La Vie Developments Pty Ltd

Stage 1 Land Contamination Assessment: Lot 22 DP 607750 and Lot 4 DP 258024 Corner Avondale Road and Huntley Road, Huntley, NSW

martens consulting engineers

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May 2009

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All enquiries regarding this project are to be directed to the Project Manager.

Contents

1 Introduction

1.1 Project Scope

Martens & Associates Pty Ltd has prepared this Stage 1 Land Contamination Assessment for La Vie Developments to form part of a development application for a proposed private hospital and health care campus on Lot 22 DP 607750 and Lot 4 DP 258024, corner Avondale Road and Huntley Road, Huntley, NSW.

The Stage 1 assessment included site history review and some preliminary soil testing. The purpose of the assessment is to ascertain the suitability of the site for the proposed development and to determine if further site analysis (complete Stage 2 soil testing) is required.

The assessment is prepared in accordance with the following guidelines:

- NSW EPA Contaminated Sites guidelines for preliminary contaminated land assessments (1998); and
- SEPP 55 – Remediation of Land (Managing Land Contamination Guidelines).

1.2 Development Proposal

We understood that the 'Illawarra International Health Precinct' hospital and health care campus is to include the following key components as shown on the proposed development plan (Attachment A):

- Specialist consultation suites and day surgery;
- 24 hour radiology and pathology;
- Hospital casualty and 24 hour medical centre;
- Stand alone obstetrics unit;
- 352 bed private tertiary referral hospital;
- Shopping plaza incorporating a range of specialist retailers including newsagency, convenience store, florist, café, restaurant and professional suites;
- Commercial laundry, dry cleaner and car washing facility;
- Accommodation for nursing staff, medical students, resident medical officers and registrar (30 one-bedroom and 20 two-bedroom serviced apartments, 4 meeting rooms and one training room);

- Further education facility including 80 one-bedroom serviced apartments, 4 meeting rooms and 2 conference rooms;
- Aged and disability centre; and
- 46 seniors independent living houses.

The proposal will be staged to develop over the next 8 – 12 years, matching growth in the adjacent West Dapto release area.

2 Site Description

2.1 Location

The subject site (Lot 22 DP 607750 and Lot 4 DP 258024) is located at the corner of Avondale Road and Huntley Road, Huntley, NSW and is within the Wollongong City Council Local Government Area. It is bordered by Huntley Road to the south, Avondale Road to the west and north, and Goolagong Street to the east (Figure 1).

The site is currently pasture and has an area of approximately 10.5 ha. Refer to Attachment A for a site plan. Surrounding land use is generally low density residential to the east and rural pastures west and south of the site.

Figure 1: Site location.

2.2 Field Investigations

Site inspections were undertaken on the 3rd December 2008 and included the following:

- Walkover inspection of the site to assess existing conditions and identify any evidence of past contaminating land uses; and
- Excavation of 15 boreholes generally to 1 – 3 m depth using a hydraulic auger to allow for the characterisation of site soils and geology and to collect soil samples for laboratory analysis.

2.3 Topography and Drainage

The site has grades of up to approximately 15% east and west of a knoll near the middle of the site and shallower grades on the northern and southern hillsides. Elevation ranges between 30 – 48 mAHD. No surface drainage lines were observed on the site, nor were there any indications of springs or seepage at the time of inspection. Runoff drains from the centre of the site towards the boundaries, following natural contours. Borehole logs are provided as Attachment D.

2.4 Soils and Geology

The Kiama 1:100,000 Soil Landscape Sheet (Hazelton, 1992) identifies the site as having soils of the Shellharbour soil landscape group. The Shellharbour soil landscape group consists of deep Prairie soils on crests and upper slopes, Brown krasnozems on midslopes, and Red podzolic soils and Prairie soils on lower slopes and drainage plains.

Geological mapping (Wollongong 1:250,000, NSW Dept. Mines, 1966) indicates that the site is underlain by Budgong sandstones and also close to the influence of Illawarra Lake alluvium deposits.

On-site subsurface investigations indicated that the site is predominantly covered by silt topsoils underlain by clay with siltstone and shale bedrock. Soil depth was found to range between 0.15 m and 2.2 m.

2.5 Groundwater

Site subsurface investigations to maximum depth 3.0 m / into bedrock did not encounter groundwater. Based on site topography we estimate that the permanent groundwater table would exist within the bedrock at more than 5 m below ground level at the site. Ephemeral groundwater is likely to collect at the soil / rock interface after periods of substantial or prolonged rainfall.

3 Site History Review

3.1 Overview

A review of site use and development history has been completed based on an examination of site aerial photographs and Council development application (DA) records. This was done to assess the risk of past landuse practices resulting in site contamination.

3.2 Land Use and Council DA/BA Historical Records

The current land use of the site comprises cleared grassland sustaining grazing activities. A transmission and natural gas easement traverses the site in a north-south direction with an overhead power line located on the easement. There are no other improvements on the site.

A summary of DA records to date was acquired from Wollongong City Council. Council indicated that no approvals were recorded for the site (both Lot 22 DP 607750 and Lot 4 DP 258024) and that only two development applications had been received. The records indicate that no distinct forms of development which are frequently associated with site contamination have existed on the site. Refer to Table 1 for a summary of DA records to date.

Table 1: Summary of DA records to date for the site (Source: Wollongong Council, 2008).

Year	Development Application Summary	Development Application Verdict
1995	Proposed 40 bed nursing home	Withdrawn
1995	Master Plan for proposed retirement village	Withdrawn
1998	Proposed private tertiary referral hospital	-

3.3 Zoning

The site is currently zoned *1 Non Urban* under the Wollongong Local Environmental Plan 1990. Surrounding areas are exclusively *2(a) Residential –Low Density* to the east of the site and *1 Non Urban* west of the site.

The draft West Dapto LEP also applies to the site. Under the draft LEP, the site is zoned:

- Mostly R2 Low Density Residential;
- Some R3 Medium Density Residential and
- B1 Neighbourhood Centre; and
- An easement of SP2 Infrastructure.

Surrounding areas are mostly *R2 Low Density Residential* with some *RU2 Rural Landscape* areas also.

3.4 Historical Aerial Photograph Analysis

Historical aerial photographs taken of the site during 1949, 1961, 1973 and 1990 were reviewed in order to investigate the history of site land use. A copy of each photo is provided in Attachment B.

Aerial photos of 1949, 1961, 1973 and 1990 indicate that the site was cleared prior to 1949 and has been used as pasture since then. No development is evident on the site until the appearance of a transmission tower in the 1973 photograph, located approximately in the same location as the present transmission tower on-site. Refer to Table 2 for an aerial photograph summary description.

Table 2: Aerial photograph description summary for the site and surrounding area.

Year	Description
1949	No visible structures on site. Visible dwellings widely scattered in the region surrounding the site. Land in area of the site appears to be used for grazing/agricultural purposes. Bushland to the south and east of the site.
1961	As above. More dwellings to the north and east, laid out in urban blocks. Transmission lines to the south of the site.
1973	Huntley Road exists on the southern site boundary. Areas to the north and the east of the site are developed. Areas to the west and south still rural holdings. Transmission tower onsite.
1990	Areas to the north and south of the site are extensively developed. Goolagong Street exists on the eastern site boundary of the site. Areas to the south and west of the site appear to be rural holdings.

3.5 Site History Implications

The results of the site history review (historical aerial photographs and Council DA records) suggest that the site has been used exclusively as grazing pastures for at least the last 60 years and the potential for site contamination is low. There is only a minor potential for site contamination associated with past agricultural activities.

4 Preliminary Soil Testing

4.1 Potential Contamination

Review of the site's land use history indicates that it has previously been used for grazing pastures. There is only a minor potential for contaminants associated with agricultural land use such as pesticides and spilled or leaked chemicals and hydrocarbons. On this basis, some further soil testing and analysis were undertaken for screening purposes.

4.2 Site Investigations

A total of 15 boreholes were drilled across the site as a screening measure. The borehole logs are provided in Attachment D and summarised below in Table 3. The site investigations found that there is no visual or odour evidence of contamination.

Table 3: Borehole observations from Lot 22 DP 607750 and Lot 4 DP 258024, Huntley NSW.

Borehole	Fill Present?	Odour?	Comment
1	No	No	No other indication of contamination
2	No	No	No other indication of contamination
3	No	No	No other indication of contamination
4	No	No	No other indication of contamination
5	No	No	No other indication of contamination
6	No	No	No other indication of contamination
7	No	No	No other indication of contamination
8	No	No	No other indication of contamination
9	No	No	No other indication of contamination
10	No	No	No other indication of contamination
11	No	No	No other indication of contamination
12	No	No	No other indication of contamination
13	No	No	No other indication of contamination
14	No	No	No other indication of contamination
15	No	No	No other indication of contamination

Six soil samples were collected from the site and submitted for laboratory testing. A sampling density in accordance with NSW EPA (1995) Contaminated Sites Sampling Design Guidelines was not warranted based on the completed site history review (Stage 1 assessment).

Samples were collected at 0.5 m depth at each borehole location BH2, BH4, BH6, BH9, BH12, and BH14, shown on the site plan (Attachment A).

4.3 Laboratory Analysis

The soil samples submitted for laboratory analysis are shown in Table 4. Laboratory analysis was conducted by Envirolab Services and the selected range of analyses targeted the most likely contaminants based on site history (agricultural land use). A duplicate sample was submitted as a quality control and assurance measure (2279/12/0.5).

Table 4: Soil samples submitted for laboratory analysis from Lot 22 DP 607750 and Lot 4 DP 258024, Huntley NSW.

Count	Sample	Heavy Metals[1]	OCP/OPP/ PCB	TPH (C6 – C36) & BTEX	PAH	Herbicides
1	2279/9/0.5	X	X	X	X	
2	2279/2/0.5	X	X	X	X	
3	2279/4/0.5	X	X	X	X	X[2]
4	2279/6/0.5	X	X	X	X	
5	2279/12/0.5	X	X	X	X	
6	2279/14/0.5	X	X	X	X	
7	2279/12/0.5[3]	X				

Notes: [1] Heavy metals include As, Cd, Cr, Cu, Pb, Hg, Ni and Zn.

[2] Herbicide tested for is Triazine.

[3] Duplicate

4.4 Contamination Guidelines

Soil sample laboratory analysis results were assessed with reference to the following guidelines:

- NSW EPA (2006) *Guidelines for the NSW Site Auditor Scheme: Health-based Soil Investigation Levels: Column 1: Residential with gardens and accessible soil* (for assessment of heavy metals, TPH, PAH, OCP/OPP and PCB concentrations); and
- NSW EPA (1994) *Contaminated Sites: Guidelines for Assessing Service Station Sites: Table 3: Threshold concentrations for sensitive land use – soils* (for assessment of BTEX concentrations).

4.5 Laboratory Analysis Results

All results are below the guideline levels and, except for heavy metals, all results are less than laboratory detection limits. Heavy metal concentrations are shown in Table 5 and the complete laboratory test report is provided as Attachment C.

Table 5: Heavy metal concentrations in soil samples from Lot 22 DP 607750 and Lot 4 DP 258024, Huntley NSW. Units are mg/kg.

Sample	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
2279/9/0.5	<4	<0.5	29	21	16	<0.1	8	28
2279/2/0.5	<4	<0.5	27	14	11	<0.1	7	20
2279/4/0.5	<4	<0.5	22	13	8	<0.1	6	18
2279/6/0.5	<4	<0.5	32	16	17	<0.1	7	19
2279/12/0.5	<4	<0.5	42	26	13	<0.1	11	42
2279/14/0.5	<4	<0.5	20	13	10	<0.1	7	22
2279/12/0.5	<4	<0.5	36	21	10	<0.1	9	31
Guideline Limit[1]	**100**	**20**	**100**	**1,000**	**300**	**15**	**600**	**7000**

Notes: [1] NSW EPA (2006) *Guidelines for the NSW Site Auditor Scheme: Health-based Soil Investigation Levels: Column 1: Residential with gardens and accessible soil.*

4.6 Quality Control and Assurance

The results from duplicate samples were generally within 20% of each other and indicate that sampling and testing procedures used were reliable.

As noted in the Envirolab laboratory report (Attachment C), the laboratory QA/QC included the analysis of reagent blanks, sample portion duplicates, matrix spike duplicates and surrogate spikes. Results indicate that acceptable recovery rates were achieved by the laboratory.

5 Conclusions and Recommendations

A Stage 1 land contamination assessment has been completed at Lot 22 DP 607750 and Lot 4 DP 258024, corner Avondale Road and Huntley Road, Huntley, NSW, where a hospital and health care campus is proposed. The Stage 1 assessment included site history review (historical aerial photographs and Council DA records) and site investigations at 15 borehole locations across the study area supplemented by screening laboratory soil testing.

The results of the site history review indicated that the potential for site contamination is very low. Preliminary soil investigations did not find any site contamination. On this basis, further site assessment is not considered necessary and the site is deemed to be suitable for the proposed development.

6 Limitations Statement

The site Stage 1 contamination assessment was undertaken in accordance with current industry standards. However, no site history analysis or sampling strategy can be considered to be a complete and exhaustive characterisation of a site and it cannot be guaranteed that any assessment shall identify and characterise all areas of potential contamination. Therefore, this report should not be read as a guarantee that no contamination will be found on the site. Should material be exposed during the site development process which appears, due to visual indications or odours, to be contaminated, the material should be assessed by Martens & Associates to determine contamination and land use implications.

Martens & Associates Pty Ltd has undertaken this assessment for the purposes of a proposed hospital and health care campus at the site. No reliance on this report should be made for any other investigation or proposal. Martens & Associates accepts no responsibility, and provides no guarantee, regarding the characteristics of areas of the site not specifically sampled in this investigation.

7 References

Hazelton (1992) Kiama 1:100,000 Soil Landscape Sheet, Soil Conservation Service of NSW.

Department of Urban Affairs and Planning and Environment Protection Authority (1998) SEPP 55 – Managing Land Contamination: Planning Guidelines SEPP 55 - Remediation of Land.

NSW EPA Contaminated Sites guidelines for preliminary contaminated land assessments (1998).

NSW EPA (1995) Contaminated Sites Sampling Design Guidelines.

NSW EPA (2006) *Guidelines for the NSW Site Auditor Scheme.*

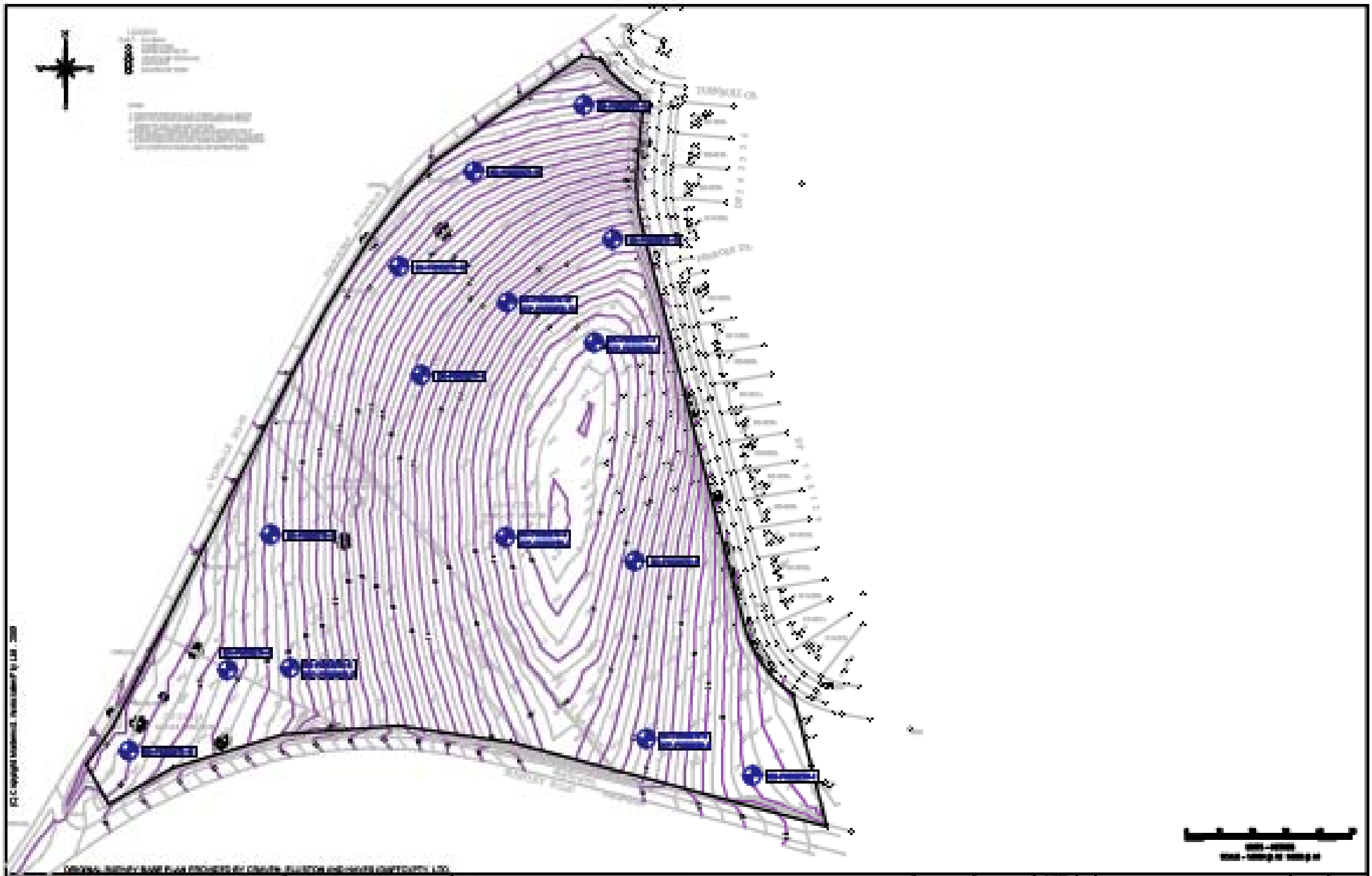
NSW EPA (1994) *Contaminated Sites: Guidelines for Assessing Service Station Sites.*

NSW Dept. Mines (1966), Wollongong 1:250,000 Geological Sheet.

Wollongong City Council (1990) Wollongong Local Environmental Plan.

Wollongong City Council (2007) Draft West Dapto LEP

8 Attachment A – Site Plan



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Hydraulic - Wastewater Engineers

BRETT BOSLEY/
CONTAMINATION ASSESSMENT

SITE PLAN - CNR HUNTLEY AND AVONDALE ROAD (LOTS 22 DP 667750 AND 4 DP 259824)

1	ILLAWARRA INTERNATIONAL SPECIALIST AND SUBSPECIALTIES INCLUDING 40 OVERNIGHT BEDS 4 ICU BEDS AND 6 HIGH DEPENDENCY BEDS INCLUDING AUGMENTATION OF SERVICES TO SITE	3 HO STOREYS
2	PATHOLOGY & RADIOLOGY UNITS	3 HO STOREYS
3	34 BED MEDICAL CENTRE DEDICATED TRAUMA THEATRES, PHARMACY & CASUALTY WITH 10 OVERNIGHT BEDS	3 HO STOREYS
4	STAND ALONE OBSTETRIC UNIT WITH 20 OVERNIGHT CHAMBER SUITES DEDICATED CAESAREAN SECTION THEATRE	3 HO STOREYS
5A	ILLAWARRA INTERNATIONAL HOSPITAL WITH 300 OVERNIGHT BEDS	6 STOREYS
5B	RETAIL SHOPPING PLAZA	3 STOREYS
5C	LAUNDRY & DRY CLEANERS, MAINTENANCE WORKSHOP	3 STOREYS
6	HOUSES, RESIDENT MEDICAL OFFICERS & MEDICAL STUDENT ACCOMMODATION INTEGRAL WITH THE TERTIARY REFERRAL HOSPITAL EDUCATIONAL PROGRAMME	3 STOREYS
7	EDUCATION FACILITY WITH ASSOCIATED ACCOMMODATION FOR 70 SEATS (RELATIVES & OUTPATIENT ACCOMMODATION WHILE UNDERGOING EXTENDED THERAPIES	3 STOREYS EASTERN END 6 STOREYS WESTERN END
8A	ILLAWARRA INTERNATIONAL AGED & DISABILITY CENTRE WITH 200 BEDS MENTAL HEALTH CARE	3 STOREYS EASTERN END 6 STOREYS WESTERN END
8B	ACCOMMODATION FOR 200 OPS	3 STOREYS WESTERN END

NOTES:

A MINIMUM OF 3.0m SETBACK HAS BEEN PROVIDED TO ALL BOUNDARIES WITH THE EXCEPTION OF THE RETAIL COMPONENT LOCATED AT THE AVONDALE ROAD AND HEWITLEY ROAD INTERSECTION.

3.0m SHAREWAY FOR PEDESTRIAN & CYCLEWAY HAS BEEN PROVIDED TO PERIMETER OF SITE.

MOTORCYCLE, BICYCLE & DISABLED PARKING TO BE DISTRIBUTED THROUGHOUT SITE.

CARPARKING TO BE DESIGNED IN ACCORDANCE WITH AS 2890.1. CARPARKING AT RIGHT ANGLES AVONDALE ROAD SHORT TERM FOR SHOPPING CENTRE - 40 SPACES.

1 **Site Plan**
1 : 1000

ILLAWARRA INTERNATIONAL HEALTH PRECINCT
Avondale Rd, Huntley
LA NEOR DEVELOPMENTS

Site Plan

EA Submission

9 Attachment B – Historical Aerial Photographs

10 Attachment C – Laboratory Test Report

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CERTIFICATE OF ANALYSIS 24867

Client:
Martens & Associates
6/37 Leighton Place
Hornsby
NSW 2077

Attention: Ben Rose

Sample log in details:

Your Reference:	**P0802279**
No. of samples:	7 Soils
Date samples received:	05/12/08
Date completed instructions received:	05/12/08

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

Report Details:

Date results requested by:	16/12/08
Date of Preliminary Report:	24/12/08
Issue Date:	6/01/09

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Tests not covered by NATA are denoted with *.

Results Approved By:

David Springett
Business Development & Quality Manager

vTPH & BTEX in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-1 2279/9/0.5 3/12/2008 Soil	24867-2 2279/2/0.5 3/12/2008 Soil	24867-3 2279/4/0.5 3/12/2008 Soil	24867-4 2279/6/0.5 3/12/2008 Soil	24867-5 2279/12/0.5 3/12/2008 Soil
Date extracted	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Date analysed	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
vTPH C6 - C9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	131	102	103	101	106

vTPH & BTEX in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-6 2279/14/0.5 3/12/2008 Soil
Date extracted	-	8/12/2008
Date analysed	-	8/12/2008
vTPH C6 - C9	mg/kg	<25
Benzene	mg/kg	<0.5
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1.0
m+p-xylene	mg/kg	<2.0
o-Xylene	mg/kg	<1.0
Surrogate aaa-Trifluorotoluene	%	109

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	24867-1	24867-2	24867-3	24867-4	24867-5
Your Reference	----------	2279/9/0.5	2279/2/0.5	2279/4/0.5	2279/6/0.5	2279/12/0.5
Date Sampled	----------	3/12/2008	3/12/2008	3/12/2008	3/12/2008	3/12/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Date analysed	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TPH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	102	103	105	101	104

sTPH in Soil (C10-C36)		
Our Reference:	UNITS	24867-6
Your Reference	----------	2279/14/0.5
Date Sampled	----------	3/12/2008
Type of sample		Soil
Date extracted	-	8/12/2008
Date analysed	-	8/12/2008
TPH C_{10} - C_{14}	mg/kg	<50
TPH C_{15} - C_{28}	mg/kg	<100
TPH C_{29} - C_{36}	mg/kg	<100
Surrogate o-Terphenyl	%	103

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-1 2279/9/0.5 3/12/2008 Soil	24867-2 2279/2/0.5 3/12/2008 Soil	24867-3 2279/4/0.5 3/12/2008 Soil	24867-4 2279/6/0.5 3/12/2008 Soil	24867-5 2279/12/0.5 3/12/2008 Soil
Date extracted	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Date analysed	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	101	99	106	99	100

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-6 2279/14/0.5 3/12/2008 Soil
Date extracted	-	8/12/2008
Date analysed	-	8/12/2008
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Surrogate p-Terphenyl-d_{14}	%	104

Organochlorine Pesticides in soil						
Our Reference:	UNITS	24867-1	24867-2	24867-3	24867-4	24867-5
Your Reference	----------	2279/9/0.5	2279/2/0.5	2279/4/0.5	2279/6/0.5	2279/12/0.5
Date Sampled	----------	3/12/2008	3/12/2008	3/12/2008	3/12/2008	3/12/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Date analysed	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	107	105	109	106	106

Organochlorine Pesticides in soil		
Our Reference:	UNITS	24867-6
Your Reference	----------	2279/14/0.5
Date Sampled	----------	3/12/2008
Type of sample		Soil
Date extracted	-	8/12/2008
Date analysed	-	8/12/2008
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCLMX	%	104

Organophosphorus Pesticides Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-1 2279/9/0.5 3/12/2008 Soil	24867-2 2279/2/0.5 3/12/2008 Soil	24867-3 2279/4/0.5 3/12/2008 Soil	24867-4 2279/6/0.5 3/12/2008 Soil	24867-5 2279/12/0.5 3/12/2008 Soil
Date extracted	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Date analysed	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	107	105	109	106	106

Organophosphorus Pesticides Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-6 2279/14/0.5 3/12/2008 Soil
Date extracted	-	8/12/2008
Date analysed	-	8/12/2008
Diazinon	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Surrogate TCLMX	%	104

PCBs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-1 2279/9/0.5 3/12/2008 Soil	24867-2 2279/2/0.5 3/12/2008 Soil	24867-3 2279/4/0.5 3/12/2008 Soil	24867-4 2279/6/0.5 3/12/2008 Soil	24867-5 2279/12/0.5 3/12/2008 Soil
Date extracted	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Date analysed	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	107	105	109	106	106

PCBs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-6 2279/14/0.5 3/12/2008 Soil
Date extracted	-	8/12/2008
Date analysed	-	8/12/2008
Arochlor 1016	mg/kg	<0.1
Arochlor 1232	mg/kg	<0.1
Arochlor 1242	mg/kg	<0.1
Arochlor 1248	mg/kg	<0.1
Arochlor 1254	mg/kg	<0.1
Arochlor 1260	mg/kg	<0.1
Surrogate TCLMX	%	104

Acid Extractable metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-1 2279/9/0.5 3/12/2008 Soil	24867-2 2279/2/0.5 3/12/2008 Soil	24867-3 2279/4/0.5 3/12/2008 Soil	24867-4 2279/6/0.5 3/12/2008 Soil	24867-5 2279/12/0.5 3/12/2008 Soil
Date digested	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Date analysed	-	9/12/2008	9/12/2008	9/12/2008	9/12/2008	9/12/2008
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	29	27	22	32	42
Copper	mg/kg	21	14	13	16	26
Lead	mg/kg	16	11	8	17	13
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	7	6	7	11
Zinc	mg/kg	28	20	18	19	42

Acid Extractable metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-6 2279/14/0.5 3/12/2008 Soil	24867-7 2279/12/0.5 3/12/2008 Soil
Date digested	-	8/12/2008	8/12/2008
Date analysed	-	9/12/2008	9/12/2008
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.5	<0.5
Chromium	mg/kg	20	36
Copper	mg/kg	13	21
Lead	mg/kg	10	10
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	7	9
Zinc	mg/kg	22	31

Moisture Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-1 2279/9/0.5 3/12/2008 Soil	24867-2 2279/2/0.5 3/12/2008 Soil	24867-3 2279/4/0.5 3/12/2008 Soil	24867-4 2279/6/0.5 3/12/2008 Soil	24867-5 2279/12/0.5 3/12/2008 Soil
Date prepared	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Date analysed	-	8/12/2008	8/12/2008	8/12/2008	8/12/2008	8/12/2008
Moisture	%	19	16	17	20	20

Moisture Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	24867-6 2279/14/0.5 3/12/2008 Soil	24867-7 2279/12/0.5 3/12/2008 Soil
Date prepared	-	8/12/2008	8/12/2008
Date analysed	-	8/12/2008	8/12/2008
Moisture	%	16	20

Herbicides in Soil		
Our Reference:	UNITS	24867-3
Your Reference	----------	2279/4/0.5
Date Sampled	----------	3/12/2008
Type of sample		Soil
Atrazine	mg/kg	<0.1
Hexazinone	mg/kg	<0.1
Metribuzine	mg/kg	<0.1
Prometryne	mg/kg	<0.1
Simazine	mg/kg	<0.1

Method ID	Methodology Summary
GC.16	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS.
GC.3	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
GC.12 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
GC-5	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
GC.8	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
GC-6	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals.20 ICP-AES	Determination of various metals by ICP-AES.
Metals.21 CV-AAS	Determination of Mercury by Cold Vapour AAS.
LAB.8	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.
Ext-020	Analysis subcontracted to Australian Government - National Measurement Institute. NATA Accreditation No: 198

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ‖ Duplicate ‖ %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			8/12/2008	24867-1	8/12/2008 ‖ 8/12/2008	LCS-4	8/12/2008
Date analysed	-			8/12/2008	24867-1	8/12/2008 ‖ 8/12/2008	LCS-4	8/12/2008
vTPH C_6 - C_9	mg/kg	25	GC.16	<25	24867-1	<25 ‖ <25	LCS-4	114%
Benzene	mg/kg	0.5	GC.16	<0.5	24867-1	<0.5 ‖ <0.5	LCS-4	98%
Toluene	mg/kg	0.5	GC.16	<0.5	24867-1	<0.5 ‖ <0.5	LCS-4	130%
Ethylbenzene	mg/kg	1	GC.16	<1.0	24867-1	<1.0 ‖ <1.0	LCS-4	116%
m+p-xylene	mg/kg	2	GC.16	<2.0	24867-1	<2.0 ‖ <2.0	LCS-4	113%
o-Xylene	mg/kg	1	GC.16	<1.0	24867-1	<1.0 ‖ <1.0	LCS-4	122%
Surrogate aaa-Trifluorotoluene	%		GC.16	106	24867-1	131 ‖ 112 ‖ RPD: 16	LCS-4	131%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ‖ Duplicate ‖ %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			8/12/08	24867-1	8/12/2008 ‖ 8/12/2008	LCS-4	8/12/08
Date analysed	-			8/12/08	24867-1	8/12/2008 ‖ 8/12/2008	LCS-4	8/12/08
TPH C_{10} - C_{14}	mg/kg	50	GC.3	<50	24867-1	<50 ‖ <50	LCS-4	76%
TPH C_{15} - C_{28}	mg/kg	100	GC.3	<100	24867-1	<100 ‖ <100	LCS-4	79%
TPH C_{29} - C_{36}	mg/kg	100	GC.3	<100	24867-1	<100 ‖ <100	LCS-4	79%
Surrogate o-Terphenyl	%		GC.3	101	24867-1	102 ‖ 103 ‖ RPD: 1	LCS-4	98%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ‖ Duplicate ‖ %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			8/12/2008	24867-1	8/12/2008 ‖ 8/12/2008	LCS-4	8/12/2008
Date analysed	-			8/12/2008	24867-1	8/12/2008 ‖ 8/12/2008	LCS-4	8/12/2008
Naphthalene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	92%
Acenaphthylene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	83%
Phenanthrene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	93%
Anthracene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	88%
Pyrene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	93%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ‖ Duplicate ‖ %RPD	Spike Sm#	Spike % Recovery
Benzo(a)anthracene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	97%
Benzo(b+k)fluoranthene	mg/kg	0.2	GC.12 subset	<0.2	24867-1	<0.2 ‖ <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	GC.12 subset	<0.05	24867-1	<0.05 ‖ <0.05	LCS-4	94%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	GC.12 subset	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		GC.12 subset	102	24867-1	101 ‖ 100 ‖ RPD: 1	LCS-4	96%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ‖ Duplicate ‖ %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			8/12/2008	24867-1	8/12/2008 ‖ 8/12/2008	LCS-4	8/12/2008
Date analysed	-			8/12/2008	24867-1	8/12/2008 ‖ 8/12/2008	LCS-4	8/12/2008
HCB	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	69%
gamma-BHC	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	60%
Heptachlor	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	71%
delta-BHC	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	69%
Heptachlor Epoxide	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	76%
gamma-Chlordane	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	75%
Dieldrin	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	77%
Endrin	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	80%
pp-DDD	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	79%
Endosulfan II	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	LCS-4	78%
Methoxychlor	mg/kg	0.1	GC-5	<0.1	24867-1	<0.1 ‖ <0.1	[NR]	[NR]
Surrogate TCLMX	%		GC-5	96	24867-1	107 ‖ 108 ‖ RPD: 1	LCS-4	97%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ǁ Duplicate ǁ %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			8/12/2008	24867-1	8/12/2008 ǁ 8/12/2008	LCS-4	8/12/2008
Date analysed	-			8/12/2008	24867-1	8/12/2008 ǁ 8/12/2008	LCS-4	8/12/2008
Diazinon	mg/kg	0.1	GC.8	<0.1	24867-1	<0.1 ǁ <0.1	[NR]	[NR]
Dimethoate	mg/kg	0.1	GC.8	<0.1	24867-1	<0.1 ǁ <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	0.1	GC.8	<0.1	24867-1	<0.1 ǁ <0.1	[NR]	[NR]
Ronnel	mg/kg	0.1	GC.8	<0.1	24867-1	<0.1 ǁ <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	GC.8	<0.1	24867-1	<0.1 ǁ <0.1	LCS-4	103%
Fenitrothion	mg/kg	0.1	GC.8	<0.1	24867-1	<0.1 ǁ <0.1	LCS-4	116%
Bromophos-ethyl	mg/kg	0.1	GC.8	<0.1	24867-1	<0.1 ǁ <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	GC.8	<0.1	24867-1	<0.1 ǁ <0.1	LCS-4	81%
Surrogate TCLMX	%		GC.8	96	24867-1	107 ǁ 108 ǁ RPD: 1	LCS-4	100%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ǁ Duplicate ǁ %RPD
Date extracted	-			8/12/2008	24867-1	8/12/2008 ǁ 8/12/2008
Date analysed	-			8/12/2008	24867-1	8/12/2008 ǁ 8/12/2008
Arochlor 1016	mg/kg	0.1	GC-6	<0.1	24867-1	<0.1 ǁ <0.1
Arochlor 1232	mg/kg	0.1	GC-6	<0.1	24867-1	<0.1 ǁ <0.1
Arochlor 1242	mg/kg	0.1	GC-6	<0.1	24867-1	<0.1 ǁ <0.1
Arochlor 1248	mg/kg	0.1	GC-6	<0.1	24867-1	<0.1 ǁ <0.1
Arochlor 1254	mg/kg	0.1	GC-6	<0.1	24867-1	<0.1 ǁ <0.1
Arochlor 1260	mg/kg	0.1	GC-6	<0.1	24867-1	<0.1 ǁ <0.1
Surrogate TCLMX	%		GC-6	96	24867-1	107 ǁ 108 ǁ RPD: 1

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ǁ Duplicate ǁ %RPD	Spike Sm#	Spike % Recovery
Date digested	-			08/12/08	24867-1	8/12/2008 ǁ 8/12/2008	LCS-1	08/2/08
Date analysed	-			09/12/08	24867-1	9/12/2008 ǁ 9/12/2008	LCS-1	09/12/08
Arsenic	mg/kg	4	Metals.20 ICP-AES	<4	24867-1	<4 ǁ <4	LCS-1	98%
Cadmium	mg/kg	0.5	Metals.20 ICP-AES	<0.5	24867-1	<0.5 ǁ <0.5	LCS-1	101%
Chromium	mg/kg	1	Metals.20 ICP-AES	<1	24867-1	29 ǁ 26 ǁ RPD: 11	LCS-1	100%
Copper	mg/kg	1	Metals.20 ICP-AES	<1	24867-1	21 ǁ 19 ǁ RPD: 10	LCS-1	104%
Lead	mg/kg	1	Metals.20 ICP-AES	<1	24867-1	16 ǁ 10 ǁ RPD: 46	LCS-1	98%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ‖ Duplicate ‖ %RPD	Spike Sm#	Spike % Recovery
Mercury	mg/kg	0.1	Metals.21 CV-AAS	<0.1	24867-1	<0.1 ‖ <0.1	LCS-1	106%
Nickel	mg/kg	1	Metals.20 ICP-AES	<1	24867-1	8 ‖ 7 ‖ RPD: 13	LCS-1	101%
Zinc	mg/kg	1	Metals.20 ICP-AES	<1	24867-1	28 ‖ 25 ‖ RPD: 11	LCS-1	102%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ‖ Duplicate ‖ %RPD
Date prepared	-			8/12/08	24867-1	8/12/2008 ‖ 8/12/2008
Date analysed	-			8/12/08	24867-1	8/12/2008 ‖ 8/12/2008
Moisture	%	0.1	LAB.8	<0.10	24867-1	19 ‖ 19 ‖ RPD: 0

QUALITY CONTROL Herbicides in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ‖ Duplicate ‖ %RPD	Spike Sm#	Spike % Recovery
Atrazine	mg/kg	0.1	Ext-020	<0.1	[NT]	[NT]	[NR]	[NR]
Hexazinone	mg/kg	0.1	Ext-020	<0.1	[NT]	[NT]	[NR]	[NR]
Metribuzine	mg/kg	0.1	Ext-020	<0.1	[NT]	[NT]	[NR]	[NR]
Prometryne	mg/kg	0.1	Ext-020	<0.1	[NT]	[NT]	[NR]	[NR]
Simazine	mg/kg	0.1	Ext-020	<0.1	[NT]	[NT]	LCS	117%

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	24867-2	8/12/2008
Date analysed	-	[NT]	[NT]	24867-2	8/12/2008
vTPH C6 - C9	mg/kg	[NT]	[NT]	24867-2	88%
Benzene	mg/kg	[NT]	[NT]	24867-2	83%
Toluene	mg/kg	[NT]	[NT]	24867-2	91%
Ethylbenzene	mg/kg	[NT]	[NT]	24867-2	86%
m+p-xylene	mg/kg	[NT]	[NT]	24867-2	91%
o-Xylene	mg/kg	[NT]	[NT]	24867-2	101%
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	24867-2	107%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	24867-2	8/12/08
Date analysed	-	[NT]	[NT]	24867-2	8/12/08
TPH C_{10} - C_{14}	mg/kg	[NT]	[NT]	24867-2	68%
TPH C_{15} - C_{28}	mg/kg	[NT]	[NT]	24867-2	71%
TPH C_{29} - C_{36}	mg/kg	[NT]	[NT]	24867-2	70%
Surrogate o-Terphenyl	%	[NT]	[NT]	24867-2	102%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	24867-2	8/12/2008
Date analysed	-	[NT]	[NT]	24867-2	8/12/2008
Naphthalene	mg/kg	[NT]	[NT]	24867-2	77%
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	24867-2	77%
Phenanthrene	mg/kg	[NT]	[NT]	24867-2	84%
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	24867-2	81%
Pyrene	mg/kg	[NT]	[NT]	24867-2	86%
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	24867-2	87%
Benzo(b+k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	24867-2	82%
Indeno(1,2,3-c,d)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%	[NT]	[NT]	24867-2	99%

QUALITY CONTROL Organochlorine Pesticides In soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	24867-2	8/12/2008
Date analysed	-	[NT]	[NT]	24867-2	8/12/2008
HCB	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	[NT]	[NT]	24867-2	76%
gamma-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	[NT]	[NT]	24867-2	79%
Heptachlor	mg/kg	[NT]	[NT]	24867-2	78%
delta-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	[NT]	[NT]	24867-2	74%
Heptachlor Epoxide	mg/kg	[NT]	[NT]	24867-2	81%
gamma-Chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	[NT]	[NT]	24867-2	82%
Dieldrin	mg/kg	[NT]	[NT]	24867-2	81%
Endrin	mg/kg	[NT]	[NT]	24867-2	82%
pp-DDD	mg/kg	[NT]	[NT]	24867-2	82%
Endosulfan II	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	[NT]	[NT]	24867-2	87%
Methoxychlor	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	24867-2	106%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	24867-2	8/12/2008
Date analysed	-	[NT]	[NT]	24867-2	8/12/2008
Diazinon	mg/kg	[NT]	[NT]	[NR]	[NR]
Dimethoate	mg/kg	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Ronnel	mg/kg	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	mg/kg	[NT]	[NT]	24867-2	99%
Fenitrothion	mg/kg	[NT]	[NT]	24867-2	111%
Bromophos-ethyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	[NT]	[NT]	24867-2	80%
Surrogate TCLMX	%	[NT]	[NT]	24867-2	103%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	24867-2	8/12/2008
Date analysed	-	[NT]	[NT]	24867-2	8/12/2008
Arochlor 1016	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	[NT]	[NT]	24867-2	74%
Arochlor 1260	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	24867-2	67%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	24867-2	08/12/08
Date analysed	-	[NT]	[NT]	24867-2	09/12/08
Arsenic	mg/kg	[NT]	[NT]	24867-2	74%
Cadmium	mg/kg	[NT]	[NT]	24867-2	92%
Chromium	mg/kg	[NT]	[NT]	24867-2	105%
Copper	mg/kg	[NT]	[NT]	24867-2	108%
Lead	mg/kg	[NT]	[NT]	24867-2	95%
Mercury	mg/kg	[NT]	[NT]	24867-2	107%
Nickel	mg/kg	[NT]	[NT]	24867-2	92%
Zinc	mg/kg	[NT]	[NT]	24867-2	98%

Report Comments:

Herbicides analysed by NMI report number RN713495.

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

INS: Insufficient sample for this test NT: Not tested PQL: Practical Quantitation Limit <: Less than >: Greater t

RPD: Relative Percent Difference NA: Test not required LCS: Laboratory Control Sample NR: Not requested

Quality Control Definitions

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

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

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

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

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

Laboratory Acceptance Criteria:

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

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

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

11 Attachment D – Borehole Logs

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF	BH1
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BRSL	CHECKED	DMM	Sheet	1 of 1
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Sillstone	VEGETATION	Grass	PROJECT NO.	P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	37m AHD		
EXCAVATION DIMENSIONS	Ø 90mm X 2250mm depth	NORTHING	NA	ASPECT	East	SLOPE	5-10 %

EXCAVATION DATA						MATERIAL DATA				SAMPLING & TESTING			
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE (L M H R)	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.3			MH	SILT - Brown.	-				
A	Nil	N	D	1.0			CL	CLAY - Brown to grey with orange.	-		B	0.5	2279/U 0.5
A	Nil	N	M	2.0 2.2			CH	CLAY - Brown, high plasticity.	-		B	1.5	2279/U 1.5
A	Nil	N	D	2.25			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
				3.0 4.0 4.5				Borehole refused at 2.25m on moderately weathered siltstone.					

EQUIPMENT / METHOD: N Natural exposure; X Existing excavation; BH Backhoe bucket; E Excavator; HA Hand auger; S Hand spade; PT Push tube; A Auger; CC Concrete Corer

SUPPORT: SH Shoring; SC Shotcrete; RB Rock Bolts; Nil No support

WATER: N None observed; X Not measured; Water level; Water outflow; Water inflow

MOISTURE: D Dry; M Moist; W Wet; Wp Plastic limit; Wl Liquid limit

PENETRATION: L Low; M Moderate; H High; R Refusal

CONSISTENCY: VS Very Soft; S Soft; F Firm; St Stiff; VSt Very Stiff; H Hard; Fr Friable

DENSITY: VL Very Loose; L Loose; MD Medium Dense; D Dense; VD Very Dense

SAMPLING & TESTING: A Auger sample; B Bulk sample; U Undisturbed sample; D Disturbed sample; M Moisture content; Ux Tube sample (x mm); pp Pocket penetrometer; S Standard penetration test; VS Vane shear; DCP Dynamic cone penetrometer; FD Field density; WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION: Y USCS; N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

martens
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Hornsby, NSW 2077 Australia
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Engineering Log - Borehole

Code/Sheet No. 4

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF BH2
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BRISL	CHECKED	DMM	Sheet 1 of 1
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO. P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	42.5m AHD	
EXCAVATION DIMENSIONS	Ø 90mm X 900mm depth	NORTHING	NA	ASPECT	East	SLOPE 10 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.3			MH	SILT - Brown.	-				
A	Nil	N	D	0.6			CL	CLAY - Brown to grey with orange.	-		B	0.5	2279/2/0.5 (X2)
A	Nil	N	D	0.9			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.			B	0.85	2279/2/0.85
				1.0				Borehole refused at 0.9m on moderately weathered siltstone.					
				2.0									
				3.0									
				4.0									
				4.5									

EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
E Excavator
HA Hand auger
S Hand spade
PT Push tube
A Auger
CC Concrete Corer

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
Water level
Water outflow
Water inflow

MOISTURE
D Dry
M Moist
W Wet
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)
pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
Y USCS
N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

martens

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Hornsby, NSW 2077 Australia
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Engineering Log - Borehole

Geolith Sheet No. 4

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF	BH3
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BRSL	CHECKED	DMM	Sheet	1 of 1
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Sillstone	VEGETATION	Grass	PROJECT NO.	P0602279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	46.5m AHD		
EXCAVATION DIMENSIONS	Ø 90mm X 500mm depth	NORTHING	NA	ASPECT	West	SLOPE	20 %

EXCAVATION DATA						MATERIAL DATA				SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE (L M H R)	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.15			MH	SILT - Brown.	-				
A	Nil	N	D	0.5			SW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
				1.0				Borehole refused at 0.5m on moderately weathered siltstone.					
				2.0									
				3.0									
				4.0									
				4.5									

EQUIPMENT / METHOD: N Natural exposure; X Existing excavation; BH Backhoe bucket; E Excavator; HA Hand auger; S Hand spade; PT Push tube; A Auger; CC Concrete Corer

SUPPORT: SH Shoring; SC Shotcrete; RB Rock Bolts; Nil No support

WATER: N None observed; X Not measured; Water level; Water outflow; Water inflow

MOISTURE: D Dry; M Moist; W Wet; Wp Plastic limit; Wl Liquid limit

PENETRATION: L Low; M Moderate; H High; R Refusal

CONSISTENCY: VS Very Soft; S Soft; F Firm; St Stiff; VSt Very Stiff; H Hard; Fr Friable

DENSITY: VL Very Loose; L Loose; MD Medium Dense; D Dense; VD Very Dense

SAMPLING & TESTING: A Auger sample; B Bulk sample; U Undisturbed sample; D Disturbed sample; M Moisture content; Ux Tube sample (x mm); pp Pocket penetrometer; S Standard penetration test; VS Vane shear; DCP Dynamic cone penetrometer; FD Field density; WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION: Y USCS; N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - Borehole

Code/Sheet No. 4

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BR/SL	CHECKED	DMM
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	45m AHD
EXCAVATION DIMENSIONS	Ø 90mm X 1000mm depth	NORTHING	NA	ASPECT	East

REF BH4
Sheet 1 of 1
PROJECT NO. P0802279
SLOPE 25 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.1			MH	SILT - Brown.	-				
A	Nil	N	D	0.7			CL	CLAY - Brown to grey with orange.	-		B	0.5	2279/4/ 0.5 (X2)
A	Nil	N	D	1.0			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
								Borehole refused at 1.0m on moderately weathered siltstone.					

EQUIPMENT / METHOD	SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
N Natural exposure	SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample	pp Pocket penetrometer	Y USCS
X Existing excavation	SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample	S Standard penetration test	N Agricultural
BH Backhoe bucket	RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample	VS Vane shear	
E Excavator	Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample	DCP Dynamic cone penetrometer	
HA Hand auger		Water inflow	Wl Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content	FD Field density	
S Hand spade					H Hard		Ux Tube sample (x mm)	WS Water sample	
PT Push tube					F Friable				
A Auger									
CC Concrete Corer									

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

martens

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF	BH5
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BRSL	CHECKED	DMM	Sheet	1 of 1
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO.	P0602279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	34m AHD		
EXCAVATION DIMENSIONS	Ø 90mm X 1200mm depth	NORTHING	NA	ASPECT	West	SLOPE	15 %

EXCAVATION DATA						MATERIAL DATA				SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE L M H X	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.2			MH	SILT - Brown.	-				
A	Nil	N	D	1.0 1.1			CL	CLAY - Brown.	-				1.0
A	Nil	N	D	1.2			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
				2.0				Borehole refused at 1.2m on moderately weathered siltstone.					2.0
				3.0									3.0
				4.0									4.0
				4.5									4.5

EQUIPMENT / METHOD: N Natural exposure; X Existing excavation; BH Backhoe bucket; E Excavator; HA Hand auger; S Hand spade; PT Push tube; A Auger; CC Concrete Corer

SUPPORT: SH Shoring; SC Shotcrete; RB Rock Bolts; Nil No support

WATER: N None observed; X Not measured; Water level; Water outflow; Water inflow

MOISTURE: D Dry; M Moist; W Wet; Wp Plastic limit; Wl Liquid limit

PENETRATION: L Low; M Moderate; H High; R Refusal

CONSISTENCY: VS Very Soft; S Soft; F Firm; St Stiff; VSt Very Stiff; H Hard; Fr Friable

DENSITY: VL Very Loose; L Loose; MD Medium Dense; D Dense; VD Very Dense

SAMPLING & TESTING: A Auger sample; B Bulk sample; U Undisturbed sample; D Disturbed sample; M Moisture content; Ux Tube sample (x mm); pp Pocket penetrometer; S Standard penetration test; VS Vane shear; DCP Dynamic cone penetrometer; FD Field density; WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION: Y USCS; N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - Borehole

Code/Sheet No. 4

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF BH6
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BRISL	CHECKED	DMM	Sheet 1 of 1
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO. P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	29.5m AHD	
EXCAVATION DIMENSIONS	Ø 90mm X 2700mm depth	NORTHING	NA	ASPECT	West	SLOPE 10 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.2			MH	SILT - Brown.	-				
A	Nil	N	D	0.8			CL	CLAY - Brown.	-		B	0.5	2279/6/ 0.5
A	Nil	N	M	1.0 1.7			CH	CLAY - Grey to brown, high plasticity.			B	1.5	2279/6/ 1.5
A	Nil	N	D	2.0 2.7			EW	RESIDUAL SOIL GRADING TO EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
				3.0 4.0 4.5				Borehole terminated at 2.7m on moderately weathered siltstone.					

EQUIPMENT / METHOD	SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
N Natural exposure X Existing excavation BH Backhoe bucket E Excavator HA Hand auger S Hand spade PT Push tube A Auger CC Concrete Corer	SH Shoring SC Shotcrete RB Rock Bolts Nil No support	N None observed X Not measured Water level Water outflow Water inflow	D Dry M Moist W Wet Wp Plastic limit Wl Liquid limit	L Low M Moderate H High R Refusal	VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard F Friable	VL Very Loose L Loose MD Medium Dense D Dense VD Very Dense	A Auger sample B Bulk sample U Undisturbed sample D Disturbed sample M Moisture content Ux Tube sample (x mm)	pp Pocket penetrometer S Standard penetration test VS Vane shear DCP Dynamic cone penetrometer FD Field density WS Water sample	Y USCS N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - Borehole

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF	BH7
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BRISL	CHECKED	DMM	Sheet 1 of 1	
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO.	P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	48m AHD		
EXCAVATION DIMENSIONS	Ø 90mm X 1000mm depth	NORTHING	NA	ASPECT	North	SLOPE	10 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.15			MH	SILT - Brown.	-				
A	Nil	N	D	0.5			CL	CLAY - Brown to grey with orange.	-				
A	Nil	N	D	1.0			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					1.0
				2.0				Borehole terminated at 1.0m on Shale grey.					2.0
				3.0									3.0
				4.0									4.0
				4.5									4.5

EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
E Excavator
HA Hand auger
S Hand spade
PT Push tube
A Auger
CC Concrete Corer

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
Water level
Water outflow
Water inflow

MOISTURE
D Dry
M Moist
W Wet
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)
pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
Y USCS
N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - Borehole

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF	BH8
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BR/SL	CHECKED	DMM	Sheet 1 of 1	
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO.	P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	31.25m AHD		
EXCAVATION DIMENSIONS	Ø 90mm X 750mm depth	NORTHING	NA	ASPECT	West	SLOPE	20 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.3			MH	SILT - Brown.	-				
A	Nil	N	D	0.7			CL	CLAY - Brown.	-		B	0.5	2279/8/0.5 (X2)
A	Nil	N	D	0.75			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
				1.0				Borehole refused at 0.75m on moderately weathered siltstone.					
				2.0									
				3.0									
				4.0									
				4.5									

EQUIPMENT / METHOD	SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
N Natural exposure	SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample	pp Pocket penetrometer	Y USCS
X Existing excavation	SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample	S Standard penetration test	N Agricultural
BH Backhoe bucket	RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample	VS Vane shear	
E Excavator	Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample	DCP Dynamic cone penetrometer	
HA Hand auger		Water inflow	Wl Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content	FD Field density	
S Hand spade					H Hard		Ux Tube sample (x mm)	WS Water sample	
PT Push tube					F Friable				
A Auger									
CC Concrete Corer									

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - Borehole

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF BH9
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BR/SL	CHECKED	DMM	Sheet 1 of 1
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO. P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	39.5m AHD	
EXCAVATION DIMENSIONS	Ø 90mm X 3000mm depth	NORTHING	NA	ASPECT	West	SLOPE 25 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.3			MH	SILT - Brown.	-				
A	Nil	N	D	1.0			CL	CLAY - Brown.	-		B	0.5	2279/9/ 0.5
A	Nil	N	D	2.0 3.0			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.			B	2.3	2279/9/ 2.3
				4.0 4.5				Borehole terminated at 3.0m on extremely weathered siltstone.					

EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
E Excavator
HA Hand auger
S Hand spade
PT Push tube
A Auger
CC Concrete Corer

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
Water level
Water outflow
Water inflow

MOISTURE
D Dry
M Moist
W Wet
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)
pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
Y USCS
N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - Borehole

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF	BH10
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BRISL	CHECKED	DMM	Sheet 1 of 1	
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO.	P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	42.5m AHD		
EXCAVATION DIMENSIONS	Ø 90mm X 1100mm depth	NORTHING	NA	ASPECT	North West	SLOPE	25 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.2			MH	SILT - Brown.	-				
A	Nil	N	D	0.9			CL	CLAY - Brown to grey with orange.	-		B	0.5	2279/10/0.5
A	Nil	N	D	1.0 1.1			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
				2.0 3.0 4.0 4.5				Borehole terminated at 1.1m on moderately weathered siltstone.					

EQUIPMENT / METHOD: N Natural exposure; X Existing excavation; BH Backhoe bucket; E Excavator; HA Hand auger; S Hand spade; PT Push tube; A Auger; CC Concrete Corer

SUPPORT: SH Shoring; SC Shotcrete; RB Rock Bolts; Nil No support

WATER: N None observed; X Not measured; Water level; Water outflow; Water inflow

MOISTURE: D Dry; M Moist; W Wet; Wp Plastic limit; Wl Liquid limit

PENETRATION: L Low; M Moderate; H High; R Refusal

CONSISTENCY: VS Very Soft; S Soft; F Firm; St Stiff; VSt Very Stiff; H Hard; F Friable

DENSITY: VL Very Loose; L Loose; MD Medium Dense; D Dense; VD Very Dense

SAMPLING & TESTING: A Auger sample; B Bulk sample; U Undisturbed sample; D Disturbed sample; M Moisture content; Ux Tube sample (x mm); pp Pocket penetrometer; S Standard penetration test; VS Vane shear; DCP Dynamic cone penetrometer; FD Field density; WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION: Y USCS; N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - Borehole

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF	BH11
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BR/SL	CHECKED	DMM	Sheet 1 of 1	
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO.	P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	40m AHD		
EXCAVATION DIMENSIONS	Ø 90mm X 1550mm depth	NORTHING	NA	ASPECT	North	SLOPE	25 %

EXCAVATION DATA | **MATERIAL DATA** | **SAMPLING & TESTING**

METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE (L M H R)	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA (Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.)	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.2			MH	SILT - Brown.	-				
A	Nil	N	D	1.0 1.3			CL	CLAY - Brown to yellow, appreciable silt content.	-		B	0.5	2279/11/0.5
A	Nil	N	D	1.55			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
				2.0 3.0 4.0 4.5				Borehole refused at 1.55m on moderately weathered siltstone.					

EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
E Excavator
HA Hand auger
S Hand spade
PT Push tube
A Auger
CC Concrete Corer

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
Water level
Water outflow
Water inflow

MOISTURE
D Dry
M Moist
W Wet
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)
pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
Y USCS
N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - Borehole

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF	BH12
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BRISL	CHECKED	DMM	Sheet 1 of 1	
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO.	P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	33.5m AHD		
EXCAVATION DIMENSIONS	Ø 90mm X 1350mm depth	NORTHING	NA	ASPECT	North West	SLOPE	30 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.2			MH	SILT - Brown.	-				
A	Nil	N	D	0.9			CL	CLAY - Brown to grey with orange.	-		B	0.5	2279/12/0.5 (X 2)
A	Nil	N	D	1.0 1.35			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.			B	1.0	2279/12/ 1.0 (X 2)
				2.0 3.0 4.0 4.5				Borehole terminated at 1.35m on moderately weathered siltstone.					

EQUIPMENT / METHOD	SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
N Natural exposure	SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample	pp Pocket penetrometer	Y USCS
X Existing excavation	SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample	S Standard penetration test	N Agricultural
BH Backhoe bucket	RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample	VS Vane shear	
E Excavator	Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample	DCP Dynamic cone penetrometer	
HA Hand auger		Water inflow	Wl Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content	FD Field density	
S Hand spade					H Hard		Ux Tube sample (x mm)	WS Water sample	
PT Push tube					F Friable				
A Auger									
CC Concrete Corer									

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - Borehole

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BR/SL	CHECKED	DMM
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	34.5m AHD
EXCAVATION DIMENSIONS	Ø 90mm X 1400mm depth	NORTHING	NA	ASPECT	North West

REF BH13

Sheet 1 of 1

PROJECT NO. P0802279

SLOPE 30 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS
A	Nil	N	D	0.2			MH	SILT - Brown.	-				
A	Nil	N	D	0.7			CL	CLAY - Brown.	-		B	0.5	2279/13/0.5
A	Nil	N	D	1.0 1.4			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
				2.0 3.0 4.0 4.5				Borehole terminated at 1.4m on moderately weathered siltstone.					

EQUIPMENT / METHOD	SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
N Natural exposure	SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample	pp Pocket penetrometer	Y USCS
X Existing excavation	SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample	S Standard penetration test	N Agricultural
BH Backhoe bucket	RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample	VS Vane shear	
E Excavator	Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample	DCP Dynamic cone penetrometer	
HA Hand auger		Water inflow	Wl Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content	FD Field density	
S Hand spade					H Hard		Ux Tube sample (x mm)	WS Water sample	
PT Push tube					F Friable				
A Auger									
CC Concrete Corer									

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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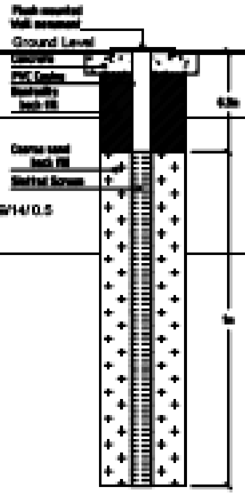
Engineering Log - Borehole

Quality Sheet No. 4

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF	BH14
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BRISL	CHECKED	DMM	Sheet 1 of 1	
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO.	P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	31m AHD		
EXCAVATION DIMENSIONS	Ø 90mm X 1700mm depth	NORTHING	NA	ASPECT	North West	SLOPE	20 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS GROUND WATER WELL
A	Nil	N	D	0.2			MH	SILT - Brown.	-				
A	Nil	N	D	0.6			CL	CLAY - Brown.	-		B	0.5	2279/14/0.5
A	Nil	N	D	1.0 1.7			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
				2.0				Borehole terminated at 1.7m on moderately weathered rock.					
				3.0									
				4.0									
				4.5									



EQUIPMENT / METHOD
N Natural exposure
X Existing excavation
BH Backhoe bucket
E Excavator
HA Hand auger
S Hand spade
PT Push tube
A Auger
CC Concrete Corer

SUPPORT
SH Shoring
SC Shotcrete
RB Rock Bolts
Nil No support

WATER
N None observed
X Not measured
Water level
Water outflow
Water inflow

MOISTURE
D Dry
M Moist
W Wet
Wp Plastic limit
Wl Liquid limit

PENETRATION
L Low
M Moderate
H High
R Refusal

CONSISTENCY
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
F Friable

DENSITY
VL Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

SAMPLING & TESTING
A Auger sample
B Bulk sample
U Undisturbed sample
D Disturbed sample
M Moisture content
Ux Tube sample (x mm)
pp Pocket penetrometer
S Standard penetration test
VS Vane shear
DCP Dynamic cone penetrometer
FD Field density
WS Water sample

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
Y USCS
N Agricultural

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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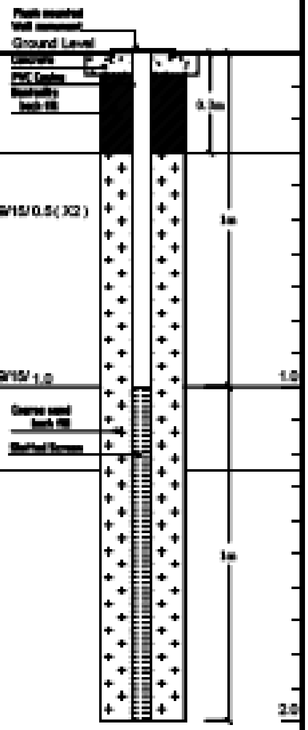
Engineering Log - Borehole

CLIENT	Brett Gooley	COMMENCED	03.12.08	COMPLETED	03.12.08	REF	BH15
PROJECT	Geotechnical/Contamination Assessment	LOGGED	BR/SL	CHECKED	DMM	Sheet 1 of 1	
SITE	CNR Huntley and Avondale Road, Dapto	GEOLOGY	Siltstone	VEGETATION	Grass	PROJECT NO.	P0802279
EQUIPMENT	Hydraulic Auger	EASTING	NA	RL SURFACE	27.6m AHD		
EXCAVATION DIMENSIONS	Ø 90mm X 2600mm depth	NORTHING	NA	ASPECT	North West	SLOPE	20 %

EXCAVATION DATA						MATERIAL DATA					SAMPLING & TESTING		
METHOD	SUPPORT	WATER	MOISTURE	DEPTH (M)	PENETRATION RESISTANCE	GRAPHIC LOG	CLASSIFICATION	DESCRIPTION OF STRATA Soil type, texture, structure, mottling, colour, plasticity, rocks, oxidation, particle characteristics, organics, secondary and minor components, fill, contamination, odour.	CONSISTENCY	DENSITY INDEX	TYPE	DEPTH (M)	RESULTS AND ADDITIONAL OBSERVATIONS GROUND WATER WELL
A	Nil	N	D	0.3			MH	SILT - Brown.	-				
A	Nil	N	D	1.0			CL	CLAY - Brown.	-		B B	0.5 1.0	2279/15/0.5 (X2) 2279/15/ 1.0
A	Nil	N	D	1.25			EW	EXTREMELY WEATHERED SILTSTONE – Light brown to yellow.					
A	Nil	N	D	2.0 2.6			EW	MODERATELY WEATHERED SILTSTONE – Brown.					
				3.0 4.0 4.5				Borehole refused at 2.6m on moderately weathered siltstone.					



EQUIPMENT / METHOD	SUPPORT	WATER	MOISTURE	PENETRATION	CONSISTENCY	DENSITY	SAMPLING & TESTING		CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION
N Natural exposure	SH Shoring	N None observed	D Dry	L Low	VS Very Soft	VL Very Loose	A Auger sample	pp Pocket penetrometer	Y USCS
X Existing excavation	SC Shotcrete	X Not measured	M Moist	M Moderate	S Soft	L Loose	B Bulk sample	S Standard penetration test	N Agricultural
BH Backhoe bucket	RB Rock Bolts	Water level	W Wet	H High	F Firm	MD Medium Dense	U Undisturbed sample	VS Vane shear	
E Excavator	Nil No support	Water outflow	Wp Plastic limit	R Refusal	St Stiff	D Dense	D Disturbed sample	DCP Dynamic cone penetrometer	
HA Hand auger		Water inflow	Wl Liquid limit		VSt Very Stiff	VD Very Dense	M Moisture content	FD Field density	
S Hand spade					H Hard		Ux Tube sample (x mm)	WS Water sample	
PT Push tube					F Friable				
A Auger									
CC Concrete Corer									

EXCAVATION LOG TO BE READ IN CONJUNCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

martens

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Engineering Log - Borehole