidelines for Column 1 NEHF “A” site. The sample is located beyond the boundaries of the proposed development and we consider this sample to be an isolated hotspot. In addition the statistical analysis undertaken indicates that the results comply with the EPA recommended guidelines compliance of the 95% Upper Confidence Limit for this site.

- Table 1 provides the statistical data analysis for this laboratory testing undertaken at this site,
- There is no significant risk of harm, and
- Laboratory results indicate no cross contamination of samples.

Table 1 Summary of Laboratory Results

Analytes	Min (mg/kg)	Max (mg/kg)	Arithmetic Average	95% Upper Confidence Limit of Arithmetic Average	Assessment Criteria ¹
Arsenic	0.5	4	2	2.8	100
Cadmium	0.05	0.4	0.195	0.27	20
Chromium (VI)	5	14	7.2	8.9	100
Copper	8	35	21.9	28.6	1,000
Nickel	1	21	5.5	9.4	600
Lead	17	490	110.2	201.5	300
Zinc	17	270	125.4	184.7	7,000
Aldrin	Nd	-	-	-	10
Dieldrin	Nd	-	-	-	10
DDT	Nd	-	-	-	200
Heptachlor	Nd	-	-	-	10
Ethoprop	Nd	-	-	-	10
Diazin	Nd	-	-	-	10
Fenitrothion	Nd	-	-	-	10
Parathion	Nd	-	-	-	10

Note:

1. NSW EPA Guidelines for the NSW auditor Scheme (1998) – Residential use
2. Nd Non-Detect

Based on the fieldwork and laboratory analysis, the discussions above and the attached Statement of Limitations, Macquarie Geotechnical Pty Ltd concludes that;

- The site is suitable for a residential development with readily accessible soils, and
- No further environmental investigation is warranted in relation to the site.

Scope of Work

The work involved;

- field sampling in accordance with the requirements of "Sampling Design Guidelines" (Ref: NSW Wales Environmental Protection Authority (EPA), May 1995). Samples were collected on a standard grid system.
- assessment of analytical laboratory data, and
- documentation and reporting of the investigation findings against the "Guidelines for Consultants Reporting on Contaminated Sites" (Ref: NSW EPA , November 1997).

The initial field sampling involved collection of a total of twelve (12) samples, a further six (6) samples was also collected at a later date.

Fieldwork was undertaken on the 2nd December 2005 & 16th January 2006, by an experienced Geologist from our Bathurst office.

Site Identification

Street number, street name and suburb

Col Drew Drive South Bowenfels, 'Sweetbriar', Great Western Highway, Lithgow

Lot number & Deposited Plan number

Lot 1 DP 1082148

Geographical Co-ordinates

Figure 1 illustrates the geographical co-ordinates

Locality map

Figure 2 illustrates the site location.

Current site plan

Figure 3 illustrates the current site plan.

Site History

Zoning

Discussion with Lithgow City Council staff on 4 July 2006 indicates that the land is currently zoned as Residential 2a & Open Space 6.

Land use

The land has been used as animal holding yards and loading facilities.

Summary of Council rezoning

No information readily available.

Chronological list of site uses

No information readily available.

Review of aerial photographs

A review of readily available aerial photographs was undertaken.

Site photographs

No information readily available.

Inventory of site chemical & waste usage area and storage location

No information readily available.

Possible contaminant sources & potential off-site effects

No information readily available.

Site layout plans showing present & past industrial processes

No information readily available.

Sewer & service plans

No sewer or services located in the vicinity of the site.

Description of manufacturing processes

No manufacturing processes undertaken at the site.

Details and locations of fuel storage tanks

No information readily available.

Product spill and loss history

No information readily available.

Discharge to land, water and air

No information readily available.

Disposal locations

No information readily available.

Relevant complaint history

No information readily available.

Local site knowledge of residents and staff

No information readily available.

Summary of local literature about the site

No information readily available.

Details of building and related trade waste agreements

No information readily available.

Historical usage of adjacent land

No information readily available.

Local Use of ground/surface waters and locations of bores/pumps

Several stock dams are located on the property.

Integrity Assessment

Due to the site history being incomplete a preliminary sampling and analysis program was undertaken. The relevant assessment guidelines for this site is the "Managing Land Contamination: Planning Guidelines 1988 (Ref NSW Department of Urban Affairs & Planning and the NSW EPA 1998).

Site Condition & Surrounding Environment

Topography

The site covers approximately 200m² and comprises of a set of yards and fences, some building rubble, and concrete hard stand areas.

The surrounding area is predominately grassed.

The site slopes rises from the north to the south at approximately 3°.

Site boundaries

The site is bounded by The Great Western Highway, Lithgow Hospital and a new residential development to the north.

Visible signs of contamination

There were no clearly visible signs of contamination at the time of the investigation.

Visible signs of plant stress

There were no clearly visible signs of plant stress at the time of the investigation.

Presence of drums, wastes and fill materials

There were no drums or waste material located at the site at the time of the investigation.

Odours

There were no odours noted at the time of the investigation

Conditions of buildings & roads

There are no buildings or roads located within the proposed site at the time of the investigation.

Quality of surface water

No surface water was identified at the time of the investigation.

Flood potential

The site has minimal flood potential.

Details of relevant local sensitive environment

No local sensitive environments were identified.

Geology & Hydrogeology

Soil stratigraphy

No sub-surface investigation was undertaken at the site.

Location and extent of imported and locally derived fill

No fill was identified.

Sub-surface conditions

No sub-surface investigation was undertaken at the site.

Description and location of on-site wells

A search of registered groundwater bores indicates no bores or wells on this site.

Description and location of springs and wells in the vicinity

No information readily available.

Depth to groundwater table

No information readily available.

Direction and rate of groundwater flow

No information readily available.

Direction of surface water run-off

South to North

Background water quality

No information readily available.

Preferential water courses

No information readily available.

Summary of local metrology

The rainfall data for this site is summarised in the Table 2.

Table 2 Average Rainfall

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aver. (mm)	94	83	86	65	65	70	69	64	59	66	69	78

Sampling & analysis plan & sampling methodology

Sampling, analysis and data quality objectives (DQO's)

A statistical based strategy was used at this site to remove any sampling bias.

The statistical analysis performed on the data will determine whether or not the acceptance criteria has been met.

The DQO for this site was to gather information concerning the location, nature, level and extent of the contamination and to provide statistical support for assessing site validation.

Sampling rationale

Field sampling was done in accordance with the requirements of "Sampling Design Guidelines" (Ref: NSW Wales Environmental Protection Authority (EPA), May 1995).

Sampling Pattern

Samples were collected on a standard systematic 5m grid system.

Sampling Density

Samples were collected in accordance with Table A "Sampling Design Guidelines". This table derives its recommendations from the following principles;

- Capable of detecting a reasonable size of hot spots in comparison to the size of the site. Reasonable size means the 'largest area of contamination that could be dealt with if it were not identified during the investigation, rather discovered only after construction work was underway, and
- The number of samples is reasonably adequate to indicate the true value of other critical parameters of a contaminant distribution such as arithmetic average concentration.

For this site the equivalent sampling density was approximately 35 points/hectare. Based on this sample density a 5.9m diameter hot spot can be detected with 95% confidence.

Sample Locations

Refer to Figure 1 for sample locations.

Sampling Depths

Twelve (12) samples were collected at near-surface depths (0.1-0.3m). A further five (5) samples were also collected at near surface depths (0.1-0.3m) and one sample was collected at a shallow depth (0.3-0.5m) at a later date.

Samples analysed and samples not analysed

A total of Sixteen (16) samples were analysed.

Analytical methods

Refer Appendix B.

Analytes for samples

Refer Appendix B.

Description of the sampling methods

The following measures were taken to ensure the integrity of the data collected during soil sampling.

Sample Containers

Soil samples were collected in laboratory supplied sample containers appropriately preserved for the specific analysis.

Sampling Devices

Soil samples were collected using a stainless steel trowel.

Equipment Decontamination

The stainless steel trowel was decontaminated using a phosphate free Decon-90 solution between samples.

Sample Handling Procedures

Samples were transported under Chain of Custody conditions from the site to the laboratory.

Sample Preservation Methods

The sample containers were packed in ice from the time of collection in accordance with relevant standards (ISO, AS, USEPA, ALPHA).

Description of Field Protocol

Field procedures were conducted in accordance with Macquarie Geotechnical standard procedures with all fieldwork undertaken by an experienced Geologist from our Bathurst office.

Field Quality Assurance & Quality Control

Details of sampling team

Fieldwork was undertaken by an experienced Geologist from our Bathurst office.

Decontamination procedures

Sampling equipment was decontaminated using a phosphate free Decon-90 solution between samples.

Logs for each sample collected

Samples were given individual sample numbers which were recorded on the sample jar as well as on field notes and chain of custody form.

Chain of custody (CoC) form

The Chain of Custody form is attached in Appendix B.

Sample splitting techniques

No splitting was undertaken.

Statement of duplicate frequency

One soil duplicate samples were collected for Laboratory Quality Assurance. These samples are summarised in the Table 3.

Table 3 Duplicate Identification.

Sample Identification	Duplicate Identification
E	F

The number of soil field duplicates collected was 7% of the total number of samples.

Field blank results

Refer Appendix B.

Rinsate sample results

Refer Appendix B.

Laboratory-prepared trip spike results for volatile analytes

Refer Appendix B.

Trip blank results

Refer Appendix B.

Field instrument calibration

No field equipment was used which required calibration.

Laboratory QA/QC

Chain-of-custody acknowledgement form

Refer Appendix B.

Record of holding times

Refer Appendix B.

Analytical methods Used

Refer Appendix B.

Laboratory accreditation

Labmark Pty Ltd performed all analytical determinations for the soil. Labmark is a NATA accredited laboratory for the analyses conducted that undertakes determinations in accordance with relevant standards (ISO, AS, USEPA, ALPHA).

Laboratory performance in inter-laboratory trials for the analytical methods used

Not available.

Description of surrogate and spikes used

Refer Appendix B.

% recoveries of spikes and surrogates

Refer Appendix B.

Instrument detection limit

Refer Appendix B.

Matrix or practical quantification

Refer Appendix B.

Standard solution used

Refer Appendix B.

Reference samples results

Refer Appendix B.

Daily check sample results

Refer Appendix B.

Laboratory duplicate results

Refer Appendix B.

Laboratory blank results

Refer Appendix B.

Laboratory standard charts

Refer Appendix B.

QA/QC Data Evaluation

Document Completeness

A review of the field and laboratory QA documentation has been undertaken to ensure that the accuracy and precision of the data.

Data completeness and comparability checks

Based on the review of the data results the following conclusions can be drawn:

- Laboratory QA indicates an acceptable degree of performance in terms of accuracy and precision, and minimal impact from sampling matrix effects, and
- Non-detection of any analytes in the method blank indicated that no cross contamination of the soil samples occurred during the laboratory analysis.

Data representativeness, precision and accuracy

Results of the laboratory QA/QC (Appendix B) are within acceptable margins for the respective analysis. Laboratory QA/QC procedures do not indicate any anomalous results, and confirm the precision and accuracy of the laboratory results as being appropriate for an investigation such as this.

Data comparability checks

Collection & analysis of samples by different personnel

All field samples were collected by a Geologist from our Bathurst office. Analysis of samples was undertaken independently by Labmark Pty Ltd.

Use of different methodology

A statistical based strategy was used at this site to remove any sampling bias.

Collection & analysis of data

All field samples were collected by a Geologist from our Bathurst office on the 2nd December 2005 & 16th January 2006. Analysis and review of data was undertaken between 25th and 31st January 2006.

Spatial & temporal changes

No changes were undertaken.

Relative per cent differences

Duplicate analytical results have been compared to the original sample result using Relative Percent Difference (RPD). RPD is defined as the absolute difference between samples, divided by their mean value, and is expressed as a percentage.

That is;

$$RPD = \frac{R_o - R_d}{((R_o + R_d)/2)} * 100$$

where

R_o is the original analytical result
 R_d is the duplicate analytical result

Based on the review of the RPD results the following conclusions can be drawn:

- RPD results are within acceptable guidelines.

QA/QC conclusion

Based on the assessment of field and laboratory QA/QC results it is concluded the data generated from this investigation are valid and acceptable for this type of investigation.

Basis for assessment criteria

Selected assessment criteria & references

In order to determine the significance of any contaminants detected in the soil it is necessary to define suitable criteria for assessment. The relevant assessment guidelines for this site are the "National Environmental Health Forum's (NEHF) Health-based Soil Investigation Levels", (Ref NSW EPA "Guidelines for Consultants Reporting on Contaminated Sites", 1997) and NSW EPA "Guidelines for Assessing Service Station Sites (1994). In addition the NSW EPA "Guidelines for the Contaminated Land Auditor Scheme (1998) was also assessed.

These investigation levels are incorporated in the National Environmental Protection (Assessment of Site Contamination) Measure (1999) as complied by the National Environmental Protection Council (NEPC).

Rationale for and appropriateness of the selection of criteria

A review of the selection criteria for this project has been undertaken to ensure that the relevant government and industry guidelines for the purpose of assessing soil contamination is appropriate for this site.

The National Environmental Health Forum's (NEHF) Health-based Soil Investigation Levels for this site is Column 1 "Residential with access to soils including" (NEHF "A").

Site assessment criteria

The site assessment criteria is summarised in Table 4.

Table 4 Summary of Site Assessment Criteria.

Contaminant	Concentration (mg/kg)
Metals ¹	
Arsenic	100
Cadmium	20
Chromium (VI)	100
Copper	1,000
Nickel	600
Lead	300
Zinc	7,000
Organo-Chlorine Pesticides ¹	
Aldrin	10
Dieldrin	10
DDT	200
Heptachlor	10
Organo-Phosphorous Pesticides ¹	
Ethoprop	10
Diazin	10
Fenitrothion	10
Parathion	10

Note:

1. NSW EPA Guidelines for the NSW auditor Scheme (1998) – Residential use

Results

Summary of previous results

No previous results are available for this site.

Summary of all results

Results for soil samples are illustrated in the Tables 5, 6 & 7. Figure 1 illustrates the site plan and shows the environmental sample locations.

Table 5 Summary of Metals tested.

	Arsenic	Cadmium	Chromium	Copper	Nickel	Lead	Zinc
Max Level	100	20	100	1,000	600	300	7,000
Sample Number	Mg/kg						
A	1	0.1	5	8	2	24	64
B	3	0.3	14	35	21	65	200
C	3	0.2	9	29	10	37	80
E	4	0.3	8	22	4	87	270
F	4	0.4	7	34	7	87	220
G	1	<0.1	5	8	1	490	28
H	2	0.3	8	33	7	230	240
J	<1	<0.1	6	21	1	17	17
K	1	0.1	5	20	1	38	64
L	<1	0.1	5	9	1	27	71
M	-	-	-	-	-	40	-
N	-	-	-	-	-	5	-
O	-	-	-	-	-	39	-
P	-	-	-	-	-	6	-
Q	-	-	-	-	-	6	-
R	-	-	-	-	-	6	-

Note: 1. Sample G exceed the EPA Health-based investigation levels (Reference Soil Investigation levels for urban redevelopment sites in NSW, "Guidelines for the NSW Auditor Scheme", NSW EPA).
2. Please refer to Appendix A for full laboratory analysis of Metal results.

Table 6 Summary of main Organo-Chlorine Pesticides (OCP) tested.

	Aldrin*	Dieldrin*	DDT	Heptachlor
Max Level	10	10	200	10
Sample Number	Mg/kg			
A	<0.05	<0.05	<0.02	<0.05
B	<0.05	<0.05	<0.02	<0.05
C	<0.05	<0.05	<0.02	<0.05
E	<0.05	<0.05	<0.02	<0.05
F	<0.05	<0.05	<0.02	<0.05
G	<0.05	<0.05	<0.02	<0.05
H	<0.05	<0.05	<0.02	<0.05
J	<0.05	<0.05	<0.02	<0.05
K	<0.05	<0.05	<0.02	<0.05
L	<0.05	<0.05	<0.02	<0.05

Note: 1. No OCP's levels exceed EPA Health-based investigation levels (Reference Soil Investigation levels for urban redevelopment sites in NSW, "Guidelines for the NSW Auditor Scheme", NSW EPA).

2. Please refer to Appendix A for full laboratory analysis of OCP's.

* The EPA Health-based investigation levels (NEHF A) for Aldrin + Dieldrin = 10mg/Kg

Table 7 Summary of main Organo-Phosphorus Pesticides (OPP) tested.

	Ethoprop	Diazin	Fenrithion	Parathion
Max Level	10	10	10	10
Sample Number	Mg/kg			
A	<0.05	<0.05	<0.02	<0.05
B	<0.05	<0.05	<0.02	<0.05
C	<0.05	<0.05	<0.02	<0.05
E	<0.05	<0.05	<0.02	<0.05
F	<0.05	<0.05	<0.02	<0.05
G	<0.05	<0.05	<0.02	<0.05
H	<0.05	<0.05	<0.02	<0.05
J	<0.05	<0.05	<0.02	<0.05
K	<0.05	<0.05	<0.02	<0.05
L	<0.05	<0.05	<0.02	<0.05

Note: 1. No OCP's levels exceed EPA Health-based investigation levels (Reference Soil Investigation levels for urban redevelopment sites in NSW, "Guidelines for the NSW Auditor Scheme", NSW EPA).

2. Please refer to Appendix A for full laboratory analysis of OCP's.

Site Characterisation

Assessment of type of environmental contamination

Arsenic

Ten (10) soil samples were analysed for arsenic. All soil samples analysed for arsenic were found to exhibit concentrations below the assessment criteria. Therefore this metal is not considered as a potential contaminant for this site.

Cadmium

Ten (10) soil samples were analysed for cadmium. All soil samples analysed for cadmium were found to exhibit concentrations below the assessment criteria. Therefore this metal is not considered as a potential contaminant for this site.

Chromium

Ten (10) soil samples were analysed for chromium. All soil samples analysed for chromium were found to exhibit concentrations below the assessment criteria. Therefore this metal is not considered as a potential contaminant for this site.

Copper

Ten (10) soil samples were analysed for copper. All soil samples analysed for copper were found to exhibit concentrations below the assessment criteria. Therefore this metal is not considered as a potential contaminant for this site.

Nickel

Ten (10) soil samples were analysed for nickel. All soil samples analysed for nickel were found to exhibit concentrations below the assessment criteria. Therefore this metal is not considered as a potential contaminant for this site.

Lead

Sixteen (16) soil samples were analysed for lead.

Initially ten (10) samples were analysed for lead and one sample had high lead levels. Six (6) additional samples were then taken in close proximity to this location to assess the extent of contamination. No further elevated levels were then identified from the subsequent samples.

Statistically analysis of the results indicates that the arithmetic average is 110.2 mg/kg and that there is a 95% probability that the arithmetic average concentration of lead will not exceed 201.5 mg/kg.

One laboratory result is above the assessment criteria and therefore lead is considered a potential contaminant for this site. The sample is located beyond the boundaries of the proposed development and we consider this sample to be an isolated hotspot.

There is no explanation for the unusually high lead level at this site.

Zinc

Ten (10) soil samples were analysed for zinc. All soil samples analysed for zinc were found to exhibit concentrations below the assessment criteria.

Organo-Chlorine Pesticide

Ten (10) soil samples were analysed for OC Pesticides including heptachlor, aldrin and dieldrin, DDT and chlordane were found to exhibit concentrations below the assessment criteria. Therefore organo-chlorine pesticides are not considered as potential contaminant for this site.

Organo-Phosphorous Pesticides

Ten (10) soil samples were analysed for Organo-phosphorous Pesticides including Ethoprop, Diazinon, Fenitrothion and Parathion were found to exhibit concentrations below the assessment criteria. Therefore organo-phosphorous pesticides are not considered as potential contaminant for this site.

Assessment of extent of soil and groundwater contamination

Sample G exceed the assessment criteria for Lead.

The cause of this may be as the result of unauthorised disposal of batteries or storage of batteries in the vicinity. At the time of the investigation there were no batteries in the area.

Further testing was undertaken in the vicinity of Sample G however no other samples showed high lead levels indicating that Sample G is an isolated hotspot.

No groundwater was encountered during the investigation.

Assessment of possible exposure routes and exposed populations

Personal Ingestion or Dermal Contact

Based on the available laboratory information one sample exhibited a high lead level however we consider the risk of exposure to this contaminant is minimal through personal ingestion, dermal contact or otherwise.

Wind Transport

Based on the findings of the soil-sampling program, the likely movement of contaminants via wind through attachment to soil is minimal as the site has good grass coverage.

Solubilisation or Sediment Transport

Due to the contamination being identified in a shallow surface sample the risk of contaminate exposure is minimal. There are no major drains running through the site indicating that any unknown contaminants will not migrate off site via these routes.

Leaching or Infiltration

No groundwater was identified, however our experience in this area is that the groundwater table is generally in the vicinity of 5.0m. Hence the potential risk of migration of leaching of contaminants and impact to local groundwater is minimal.

Suitability of the site for Residential Use

Macquarie Geotechnical is aware of plans to develop the site as a residential development (i.e residential houses with access to soils). This site has been assessed against health based investigation levels in accordance with current guidelines. The preliminary investigation has identified that the one location has unexplainably higher lead levels than the surrounding soils. However this site is not in the proposed development and is located approximately 5-6m from the development boundary.

The potential for migration of unknown contaminants has also been addressed by this report. The site does not exhibit areas with any contaminated odours or other aesthetic nuisance.

Therefore as long as the findings of this report are implemented then the site is considered suitable for a residential development with accessible soils.

Assessment of Risk of Harm

Based on a following NSW EPA Environmental Guidelines: "National Environmental Health Forum's (NEHF) Health-based Soil Investigation Levels", (Ref NSW EPA "Guidelines for Consultants Reporting on Contaminated Sites", 1997), National Environmental Protection (Assessment of Site Contamination) Measure (1999) as complied by the National Environmental Protection Council (NEPC) & the "Interim Urban Ecological Investigations" the likely evaluation as to whether site contamination presents a significant risk of harm is based on the following;

- Where the contaminant concentrations in soil are analysed and are greater than the relevant guidelines values for the current or approved land use, and/or the contaminants occur over a relatively large area, and
- Where humans either on-site or off-site are exposed to these contaminants.
- Where the contaminant of the land has already caused harm.
- Whether adjoining land uses are that which increases the risk of potential exposure.
- Whether the substances have migration or are likely to migrate from the land.

Where the contaminant concentrations in soil are analysed and are greater than the relevant guidelines values for the current or approved land use, and/or the contaminants occur over a relatively large area.

The preliminary investigation revealed one area of contamination above the relevant guidelines for the proposed land use. It is noted that the contaminants are not expected to occur over a large area.

Where humans either on-site or off-site are exposed to these contaminants.

There is a low risk of exposure to humans when on this site.

Where the contaminant of the land has already caused harm.

There is no evidence recorded that would suggest that the soil contaminants have already caused harm. There is no evidence to support toxic impacts such as dead vegetation.

Whether adjoining land uses are that which increases the risk of potential exposure.

The **current** surrounding properties are residential however there are **currently** no childcare facilities or food preparation facilities on the boundary where the contamination occurs.

Whether the substances have migration or are likely to migrate from the land.

There is no visual evidence to suggest that the site has affected adjacent lands.

Based on this assessment the site can be considered as not posing significant risk of harm to human health or to some other aspect of the environment.

Conclusions & Recommendation

Macquarie Geotechnical Pty Ltd was engaged by Civil & Forensic Pty Ltd to undertake a preliminary environmental assessment of the animal loading facilities and yards near the proposed Sweet Briar residential sub-division.

Based on the objectives of this investigation the assessment judges individual results against an assessment criteria. A 95% Upper Confidence Limit of the Arithmetic Average of contamination has also been considered.

The preliminary investigation has not identified extensive areas where concentration levels occur above the assessment criteria. The results indicate a singular isolated contaminated area of the site. The area affected by tested analytes at concentration levels above acceptable limits is restricted to retained shallow soil samples in this area.

Further soil sampling and analysis in this area identified no additional contamination.

It is concluded that the site poses minimal risk of harm to human health or other aspects of the environment based on the assessment criteria.

Extent of uncertainties in the results

Determination of the Upper Confidence Limit (UCL) of the arithmetic average concentration was undertaken on measurement return concentrations to assess the extent of uncertainties.


The standard EPA minimum UCL of 95% was adopted for this site.

This implies that there is a 95% probability that the true arithmetic average contaminant concentration is within the sampling area and will exceed the value determined by this method. For this site to be considered uncontaminated then the 95% UCL of the arithmetic average concentration of the contaminants must be less than the acceptable criteria limit (Stated earlier in this report).

This report was prepared between 25th and 31st January 2006 and is based on the conditions encountered and information reviewed at the time of preparation.

If you have any questions in relation to the foregoing please contact the undersigned.

Yours sincerely



Robert Cox
Manager
Macquarie Geotechnical

Attached:	Appendix A	Figures & Site Plans
	Appendix B	Analytical Laboratory Results
	Appendix C	Environmental Limitations

Appendix A

Figures & Site Plans

Environmental Investigation

Sweet Briar Estate
Lithgow

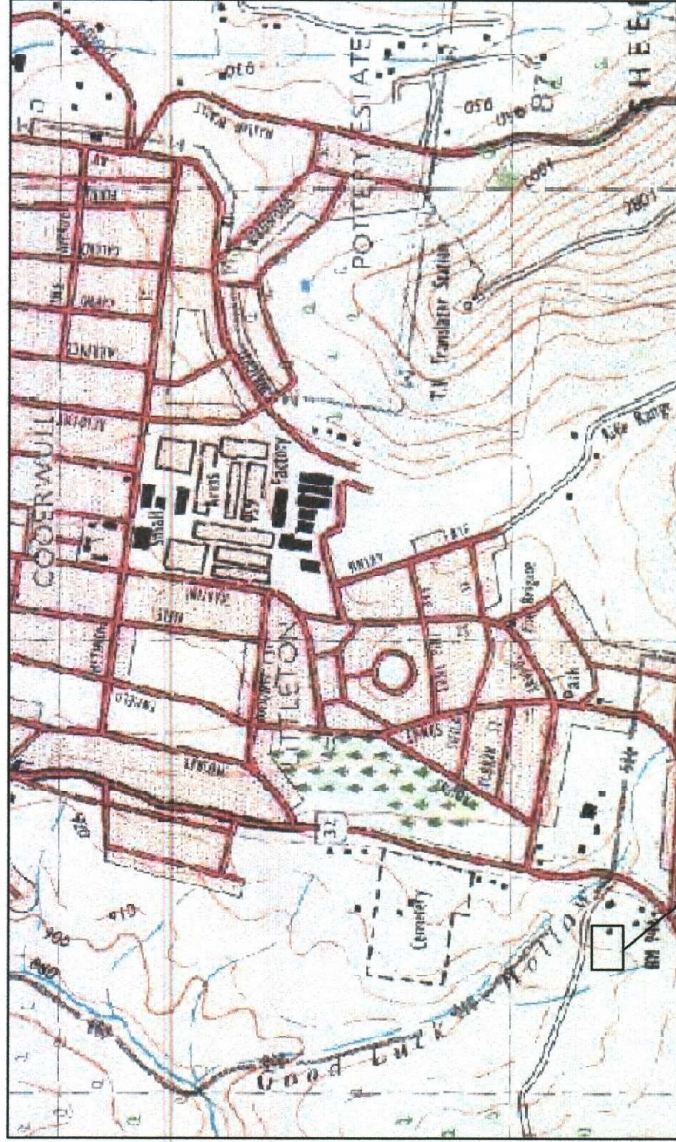
Client:
Civil & Forensic



Scale: Not to Scale

Figure 1
Site Plan

Macquarie
Geotechnical



Site Location



Environmental Investigation

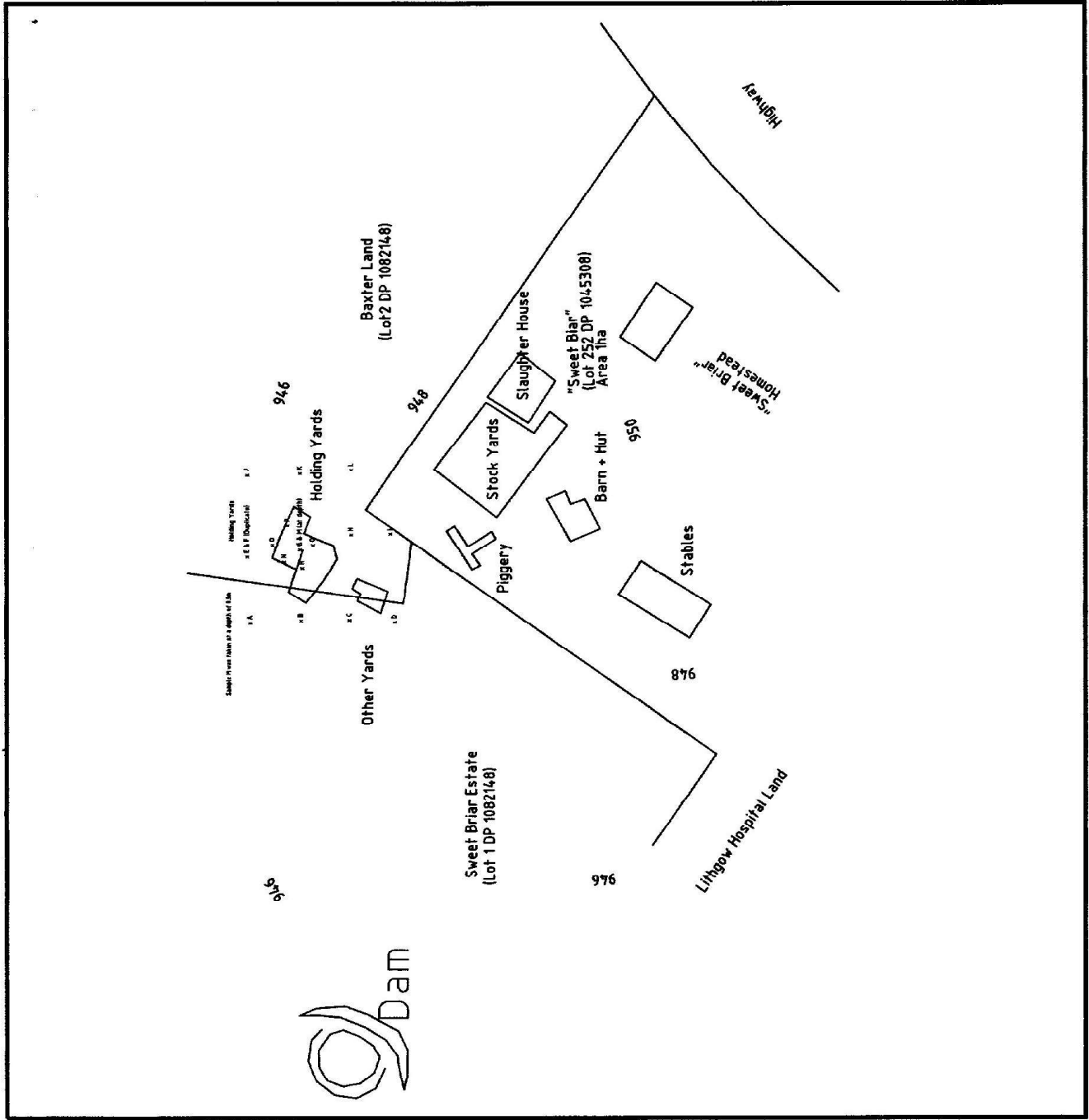
Sweet Briar Estate
Lithgow

Client:
Civil & Forensic

Scale: 1:150

Figure 2
Site Plan

Macquarie
Geotechnical



Environmental
Investigation

Sweet Briar Estate
Lithgow

Client:
Civil & Forensic



N

Scale: 1:250

Figure 3
Site Plan

Macquarie
Geotechnical

Sample M was taken at a depth of 0.5m

x J

x E & F (Duplicate)

x A

x K

x O

x P

x N

x G & M (at depth)

x B

x R

x Q

x L

x H

x C

x I

x D

Property Boundary

Appendix B

Analytical Laboratory Results



CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



No. 13542.

Accredited for compliance with ISO/IEC 17025. The results of tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

AQIS

AUSTRALIAN QUARANTINE
AND INSPECTION SERVICE

SYDNEY License No. N0356

Quarantine Approved premises criteria 5.1 for quarantine containment level 1 (QC) facilities. Class five criteria cover premises utilised for research, analysis and/or testing of biological material, soil, animal, plant and human products.

FINAL CERTIFICATE OF ANALYSIS - ENVIRONMENTAL DIVISION

Laboratory Report No: E024636
Client Name: Macquarie Geotechnical
Client Reference: 05-304
Contact Name: Robert Cox
Chain of Custody No: na
Sample Matrix: SOIL

Cover Page 1 of 4
plus Sample Results

Date Received: 05/12/2005
Date Reported: 12/12/2005

This Final Certificate of Analysis consists of sample results, DQI's, method descriptions, laboratory definitions, and internationally recognised NATA accreditation and endorsement. The DQO compliance relates specifically to QA/QC results as performed as part of the sample analysis, and may provide an indication of sample result quality. Transfer of report ownership from Labmark to the client shall only occur once full & final payment has been settled and verified. All report copies may be retracted where full payment has not occurred within the agreed settlement period.

QUALITY ASSURANCE CRITERIA

Accuracy: matrix spike: 1 in first 5-20, then 1 every 20 samples
lcs, crm, method: 1 per analytical batch
surrogate spike: addition per target organic method

Precision: laboratory duplicate: 1 in first 5-10, then 1 every 10 samples

laboratory triplicate: re-extracted & reported when duplicate RPD values exceed acceptance criteria

Holding Times: soils, waters: Refer to LabMark Preservation & TIT table
VOC's 14 days water / soil
VAC's 7 days water or 14 days acidified
VAC's 14 days soil
SVOC's 7 days water, 14 days soil
Pesticides 7 days water, 14 days soil
Metals 6 months general elements
Mercury 28 days

Confirmation: target organic analysis: GC/MS, or confirmatory column

Sensitivity: EQL: Typically 2-5 x Method Detection Limit (MDL)

RESULT ANNOTATION

DQO: Data Quality Objective
DQI: Data Quality Indicator
EQL: Estimated Quantitation Limit
na: not applicable

s: matrix spike recovery
d: laboratory duplicate
t: laboratory triplicate
r: RPD relative % difference

p: pending
lcs: laboratory control sample
crm: certified reference material
mb: method blank

QUALITY CONTROL

GLOBAL ACCEPTANCE CRITERIA (GAC)

Accuracy: spike, lcs, crm general analytes 70% - 130% recovery
surrogate: phenol analytes 50% - 130% recovery
organophosphorous pesticide analytes 60% - 130% recovery
phenoxy acid herbicides 50% - 130% recovery

anion/cation bal: +/- 10% (0-3 mcq/l),
+/- 5% (>3 mcq/l)

Precision: method blank: not detected >95% of the reported EQL
duplicate lab 0-30% (>10xEQL), 0-75% (5-10xEQL)
RPD (metals): 0-100% (<5xEQL)
duplicate lab 0-50% (>10xEQL), 0-75% (5-10xEQL)
RPD: 0-100% (<5xEQL)

QUALITY CONTROL

ANALYTE SPECIFIC ACCEPTANCE CRITERIA (ASAC)

Accuracy: spike, lcs, crm analyte specific recovery data
surrogate: <3xstd of historical mean

Uncertainty: spike, lcs: measurement calculated from historical analyte specific control charts

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

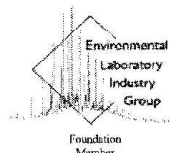
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* Telephone: (02) 9476 6533 * Fax: (02) 9476 8219

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Form Q80144, Rev. 0 : Date Issued 10/03/05



CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



Laboratory Report: E024636

Cover Page 2 of 4

NEPC GUIDELINE COMPLIANCE - DQO

1. GENERAL

- A. Results relate specifically to samples as received. Sample results are not corrected for matrix spike, lcs, or surrogate recovery data.
- B. 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 at www.nata.asn.au.
- E. VOC spikes & surrogates added to samples during extraction, SVOC spikes & surrogates added prior to extraction.
- F. Recovery data outside GAC limits shall be investigated and compared to ASAC (historical mean \pm 3sd). If recovery data $<20\%$, then the relevant results for that compound are considered not reliable.
- G. Recovery data (ms, surrogate, erm, lcs) outside ASAC limits shall initiate an investigative action. Anomalous 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.
- H. Extraction (preparation) date refers to the date that sample preparation was initiated. Note that certain methods not requiring sample preparation (eg. VOCs in water, etc) may report a common extraction and analysis date.
- I. LabMark shall maintain an official copy of this Certificate of Analysis for all traceable reference purposes.

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

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

3. NATA ACCREDITED METHODS

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

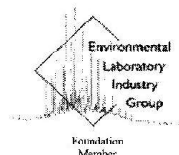
This document is issued in accordance with NATA's accreditation requirements.

LabMark PTY LTD ABN 27 079 798 397
* SYDNEY: Unit 1, 8 Leighton Place Asquith NSW 2077 * MELBOURNE: 116 Moray Street, South Melbourne VIC 3205
* Telephone: (02) 9476 6533 * Fax: (02) 9476 8219 * Telephone: (03) 9686 8344 * Fax: (03) 9686 7344

Form Q90144, Rev. 0: Date Issued 10/03/05



CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



Laboratory Report: E024636

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4. QA/QC FREQUENCY COMPLIANCE TABLE SPECIFIC TO THIS REPORT

Matrix: SOIL

Page:	Method:	Totals:	#d	%d-ratio	#t	#s	%s-ratio
1	Organochlorine Pesticides (OC)	10	1	10%	0	1	10%
3	Organophosphorus Pesticides	10	1	10%	0	1	10%
5	Acid extractable metals (M7)	10	1	10%	0	1	10%
7	Acid extractable mercury	10	1	10%	0	1	10%
8	Moisture	10	--	--	--	--	--

GLOSSARY:

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

5. THERE ARE NO ADDITIONAL COMMENTS SPECIFIC TO THIS REPORT

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

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

LabMark PTY LTD ABN 27 079 798 397

* SYDNEY: Unit 1, 8 Leighton Place Asquith NSW 2077

* MELBOURNE: 116 Moray Street, South Melbourne VIC 3205

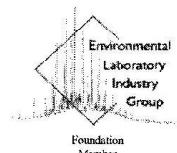
* Telephone: (02) 9476 6533 * Fax: (02) 9476 8219

* Telephone: (03) 9686 8344 * Fax: (03) 9686 7344

Form QSO144, Rev. 0 : Date Issued 10/03/02



CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



Laboratory Report: E024636

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Laboratory QA/QC data shall relate specifically to this report, and may provide an indication of site specific sample result quality. LabMark DOES NOT report NON-RELEVANT BATCH QA/QC 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.

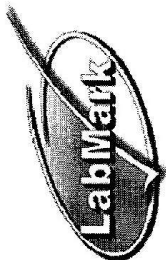
This document is issued in accordance with NATA's accreditation requirements.

LabMark PTY LTD ARN 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 Q80144, Rev. 0 : Date Issued 10/03/05



Laboratory Report No: E024636

Client Name: Macquarie Geotechnical

Contact Name: Robert Cox

Client Reference: 05-304

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of Analysis

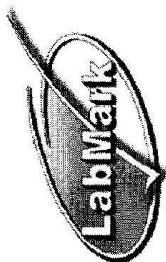
This report supersedes reports issued on: N/A

Laboratory Identification		49004	49005	49006	49007	49008	49009	49010	49011	49012	49013
Sample Identification		A	B	C	E	F	G	H	J	K	L
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05
Laboratory Extraction (Preparation) Date		8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05
Laboratory Analysis Date		9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05
Method	Organochlorine Pesticides (OC)										
E013.2	EQL										
	a-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	HCB	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	b-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	g-BHC (Lindane)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	d-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Heptachlor epoxide	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	trans-chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan I	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	cis-chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	4,4-DDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan II	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	4,4-DDD	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan sulphate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	4,4-DDT	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Methoxychlor	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	DBC (Surr @ 0.2mg/kg)	--	93%	99%	90%	93%	95%	94%	95%	97%	99%

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E013.2: 8-10g soil extracted with 20ml hexane/acetone (1:1). Analysis by GC/dual ECD.



Laboratory Report No: E024636

Client Name: Macquarie Geotechnical

Contact Name: Robert Cox

Client Reference: 05-304

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of Analysis

This report supersedes reports issued on: N/A

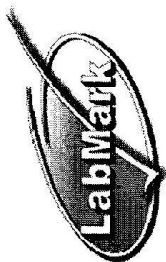
Laboratory Identification		49004d	49004r	49005s	ics	mb			
Sample Identification		QC	QC	QC	QC	QC			
Depth (m)		--	--	--	--	--			
Sampling Date recorded on COC		--	--	--	--	--			
Laboratory Extraction (Preparation) Date		8/12/05	--	8/12/05	8/12/05	8/12/05			
Laboratory Analysis Date		9/12/05	--	9/12/05	8/12/05	8/12/05			
Method	Organochlorine Pesticides (OC)								
E013.2	EQL								
	a-BHC	<0.05	--	102%	114%	<0.05			
	HCb	<0.05	--	124%	121%	<0.05			
	b-BHC	<0.05	--	108%	125%	<0.05			
	g-BHC (Lindane)	<0.05	--	109%	121%	<0.05			
	d-BHC	<0.05	--	102%	117%	<0.05			
	Heptachlor	<0.05	--	87%	110%	<0.05			
	Aldrin	<0.05	--	98%	113%	<0.05			
	Heptachlor epoxide	<0.05	--	111%	120%	<0.05			
	trans-chlordane	<0.05	--	102%	112%	<0.05			
	Endosulfan I	<0.05	--	106%	113%	<0.05			
	cis-chlordane	<0.05	--	106%	113%	<0.05			
	Dieldrin	<0.05	--	103%	114%	<0.05			
	4,4-DDE	<0.05	--	107%	115%	<0.05			
	Endrin	<0.05	--	112%	108%	<0.05			
	Endosulfan II	<0.05	--	102%	113%	<0.05			
	4,4-DDD	<0.05	--	129%	121%	<0.05			
	Endosulfan sulphate	<0.05	--	100%	104%	<0.05			
	4,4-DDT	<0.2	--	91%	112%	<0.2			
	Methoxychlor	<0.2	--	79%	103%	<0.2			
	DBC (Surr @ 0.2mg/kg)	107%	16%	89%	112%	116%			

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E013.2: 8-10g soil extracted with 20ml hexane/acetone (1:1). Analysis by GC/dual ECD.





Laboratory Report No: E024636

Client Name: Macquarie Geotechnical

Contact Name: Robert Cox

Client Reference: 05-304

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of Analysis

This report supersedes reports issued on: N/A

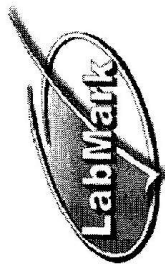
Laboratory Identification		49004	49005	49006	49007	49008	49009	49010	49011	49012	49013
Sample Identification		A	B	C	E	F	G	H	J	K	L
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05
Laboratory Extraction (Preparation) Date		8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05
Laboratory Analysis Date		9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05
Method	Organophosphorus Pesticides										
E014.2	EQL										
	Dichlorvos	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Mevinphos (Phosdrin)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Demeton (total)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Ethoprop	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Monocrotophos	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phorate	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dimethoate	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Diazinon	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Disulfoton	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Methyl parathion	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ronnel	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fenitrothion	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Malathion	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chlorpyrifos	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fenthion	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Parathion	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Stirofos	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Prothiofos	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Azinophos methyl	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Coumaphos	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	TPP (Surr @ 2mg/kg)	105%	65%	78%	71%	71%	73%	75%	68%	73%	83%

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E014.2: 8-10g soil extracted with 20ml hexane/acetone (1:1). Analysis by GC/FPD/MS.





Laboratory Report No: E024636

Client Name: Macquarie Geotechnical

Contact Name: Robert Cox

Client Reference: 05-304

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This report supersedes reports issued on: N/A

Final

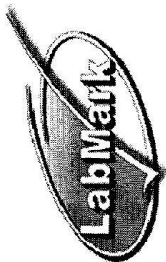
Certificate
of Analysis

Laboratory Identification		49004d	49004r	49005s	ics	mb			
Sample Identification		QC	QC	QC	QC	QC			
Depth (m)		--	--	--	--	--			
Sampling Date recorded on COC		--	--	--	--	--			
Laboratory Extraction (Preparation) Date		8/12/05	--	8/12/05	8/12/05	8/12/05			
Laboratory Analysis Date		9/12/05	--	9/12/05	9/12/05	9/12/05			
Method	Organophosphorus Pesticides	EQL							
E014.2	Dichlorvos	0.5	--	75%	70%	<0.5			
	Mevinphos (Phosdrin)	0.5	--	--	--	<0.5			
	Demeton (total)	1	--	--	--	<1			
	Ethoprop	0.5	--	74%	70%	<0.5			
	Monocrotophos	0.5	--	--	--	<0.5			
	Phorate	0.5	--	69%	72%	<0.5			
	Dimethoate	0.5	--	67%	68%	<0.5			
	Diazinon	0.5	--	104%	72%	<0.5			
	Disulfoton	0.5	--	64%	61%	<0.5			
	Methyl parathion	0.5	--	70%	66%	<0.5			
	Ronnel	0.5	--	82%	81%	<0.5			
	Fenitrothion	0.5	--	81%	61%	<0.5			
	Malathion	0.5	--	94%	70%	<0.5			
	Chlorpyrifos	0.5	--	79%	62%	<0.5			
	Fenthion	0.5	--	78%	77%	<0.5			
	Parathion	0.5	--	76%	64%	<0.5			
	Stirofos	0.5	--	81%	61%	<0.5			
	Prothiofos	0.5	--	86%	68%	<0.5			
	Azinophos methyl	0.5	--	86%	106%	<0.5			
	Coumaphos	0.5	--	84%	78%	<0.5			
	TPP (Surr @ 2mg/kg)	--	31%	68%	83%	90%			

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E014.2: 8-10g soil extracted with 20ml hexane/acetone (1:1). Analysis by GC/FPD/MS.



Laboratory Report No: E024636
Client Name: Macquarie Geotechnical
Contact Name: Robert Cox
Client Reference 05-304

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of Analysis

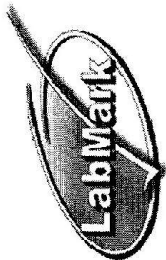
This report supersedes reports issued on: N/A

Laboratory Identification		49004	49005	49006	49007	49008	49009	49010	49011	49012	49013
Sample Identification		A	B	C	E	F	G	H	J	K	L
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05
Laboratory Extraction (Preparation) Date		9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05
Laboratory Analysis Date		12/12/05	12/12/05	12/12/05	12/12/05	12/12/05	12/12/05	12/12/05	12/12/05	12/12/05	12/12/05
Method	Acid extractable metals (M7)										
E022.2	Arsenic	1	3	3	4	4	1	2	<1	1	<1
	Cadmium	0.1	0.3	0.2	0.3	0.4	<0.1	0.3	<0.1	0.1	0.1
	Chromium	1	14	9	8	7	5	8	6	5	5
	Copper	2	35	29	22	34	8	33	21	20	9
	Nickel	1	21	10	4	7	1	7	1	1	1
	Lead	2	65	37	87	87	490	230	17	38	27
	Zinc	5	200	80	270	220	28	240	17	64	71

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample.

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



Laboratory Report No: E024636
Client Name: Macquarie Geotechnical
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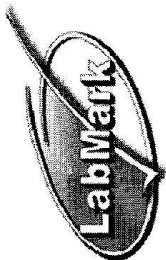
This report supersedes reports issued on: N/A

Laboratory Identification		49004d	49004r	49005s	crm	lcs	mb		
Sample Identification		QC	QC	QC	QC	QC	QC		
Depth (m)		--	--	--	--	--	--		
Sampling Date recorded on COC		--	--	--	--	--	--		
Laboratory Extraction (Preparation) Date		9/12/05	--	9/12/05	9/12/05	9/12/05	9/12/05		
Laboratory Analysis Date		12/12/05	--	12/12/05	9/12/05	9/12/05	9/12/05		
Method	Acid extractable metals (M7)	EQL							
E022.2	Arsenic	1	0%	83%	86%	113%	<1		
	Cadmium	0.1	0.0%	102%	89%	79%	<0.1		
	Chromium	1	18%	112%	86%	97%	<1		
	Copper	2	12%	98%	91%	109%	<2		
	Nickel	1	0%	130%	95%	103%	<1		
	Lead	2	22%	#	111%	84%	<2		
	Zinc	5	6%	#	87%	102%	<5		

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample.

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



Laboratory Report No: E024636
Client Name: Macquarie Geotechnical
Contact Name: Robert Cox
Client Reference 05-304

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Laboratory Identification		49004	49005	49006	49007	49008	49009	49010	49011	49012	49013
Sample Identification		A	B	C	E	F	G	H	J	K	L
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05
Laboratory Extraction (Preparation) Date		9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05
Laboratory Analysis Date		12/12/05	12/12/05	12/12/05	12/12/05	12/12/05	12/12/05	12/12/05	12/12/05	12/12/05	12/12/05
Method E026.2	Acid extractable mercury										
	EQL Mercury	0.05	0.08	0.07	0.08	0.08	0.05	0.07	0.05	0.05	<0.05

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

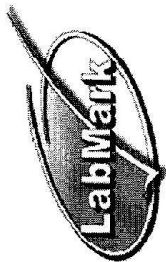
E026.2: 0.5g digested with nitric/hydrochloric acid. Analysis by CV-ICP-MS or FIMS.

Laboratory Identification		49004d	49004r	49005s	crm	lcs	mb		
Sample Identification		QC	QC	QC	QC	QC	QC		
Depth (m)		--	--	--	--	--	--		
Sampling Date recorded on COC		--	--	--	--	--	--		
Laboratory Extraction (Preparation) Date		9/12/05	--	9/12/05	9/12/05	9/12/05	9/12/05		
Laboratory Analysis Date		12/12/05	--	12/12/05	9/12/05	9/12/05	9/12/05		
Method E026.2	Acid extractable mercury								
	EQL Mercury	0.05	0.0%	97%	104%	90%	<0.05		

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

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



Laboratory Report No: E024636
Client Name: Macquarie Geotechnical
Contact Name: Robert Cox
Client Reference 05-304

Page: 8 of 8
plus cover page
Date: 12/12/05

Final Certificate
of Analysis

This report supersedes reports issued on: N/A

Laboratory Identification		49004	49005	49006	49007	49008	49009	49010	49011	49012	49013
Sample Identification		A	B	C	E	F	G	H	J	K	L
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05	2/12/05
Laboratory Extraction (Preparation) Date		8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05	8/12/05
Laboratory Analysis Date		9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05	9/12/05
Method E005.2	Moisture										
	EQL	14	18	16	15	26	13	9	17	14	15
Moisture											

Results expressed in % w/w unless otherwise specified

Comments:

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

Laboratory Identification		49004d	49004r
Sample Identification		QC	QC
Depth (m)		--	--
Sampling Date recorded on COC		--	--
Laboratory Extraction (Preparation) Date		8/12/05	--
Laboratory Analysis Date		9/12/05	--
Method E005.2	Moisture		
	EQL	13	7%
Moisture			

Results expressed in % w/w unless otherwise specified

Comments:

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



Quality, Service, Support

Sample Receipt Notice (SRN)



Client Details		Laboratory Reference Information	
Client Name: Macquarie Geotechnical Client Phone: 02 6332 2011 Client Fax: 02 6334 4213 Contact Name: Robert Cox Contact Email: macgeo@lisp.com.au Client Address: PO Box 71 Bathurst NSW 2795 Project Name: 05-304 Project Number: - Not provided - CoC Number: - Not provided - Purchase Order: - Not provided - Surcharge: No surcharge applied (results by 6:30pm on due date) Sample Matrix: SOIL		Please have this information ready when contacting Labmark. Laboratory Report: E024636 Quotation Number: - Not provided, standard prices apply Laboratory Address: Unit 1, 8 Leighton Pl. Asquith NSW 2077 Phone: 61 2 9476 6533 Fax: 61 2 9476 8219 Sample Receipt Contact: Ros Schacht Email: ros.schacht@labmark.com.au Reporting Contact: Jyothi Lal Email: jyothi.lal@labmark.com.au	
Date Sampled (earliest date): 02/12/2005 Date Samples Received: 05/12/2005 Date Sample Receipt Notice issued: 05/12/2005 Date Preliminary Report Due: 12/12/2005		NATA Accreditation: 13542 TGA GMP License: 185-336 (Sydney) APVMA License: 6105 (Sydney) AQIS Approval: NO356 (Sydney) AQIS Entry Permit: 200409998 (Sydney)	

Sample Condition:

COC received with samples. Report number and lab ID's defined on COC.
Samples received in good order.
Samples received with cooling media: Crushed ice.
Samples received warm.
Security seals intact.
Sample container & sample integrity suitable.

Comments:**Holding Times:**

Date received allows for sufficient time to meet Technical Holding Times.

Preservation:

Chemical preservation of samples satisfactory for requested analytes.

Important Notes:

Sample disposal of environmental samples shall be 31 days (water) and 3 months (soil, HN03 preserved samples) 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 \$20/ 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 verified. All report copies may be retracted where full payment does not occur within the agreed settlement period.

Analysis comments:**Subcontracted Analyses:**

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

Form QS0012, Rev 8: Date issued 23/07/04.

Page 1 of 1

Return Date:	
Fax Results To:	Robert Cox
Fax Number:	02 6534 4213
Phone Number:	02 6532 2011
Invoice To:	PO Box 71, Bathurst NSW 2795

Relinquished By (Name):	291014 Cox	Date: 2-12-2005	Signature: [Signature]
-------------------------	------------	-----------------	------------------------

Comments: _____

Legend: S = Soil, W = Water, F = Filter
T = Tube, C = Concrete

5/12
10:51 am



CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



No. 13542

Accredited for compliance with ISO/IEC 17025. The results of tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

AQIS

AUSTRALIAN QUARANTINE
AND INSPECTION SERVICE

SYDNEY License No. N0356

Quarantine Approved premises criteria 5.1 for quarantine containment level 1 (QCT) facilities. Class five criteria cover premises utilised for research, analysis and/or testing of biological material, soil, animal, plant and human products.

FINAL CERTIFICATE OF ANALYSIS - ENVIRONMENTAL DIVISION

Laboratory Report No: E025131
Client Name: Macquarie Geotechnical
Client Reference: Sweet Briar Estate
Contact Name: Robert Cox
Chain of Custody No: na
Sample Matrix: SOIL

Cover Page 1 of 3
plus Sample Results

Date Received: 18/01/2006

Date Reported: 25/01/2006

This Final Certificate of Analysis consists of sample results, DQI's, method descriptions, laboratory definitions, and internationally recognised NATA accreditation and endorsement. The DQO compliance relates specifically to QA/QC results as performed as part of the sample analysis, and may provide an indication of sample result quality. Transfer of report ownership from Labmark to the client shall only occur once full & final payment has been settled and verified. All report copies may be retracted where full payment has not occurred within the agreed settlement period.

QUALITY ASSURANCE CRITERIA

Accuracy: matrix spike: 1 in first 5-20, then 1 every 20 samples
lcs, crm, method: 1 per analytical batch
surrogate spike: addition per target organic method

Precision: laboratory duplicate: 1 in first 5-10, then 1 every 10 samples

laboratory triplicate: re-extracted & reported when duplicate RPD values exceed acceptance criteria

Holding Times: soils, waters: Refer to LabMark Preservation & THT table
VOC's 14 days water / soil
VAC's 7 days water or 14 days acidified
VAC's 14 days soil
SVOC's 7 days water, 14 days soil
Pesticides 7 days water, 14 days soil
Metals 6 months general elements
Mercury 28 days

Confirmation: target organic analysis: GC/MS, or confirmatory column

Sensitivity: EQL: Typically 2-5 x Method Detection Limit (MDL)

QUALITY CONTROL

GLOBAL ACCEPTANCE CRITERIA (GAC)

Accuracy: spike, lcs, crm general analytes 70% - 130% recovery
surrogate: phenol analytes 50% - 130% recovery
organophosphorous pesticide analytes 60% - 130% recovery
phenoxy acid herbicides 50% - 130% recovery

anion/cation bal: +/- 10% (0-3 meq/l),
+/- 5% (>3 meq/l)

Precision: method blank: not detected >95% of the reported EQL

duplicate lab 0-30% (>10xEQL), 0-75% (5-10xEQL)

RPD (metals): 0-100% (<5xEQL)

duplicate lab 0-50% (>10xEQL), 0-75% (5-10xEQL)

RPD: 0-100% (<5xEQL)

QUALITY CONTROL

ANALYTE SPECIFIC ACCEPTANCE CRITERIA (ASAC)

Accuracy: spike, lcs, crm analyte specific recovery data
surrogate: <3xsd of historical mean

Uncertainty: spike, lcs: measurement calculated from historical analyte specific control charts

RESULT ANNOTATION

DQO: Data Quality Objective

DQI: Data Quality Indicator

EQL: Estimated Quantitation Limit

na: not applicable

s: matrix spike recovery

d: laboratory duplicate

t: laboratory triplicate

r: RPD relative % difference

p: pending

lcs: laboratory control sample

crm: certified reference material

mb: method blank

David Burns
Quality Control (Report signatory)
david.burns@labmark.com.au

Geoff Weir
Authorising Chemist (NATA signatory)
gcoff.weir@labmark.com.au

Simon Mills
Authorising Chemist (NATA signatory)
simon.mills@labmark.com.au

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

LabMark PTY LTD ABN 27 079 798 397

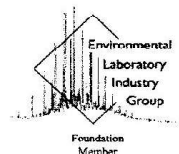
* SYDNEY: Unit 1, 8 Leighton Place Asquith NSW 2077
* Telephone: (02) 9476 6533 * Fax: (02) 9476 8219

* MELBOURNE: 116 Moray Street, South Melbourne VIC 3205
* Telephone: (03) 9686 8344 * Fax: (03) 9686 7344

Form QS0144, Rev. 0: Date issued 10/03/05



CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



Laboratory Report: E025131

Cover Page 2 of 3

NEPC GUIDELINE COMPLIANCE - DQO

1. GENERAL

- A. Results relate specifically to samples as received. Sample results are not corrected for matrix spike, lcs, or surrogate recovery data.
- B. 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 at www.nata.asn.au.
- E. VOC spikes & surrogates added to samples during extraction, SVOC spikes & surrogates added prior to extraction.
- F. Recovery data outside GAC limits shall be investigated and compared to ASAC (historical mean +/- 3sd). If recovery data <20%, then the relevant results for that compound are considered not reliable.
- G. Recovery data (ms, surrogate, crm, lcs) outside ASAC limits shall initiate an investigative action. Anomalous 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.
- H. Extraction (preparation) date refers to the date that sample preparation was initiated. Note that certain methods not requiring sample preparation (eg. VOCs in water, etc) may report a common extraction and analysis date.
- I. LabMark shall maintain an official copy of this Certificate of Analysis for all traceable reference purposes.

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

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

3. NATA ACCREDITED METHODS

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

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

LabMark PTY LTD ABN 27 079 798 397

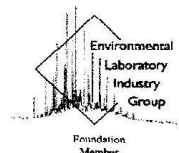
* SYDNEY: Unit 1, 8 Leighton Place Asquith NSW 2077
* Telephone: (02) 9476 6533 * Fax: (02) 9476 8219

* MELBOURNE: 116 Moray Street, South Melbourne VIC 3205
* Telephone: (03) 9686 8344 * Fax: (03) 9686 7344

Form QS0144, Rev. 0 : Date Issued 10/03/05



CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



Laboratory Report: E025131

Cover Page 3 of 3

4. QA/QC FREQUENCY COMPLIANCE TABLE SPECIFIC TO THIS REPORT

Matrix: SOIL

Page:	Method:	Totals:	#d	%d-ratio	#t	#s	%s-ratio
1	Acid extractable lead	6	1	17%	0	1	17%
2	Moisture	6	--	--	--	--	--

GLOSSARY:

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

5. THERE ARE NO ADDITIONAL COMMENTS SPECIFIC TO THIS REPORT

A. All tests were conducted by LabMark Environmental Sydney, NATA accreditation No. 13542, Corporate Site No. 13535., unless indicated below.

Laboratory QA/QC data shall relate specifically to this report, and may provide an indication of site specific sample result quality. LabMark DOES NOT report NON-RELEVANT BATCH QA/QC 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.

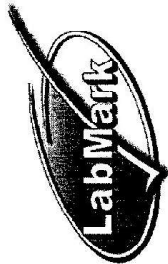
This document is issued in accordance with NATA's accreditation requirements.

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 Q50144, Rev. 0 : Date Issued 10/03/05



Laboratory Report No: E025131
Client Name: Macquarie Geotechnical
Contact Name: Robert Cox
Client Reference: Sweet Briar Estate 05-304

Page: 1 of 2
plus cover page
Date: 25/01/06

Final
Certificate
of Analysis

This report supersedes reports issued on: N/A

Laboratory Identification		2780	2781	2782	2783	2784	2785	2780d	2780r	2781s	crm
Sample Identification		M	N	O	P	Q	R	QC	QC	QC	QC
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		16/1/06	16/1/06	16/1/06	16/1/06	16/1/06	16/1/06	--	--	--	--
Laboratory Extraction (Preparation) Date		24/1/06	24/1/06	24/1/06	24/1/06	24/1/06	24/1/06	24/1/06	--	24/1/06	24/1/06
Laboratory Analysis Date		25/1/06	25/1/06	25/1/06	25/1/06	25/1/06	25/1/06	25/1/06	--	25/1/06	24/1/06
Method E022.2	Acid extractable lead		EQL								101%
	Lead		2		40		6		30		
				39	6	6	6		29%	95%	

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

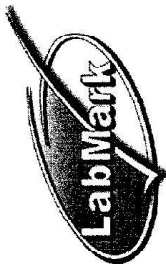
E022.2: 0.50g digested with nitric/hydrochloric acid. Analysis by ICP/MS.

Laboratory Identification		ics	mb							
Sample Identification		QC	QC							
Depth (m)		--	--							
Sampling Date recorded on COC		--	--							
Laboratory Extraction (Preparation) Date		24/1/06	24/1/06							
Laboratory Analysis Date		24/1/06	24/1/06							
Method E022.2	Acid extractable lead		EQL 2	104%	<2					
	Lead									

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E022.2: 0.50g digested with nitric/hydrochloric acid. Analysis by ICP/MS.



Laboratory Report No: E025131
Client Name: Macquarie Geotechnical
Contact Name: Robert Cox
Client Reference: Sweet Briar Estate 05-304

Page: 2 of 2
plus cover page
Date: 25/01/06

Final
Certificate
of Analysis

This report supersedes reports issued on: N/A

Laboratory Identification		2780	2781	2782	2783	2784	2785	2780d	2780r	
Sample Identification		M	N	O	P	Q	R	QC	QC	
Depth (m)		--	--	--	--	--	--	--	--	
Sampling Date recorded on COC		16/1/06	16/1/06	16/1/06	16/1/06	16/1/06	16/1/06	--	--	
Laboratory Extraction (Preparation) Date		19/1/06	19/1/06	19/1/06	19/1/06	19/1/06	19/1/06	19/1/06	--	
Laboratory Analysis Date		20/1/06	20/1/06	20/1/06	20/1/06	20/1/06	20/1/06	20/1/06	--	
Method E005.2	Moisture	EQL								
	Moisture	7	5	6	6	10	8	7	0%	

Results expressed in % w/w unless otherwise specified

Comments:

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

CHAIN OF CUSTODY

Form QSO073, Rev 8 : Date issued 12/05/2004.

LABMARK

NATA 13542, AQIS N0356

Dispatch samples to:
Unit 1/8 Leighton Place
Asquith NSW 2077
Australia

Telephone: 612-9476 6533
Facsimile: 612-9476 8219
After hours (DB): 0409 449684
After hours (IP): 0419 689300
E-mail: ros.schacht@labmark.com.au
Web: www.labmark.com.au

Client Details

Safety Precaution: labo
acid / chemicals, refer to SAFETEV label on bottle.

Company & Address: Macquarie Geotech 2/6 Kirkcaldy St Bathurst Tel: 6332 2011
Project Manager: Robert Cox Sampler: Brad Morris Fx: 6324 4213
Project Name: Sweet Briar Estate
Project Number: 05-3014

Date Required:

Lab. Quote No:

Global Specifications I require

(default is Not required if Not ticked):

1. Urgent TAT required? (please circle: 1 day 2 days 3 days days)
2. Fast TAT Guarantee required? (Surcharge may apply - Receipt cutoff time 3.00pm)
3. Do you wish sediment present in waters to be included in organic/inorganic extractions?
4. Additional QA/QC reported where sample batches submitted are < 10 samples?
5. Do you require DIFFERENT standard EQL's from those stated @ www.labmark.com.au?
6. Do you wish chromatograms to be supplied? (Additional fee applies).
7. Electronic data transfer (circle: fax xls csv pdf)?

Note 1: Additional water sample must be submitted for lab. duplicate & spike analysis.
Note 2: Contact lab if consolidating multiple analyses into a single sample container.

Analysis Request

YES (tick)

Volatile Tests	Semi- & Non-Volatile Tests	Leach	Nutrient Tests		Other (eg. TCLP tests here)
			125g (max. 4 tests)	125g (max. 4 tests) 0.1 - 1L (chemical groups)	
244	500 ml	500 ml	500 ml	500 ml	
243	200 ml	200 ml	200 ml	200 ml	
242	100 ml	100 ml	100 ml	100 ml	
241	50 ml	50 ml	50 ml	50 ml	
240	25 ml	25 ml	25 ml	25 ml	
239	12.5 ml	12.5 ml	12.5 ml	12.5 ml	
238	6.25 ml	6.25 ml	6.25 ml	6.25 ml	
237	3.125 ml	3.125 ml	3.125 ml	3.125 ml	
236	1.5625 ml	1.5625 ml	1.5625 ml	1.5625 ml	
235	0.78125 ml	0.78125 ml	0.78125 ml	0.78125 ml	
234	0.390625 ml	0.390625 ml	0.390625 ml	0.390625 ml	
233	0.1953125 ml	0.1953125 ml	0.1953125 ml	0.1953125 ml	
232	0.09765625 ml	0.09765625 ml	0.09765625 ml	0.09765625 ml	
231	0.048828125 ml	0.048828125 ml	0.048828125 ml	0.048828125 ml	
230	0.0244140625 ml	0.0244140625 ml	0.0244140625 ml	0.0244140625 ml	
229	0.01220703125 ml	0.01220703125 ml	0.01220703125 ml	0.01220703125 ml	
228	0.006103515625 ml	0.006103515625 ml	0.006103515625 ml	0.006103515625 ml	
227	0.0030517578125 ml	0.0030517578125 ml	0.0030517578125 ml	0.0030517578125 ml	
226	0.00152587890625 ml	0.00152587890625 ml	0.00152587890625 ml	0.00152587890625 ml	
225	0.000762939453125 ml	0.000762939453125 ml	0.000762939453125 ml	0.000762939453125 ml	
224	0.0003814697265625 ml	0.0003814697265625 ml	0.0003814697265625 ml	0.0003814697265625 ml	
223	0.00019073486328125 ml	0.00019073486328125 ml	0.00019073486328125 ml	0.00019073486328125 ml	
222	0.000095367431640625 ml	0.000095367431640625 ml	0.000095367431640625 ml	0.000095367431640625 ml	
221	0.0000476837158203125 ml	0.0000476837158203125 ml	0.0000476837158203125 ml	0.0000476837158203125 ml	
220	0.00002384185791015625 ml	0.00002384185791015625 ml	0.00002384185791015625 ml	0.00002384185791015625 ml	
219	0.000011920928955078125 ml	0.000011920928955078125 ml	0.000011920928955078125 ml	0.000011920928955078125 ml	
218	0.0000059604644775390625 ml	0.0000059604644775390625 ml	0.0000059604644775390625 ml	0.0000059604644775390625 ml	
217	0.00000298023223876953125 ml	0.00000298023223876953125 ml	0.00000298023223876953125 ml	0.00000298023223876953125 ml	
216	0.000001490116119384765625 ml	0.000001490116119384765625 ml	0.000001490116119384765625 ml	0.000001490116119384765625 ml	
215	0.0000007450580596923828125 ml	0.0000007450580596923828125 ml	0.0000007450580596923828125 ml	0.0000007450580596923828125 ml	
214	0.00000037252902984619140625 ml	0.00000037252902984619140625 ml	0.00000037252902984619140625 ml	0.00000037252902984619140625 ml	
213	0.000000186264514923095703125 ml	0.000000186264514923095703125 ml	0.000000186264514923095703125 ml	0.000000186264514923095703125 ml	
212	0.0000000931322574615478515625 ml	0.0000000931322574615478515625 ml	0.0000000931322574615478515625 ml	0.0000000931322574615478515625 ml	
211	0.00000004656612873077392578125 ml	0.00000004656612873077392578125 ml	0.00000004656612873077392578125 ml	0.00000004656612873077392578125 ml	
210	0.000000023283064365386962890625 ml	0.000000023283064365386962890625 ml	0.000000023283064365386962890625 ml	0.000000023283064365386962890625 ml	
209	0.0000000116415321826934814453125 ml	0.0000000116415321826934814453125 ml	0.0000000116415321826934814453125 ml	0.0000000116415321826934814453125 ml	
208	0.00000000582076609134674072265625 ml	0.00000000582076609134674072265625 ml	0.00000000582076609134674072265625 ml	0.00000000582076609134674072265625 ml	
207	0.000000002910383045673370361328125 ml	0.000000002910383045673370361328125 ml	0.000000002910383045673370361328125 ml	0.000000002910383045673370361328125 ml	
206	0.0000000014551915228366851806640625 ml	0.0000000014551915228366851806640625 ml	0.0000000014551915228366851806640625 ml	0.0000000014551915228366851806640625 ml	
205	0.00000000072759576141834259033203125 ml	0.00000000072759576141834259033203125 ml	0.00000000072759576141834259033203125 ml	0.00000000072759576141834259033203125 ml	
204	0.000000000363797880709171295166015625 ml	0.000000000363797880709171295166015625 ml	0.000000000363797880709171295166015625 ml	0.000000000363797880709171295166015625 ml	
203	0.0000000001818989403545856475830078125 ml	0.0000000001818989403545856475830078125 ml	0.0000000001818989403545856475830078125 ml	0.0000000001818989403545856475830078125 ml	
202	0.00000000009094947017729282379150390625 ml	0.00000000009094947017729282379150390625 ml	0.00000000009094947017729282379150390625 ml	0.00000000009094947017729282379150390625 ml	
201	0.000000000045474735088646411895751953125 ml	0.000000000045474735088646411895751953125 ml	0.000000000045474735088646411895751953125 ml	0.000000000045474735088646411895751953125 ml	
200	0.0000000000227373675443232059478759765625 ml	0.0000000000227373675443232059478759765625 ml	0.0000000000227373675443232059478759765625 ml	0.0000000000227373675443232059478759765625 ml	
199	0.00000000001136868377216160297393798828125 ml	0.00000000001136868377216160297393798828125 ml	0.00000000001136868377216160297393798828125 ml	0.00000000001136868377216160297393798828125 ml	
198	0.000000000005684341886080801486968994140625 ml	0.000000000005684341886080801486968994140625 ml	0.000000000005684341886080801486968994140625 ml	0.000000000005684341886080801486968994140625 ml	
197	0.000000000002842170943040400743484497072265625 ml	0.000000000002842170943040400743484497072265625 ml	0.000000000002842170943040400743484497072265625 ml	0.000000000002842170943040400743484497072265625 ml	
196	0.0000000000014210854715202003717422485361328125 ml	0.0000000000014210854715202003717422485361328125 ml	0.0000000000014210854715202003717422485361328125 ml	0.0000000000014210854715202003717422485361328125 ml	
195	0.00000000000071054273576010018587112426806640625 ml	0.00000000000071054273576010018587112426806640625 ml	0.00000000000071054273576010018587112426806640625 ml	0.00000000000071054273576010018587112426806640625 ml	
194	0.000000000000355271367880050092935562134033203125 ml	0.000000000000355271367880050092935562134033203125 ml	0.000000000000355271367880050092935562134033203125 ml	0.000000000000355271367880050092935562134033203125 ml	
193	0.0000000000001776356839400250464677810670166015625 ml	0.0000000000001776356839400250464677810670166015625 ml	0.0000000000001776356839400250464677810670166015625 ml	0.0000000000001776356839400250464677810670166015625 ml	
192	0.00000000000008881784197001252323389053350330078125 ml	0.00000000000008881784197001252323389053350330078125 ml	0.00000000000008881784197001252323389053350330078125 ml	0.00000000000008881784197001252323389053350330078125 ml	
191	0.000000000000044408920985006261616945266751650390625 ml	0.000000000000044408920985006261616945266751650390625 ml	0.000000000000044408920985006261616945266751650390625 ml	0.000000000000044408920985006261616945266751650390625 ml	
190	0.0000000000000222044604925031308084726333757751953125 ml	0.0000000000000222044604925031308084726333757751953125 ml	0.0000000000000222044604925031308084726333757751953125 ml	0.0000000000000222044604925031308084726333757751953125 ml	
189	0.00000000000001110223024625156540423631668788759765625 ml	0.00000000000001110223024625156540423631668788759765625 ml	0.00000000000001110223024625156540423631668788759765625 ml	0.00000000000001110223024625156540423631668788759765625 ml	
188	0.00000000000000555111512312578270211815833439429296875 ml	0.00000000000000555111512312578270211815833439429296875 ml	0.00000000000000555111512312578270211815833439429296875 ml	0.00000000000000555111512312578270211815833439429296875 ml	
187	0.000000000000002775557561562891351059079167197146484375 ml	0.000000000000002775557561562891351059079167197146484375 ml	0.000000000000002775557561562891351059079167197146484375 ml	0.000000000000002775557561562891351059079167197146484375 ml	
186	0.0000000000000013877787807814456755295395835985722421875 ml	0.0000000000000013877787807814456755295395835985722421875 ml	0.0000000000000013877787807814456755295395835985722421875 ml	0.0000000000000013877787807814456755295395835985722421875 ml	
185	0.00000000000000069388939039072283776476979179928612109375 ml	0.00000000000000069388939039072283776476979179928612109375 ml	0.00000000000000069388939039072283776476979179928612109375 ml	0.00000000000000069388939039072283776476979179928612109375 ml	
184	0.000000000000000346944695195361418882384895899643060546875 ml	0.000000000000000346944695195361418882384895899643060546875 ml	0.000000000000000346944695195361418882384895899643060546875 ml	0.000000000000000346944695195361418882384895899643060546875 ml	
183	0.0000000000000001734723475976807094411924479498215302734375 ml	0.0000000000000001734723475976807094411924479498215302734375 ml	0.0000000000000001734723475976807094411924479498215302734375 ml	0.0000000000000001734723475976807094411924479498215302734375 ml	
182	0.00000000000000008673617379884035472059622397491076513671875 ml	0.00000000000000008673617379884035472059622397491076513671875 ml	0.00000000000000008673617379884035472059622397491076513671875 ml	0.00000000000000008673617379884035472059622397491076513671875 ml	
181	0.000000000000000043368086899420177360298111987453756568359375 ml	0.000000000000000043368086899420177360298111987453756568359375 ml	0.000000000000000043368086899420177360298111987453756568359375 ml	0.000000000000000043368086899420177360298111987453756568359375 ml	
180	0.0000000000000000216840434497100886801490559937268782841796875 ml	0.0000000000000000216840434497100886801490559937268782841796875 ml	0.0000000000000000216840434497100886801490559937268782841796875 ml	0.0000000000000000216840434497100886801490559937268782841796875 ml	
179	0.000000000000000010842021724855044340074527996863439142089375 ml	0.000000000000000010842021724855044340074527996863439142089375 ml	0.000000000000000010842021724855044340074527996863439142089375 ml	0.000000000000000010842021724855044340074527996863439142089375 ml	
178	0.0000000000000000054210108624275221700372639984317195710446875 ml	0.000000000000000005421010862427522170			

Appendix C

Environmental Limitations

LIMITATIONS OF ENVIRONMENTAL SITE INVESTIGATION

Scope of Services

This report has been prepared for the Client in accordance with the Services Engagement Form (SEF), or as otherwise agreed, between the Client and Macquarie Geotechnical.

Reliance on Data

Macquarie Geotechnical has relied upon data and other information provided by the Client and other individuals. Macquarie Geotechnical has not verified the accuracy or completeness of the data, except as otherwise stated in the report. Recommendations in the report are based on the data.

Macquarie Geotechnical will not be liable in relation to incorrect recommendations should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed.

Environmental Investigation

Findings of Environmental Investigations are based extensively on judgment and experience. Environmental reports are prepared to meet the specific needs of individual clients. This report was prepared expressly for the Client and expressly for the Clients purposes.

Limitations of Site investigation

As a result of the limited number of sub-surface excavations or boreholes there is the possibility that variations may occur between test locations. The investigation undertaken is an estimate of the general profile of the subsurface conditions. The data derived from the investigation and laboratory testing are extrapolated across the site to form a geological model. This geological model infers the subsurface conditions and their likely behavior with regard to the proposed development.

The actual conditions at the site might differ from those inferred to exist.

No subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

Environmental Conclusions

This report is based on a subsurface investigation, which was designed for project-specific factors. Unless further advice is obtained this report cannot be applied to an adjacent site nor can it be used when the nature of any proposed development is changed.

The conclusions are based upon the data and the environmental filed monitoring and/or testing and are therefore merely indicative of the environmental condition of the site at the time of preparing the report.

Time Dependence

This report is based on conditions, which existed at the time of subsurface exploration. Construction operations at or adjacent to the site, and natural events such as floods, or groundwater fluctuations, may also affect subsurface conditions, and thus the continuing adequacy of a geotechnical report.

Macquarie Geotechnical should be kept appraised of any such events, and should be consulted for further geotechnical advice if any changes are noted.

Avoid Misinterpretation

A geotechnical engineer or engineering geologist should be retained to work with other design professionals explaining relevant geotechnical findings and in reviewing the adequacy of their plans and specifications relative to geotechnical issues.

No part of this report should be separated from the Final Report.

Sub-surface Logs

Sub-surface logs are developed by geoscientific professionals based upon their interpretation of field logs and laboratory evaluation of field samples. These logs should not under any circumstances be redrawn for inclusion in any drawings.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendations and should make their own enquiries and obtain independent advice in relation to such matters

Macquarie Geotechnical assumes no responsibility and will not be liable to any other person or organisations for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisations arising from matters dealt with or conclusions expressed in the report.

Other limitations

Macquarie Geotechnical will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

Other Information

For further information reference should be made to "Guidelines for the Provision of Geotechnical Information in Construction Contracts" published by the Institution of Engineers Australia, 1987.