

ATTACHMENT 5

**Contaminated Lands Assessment
EAL Consulting Services**

Environmental Analysis Laboratory – Contaminated Land Assessment

CONTAMINATED LAND ASSESSMENT
FOR A
REZONING AND MULTI-USE SUBDIVISION AT
LOT 1 DP 772605, LOT 1 DP772604, AND
LOTS 471 TO 474 DP 755718
CRAWFORD ROAD, EAST LISMORE

A preliminary assessment of possible soil contamination as required for
State Environmental Planning Policy 55

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EXECUTIVE SUMMARY

The objective of this preliminary investigation was to determine if land contamination has occurred from historical and current land use activities conducted at Lot 1 DP 772605, Lot 1 DP772604 and Lots 471 to 474 DP 755718 Crawford Road, East Lismore.

Based upon surrounding land use and anecdotal information provided by the owner and council records, it appears that the site has been predominantly utilised for cattle grazing with two residential houses (now offices).

In accordance with relevant guidelines, a systematic-sampling regime combined with targeted sampling has been undertaken of surface soils within the proposed development area to determine if contaminants of concern (such as heavy metals petroleum hydrocarbons, hazardous building materials and organochlorine pesticides), associated with current and previous land uses are present on site and if such contaminants represented a significant risk of harm to end users (and nearby sensitive receptors). The broadscale sampling regime involved the collection of 74 individual soil samples; which were homogenised into twenty (20) composite samples for chemical analysis. A further twenty samples were taken in the vicinity of buildings and thirty samples taken in the vicinity of a decommissioned cattle dip site. Subsequent additional sampling and follow-up analyses were also undertaken.

As the proposed rezoning will result in areas for residential, open space or industrial purposes, the respective results of the soil analysis were compared with Column 1, Column 3 and Column 4 of the NSW DEC (2006) 'Contaminated Sites – Guidelines for the NSW Site Auditor Scheme'. Column 1 represents Human - Based Investigation Levels (HBIL) for developments being 'Residential with gardens and accessible soil including children's daycare centres, preschools, primary schools, town houses or villas'. Column 3 represents Parks, recreational open space, playing fields including secondary schools. Column 4 represents Commercial of industrial land uses.

Analysis results indicated that contaminant levels for the various parameters do not represent a significant risk of harm to end users. Some precaution is warranted in the vicinity of the decommissioned Maize Grove dip site depending on the requirement for the area to be utilised for an industrial/commercial purpose and subsequent footprint. Therefore it is concluded that in general a detailed investigation is not warranted for the majority of the site, however a further validation sampling and/or site remediation/management options may be required in the vicinity of the decommissioned dip site.

1 INTRODUCTION

The Environmental Analysis Laboratory (EAL) has been commissioned by Mr. Mike Cooper (on behalf of Southern Cross University) to undertake a preliminary contaminated land assessment for a proposed residential and industrial subdivision at Crawford Rd, East Lismore. The total study area is approximately 74ha made up by Urban Mixed Use (22 ha), Industrial (15.7 ha), Open Space (14 ha) with the balance for Environmental Protection (22.3 ha). The area of land for development is considered approximately 51.7 ha and, for the purpose of this assessment, is the area assessed for contamination.

The objective of this preliminary investigation was to determine if land contamination has occurred from historical and current land use activities occurring on site or immediately nearby. To determine if the site poses a significant risk of harm to end users (and nearby sensitive receptors), soil samples have been collected and analysed for a range of contaminants typically associated with the land uses identified as having occurred on site. The results of the soil analysis are compared to relevant EPA acceptable levels in order to assess the potential significance of risk. As the proposed development is to be residential, open space or industrial, the soil analysis results are compared with the NSW DEC (2006) Column 1 (Residential), Column 3 (Parks/Open Space) and Column 4 (Commercial or Industrial) of the Table 'Soil Investigation Levels for Urban Development Sites in NSW' and ANZECC and NHMRC (1992) Table 2 'Environmental Soil Quality Guidelines'.

This investigation represents Stage 1 of the *Managing Land Contamination Planning Guidelines* (DUAP and EPA, 1998). If contamination levels exceed the adopted EPA acceptable levels, a detailed investigation is then required (i.e. a Stage 2 investigation). If the contamination levels are below the relevant acceptable levels and information gathered as part of the investigation also supports that contamination was unlikely to have occurred; only a Stage 1 investigation would be required.

2 SCOPE OF WORK

This preliminary investigation has been used to identify the following:

- Past and present potentially contaminating activities occurring on or near the site; and
- The presence of Potential Contaminants of Concern associated with the identified land uses.

The investigation will also:

- Discuss the site condition after a comprehensive site walkover;
- Provide a preliminary assessment of the site's contamination status; and
- Assess the need for further investigations.

Relevant documents considered in the preparation of this investigation included:

- ANZECC and NHMRC (1992) *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*;
- Council of Standards Australia (2005) *AS 4482.1-2005 Guide to the sampling and investigation of potentially contaminated soil – Non-volatile and semi-volatile compounds*;
- NSW DEC (2006) *Contaminated Sites – Guidelines for the NSW Site Auditor Scheme 2nd Edition*;
- NSW EPA (1995) *Contaminated Sites – Sampling Design Guidelines*; and
- NSW EPA (1997) *Guidelines for Consultants Reporting Contaminated Sites*.

3 SITE IDENTIFICATION

The site is formally known as Lot 1 DP 772605, Lot 1 DP772604 and Lots 471 to 474 DP 755718 (Fig. 1; Appendix 1). The total study area is approximately 74ha with the area of land assessed as part of this investigation is approximately 51.7 ha.

The proposed development entails mixed uses of:

- Urban Mixed Use (22 ha);
- Open Space (14 ha);
- Industrial (15.7 ha); and
- Environmental Protection (22.3 ha).

Refer Fig. 2 (Appendix 1) for proposed rezoning layout.

4 SITE HISTORY

4.1 Zoning

The majority of the site is currently zoned 5(b) Special Uses (Technology Park) Zone in accordance with the Lismore City Local Environmental Plan (Lismore LEP 2000). The north and north-eastern sections of Lot 471 DP 755718, the majority of Lot 471 DP755718 and the eastern sections of Lot 473 DP 755718 and Lot 1 DP 772605 are currently zoned 7(b) Environmental Protection (Habitat) Zone.

The proposed development will slightly modify the 7(b) Environmental Protection (Habitat) Zone while subsequently dividing the 5(b) Special Uses (Technology Park) Zone into 2(a) Residential, 4(a) Industrial and 6(a) Recreation Zones (refer Fig. 2, Appendix 1).

4.2 Land Use

Current land use is agricultural with cattle grazing as the main activity. Some of the residential houses on the site have been converted to offices (e.g. Soil Foodweb International).

4.3 Building Approvals

Not applicable to this study

4.4 Site Usages

Anecdotal information on the past usages of the site has indicated that the site has been predominantly used for grazing purposes. Two residential dwellings (converted to offices in 1998) and a number of farm sheds are located towards the northern end of the site (refer Fig. 3; Appendix 1). An old quarry face was located in the south-eastern section of the site (refer Appendix 2). The eastern boundary is steep and heavily vegetated. A decommissioned cattle dip site (Maize Grove) is also located in the southern section of the site (refer s4.13.3).

4.5 Site and Aerial Photographs

Site photos are presented in Appendix 2. A detailed review of historical aerial photography was not considered necessary for this investigation.

4.6 Inventory of Known Chemicals and Wastes and Location

An inventory of chemicals and/or wastes stored at the site was not available. Given the long term use of cattle grazing, it is anticipated the range of chemicals used would be limited to those used for the health of the cattle (e.g. tickicides and wormicides) and/or improvements for pasture (e.g. herbicides, fertilisers). It is anticipated these would have been purchased for immediate use or stored in small quantities within the farm sheds.

4.7 Possible Contaminant Sources

Table 1 below lists the sources of potential contamination at the site and their associated contaminants of concern.

Table 1: Potential Contaminants of Concern for Identified Activities

Identified Contaminant Source	Potential Contaminants	Targeted Contaminants
Agricultural Activities		
Animal Husbandry	<p>Fertiliser (Calcium phosphate, Calcium Sulfate, nitrates, ammonium sulfate, carbonates, potassium, copper, magnesium, molybdenum, boron, cadmium)</p> <p>Pesticides (Arsenic, lead, organochlorines, organophosphates, sodium tetraborate, carbamates, sulfur, synthetic pyrethroids)</p>	<p>Metals (Silver, Arsenic, Lead, Cadmium, Copper, Nickel, Selenium, Zinc, Mercury, Iron and aluminium)</p> <p>Pesticides (a-BHC, Hexachlorobenzene, b-BHC, g-BHC (Lindane), d-BHC, Heptachlor, Aldrin, Heptachlor epoxide, trans-chlordane, Endosulfan I, cis-chlordane, Dieldrin, 4,4-DDE, Endrin, Endosulfan II, 4,4-DDD, Endosulfan sulfate, 4,4-DDT, Methoxychlor)</p>

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Identified Contaminant Source	Potential Contaminants	Targeted Contaminants
Residential/Commercial Activities		
Residential (now Commercial) Buildings	Hazardous Building Materials or HBM (Synthetic Mineral Fibres, Asbestos, Lead paints)	HBM (Asbestos, lead) Metals (Silver, Arsenic, Lead, Cadmium, Copper, Nickel, Selenium, Zinc, Mercury, Iron and aluminium) Hydrocarbons (Total petroleum hydrocarbons (TPH), volatile TPH and Benzene, Toluene, Ethylbenzene, Xylene (BTEX))
Imported Fill Materials	Metals, hydrocarbons, solvents, PCB's etc.	
Termiticide Application	Pesticides (Arsenic, lead, organochlorines, organophosphates, sodium tetraborate, carbamates, sulfur, synthetic pyrethroids)	Organochlorine Pesticides (a-BHC, Hexachlorobenzene, b-BHC, g-BHC (Lindane), d-BHC, Heptachlor, Aldrin, Heptachlor epoxide, trans-chlordane, Endosulfan I, cis-chlordane, Dieldrin, 4,4-DDE, Endrin, Endosulfan II, 4,4-DDD, Endosulfan sulfate, 4,4-DDT, Methoxychlor)

4.8 Site Layout Plans

Site plans and photographs are provided in Appendices 1 and 2. The site is bounded by Crawford Road to the north, Military Rd to the west and Skyline Rd to the south. Land uses in the local area consist of a cemetery (East Lismore Cemetery) to the north, forested and vacant land also along the northern boundary, residential land to the east and west and agricultural lands to the south.

4.9 Sewer and Service Plans

Not applicable to this study.

4.10 Local Knowledge

Not applicable to this study.

4.11 Historic Use of Adjacent Land

The afore-mentioned adjacent land uses (s. 4.8) are believed to be relatively consistent for the area. Residential areas to the east (i.e. off Invercauld Road) are slightly younger than residential areas to the west.

4.12 Local Usage of Ground/Surface Waters

A number of licensed bores are located within the general locality but all are greater than 1 km of the site (www.nratlas.nsw.gov.au). The closest, GW304483 at 1.1km to the south-west is a monitoring bore. It is unlikely, that even if contamination is located on the site, those contaminants would have migrated to this or other bores in the area.

4.13 State and Local Authority Records

4.13.1 Contaminated Land Record

A search of the Contaminated Land Record (EPA 2009a) for the Lismore Local Government Area (LGA) did not identify any site notices relating to the site or adjoining the site. The closest site listed is the Invercauld Dip which is located approximately 0.4 km to the east of the eastern boundary along Invercauld Road.

4.13.2 Protection of the Environment Operations Act Licenses

A search of the current list (EPA 2009b) of licensed activities as per Schedule 1 of the Protection of the Environment Operations Act 1997 did not identify any licensed polluting activities occurring within or adjacent to the site. The closest site listed is the Richmond Waste Services site located at 15 Skyline Rd approximately 350m to the west of the south-western boundary of the site.

4.13.3 Cattle Tick Dip Sites

A search of the NSW Department of Primary Industry (DPI) Cattle Dip Site Locator tool (<http://www.agric.nsw.gov.au/tools/dipsite-locator/>) indicated that there is one Cattle Tick Dip Sites on the site. The Maize Grove Cattle Tick Dip Site is located approximately half way along the southern boundary of the site adjacent to Skyline Road. This Dip has been decommissioned and capped (leased expired 31/08/2003). Chemicals used in the dip are provided below (date first used):

Arsenic (7/51)	Ethion (9/73)
DDT (11/60)	Ethion chlordimeform (11/73)
Dioxathion (10/62)	Promacyl (3/77)
Diathion ethion (9/72)	Flumethrin (9/86)

4.14 Integrity Assessment

The information provided seems to be accurate as site inspections and soil analysis results have indicated so.

5 SITE CONDITION AND SURROUNDING ENVIRONMENT**5.1 Topography**

The site is relatively flat within the western portion with elevation approximately 10m AHD. The site gradually becomes steeper as the site progresses eastwards and northward with elevation approximately 100m AHD both along the northern and eastern boundaries. A number of unnamed creeks traverse the site to the west before flowing southwards before joining Wilsons River (approximately 3.5km to the south-west).

5.2 Conditions at Site Boundary

The site is bounded by Crawford Road to the north, Military Rd to the west and Skyline Rd to the south. Land uses surrounding the site include a cemetery, residential (including open space) and agricultural uses. No contaminating land uses were identified nor any evidence of contamination (e.g. poor plant growth, discoloured soils etc.) during the site inspections.

5.3 Visible Signs of Contamination

The subject site was investigated on foot in order to identify any signs of contamination. No obvious signs of contamination (such as surface spills, waste materials, imported fill etc.) were evident for the majority of the site during the site investigation. The disused quarry in the south-eastern section of the site still has an exposed excavation face. It is unknown the exact date that this quarry was last used.

A visual inspection of adjoining allotments indicated that there were no clearly visible signs of contamination adjoining the site other than some filling requirements for the neighbouring Country Energy substation (on Military Road).

5.4 Visible Signs of Plant Stress

There were no visible signs of plant stress observed during the site inspection.

5.5 Presence of Drums, Wastes and Fill Materials

No areas of waste disposal were evident (putrescibles or otherwise). Some fertiliser bags were located in the vicinity of the western house (TS41 – TS43).

5.6 Odours

There were no odours present on the site or when excavating soils during the site investigation.

5.7 Flood Potential

Lands along the western boundary of the site are mapped as 'Flood Fringe Area' by Council's Flood Hazard Categories. The 1 in 100 yr flood level is shown in Fig. 2 (Appendix 1).

5.8 Local Sensitivity Environment

No nearby sensitive environment (SEPP 14 etc.) were identified on site or adjoining the site.

6 GEOLOGY AND HYDROGEOLOGY

6.1 Soil Stratigraphy

Morand (1994) describes the soil landscape in the western section of the site as the alluvial landscape, *Leycester* (le) with the colluvial landscape, *Georgica variant c* (gec) in the eastern and northern sections of the site.

Leycester soils are described as:

- Deep, poorly drain to moderately well-drained alluvial Black Earths and Structured Clays occur throughout the floodplains;
- Wetter areas such as ox-bow floors, have deep, poorly drained Weisenboden.
- Deep, well-drained Earthy Sands line channels.

Georgica soils are described as:

- Shallow, moderately well-drained Chocolate Soils and Prairie Soils on crests and upper slopes;
- Shallow to moderately deep, moderately well-drained Chocolate Soils on upper slopes;
- Shallow to moderately deep, well-drained Prairie Soils and Chocolate Soil/Prairie Soil intergrades on midslopes; and
- Deep, poorly to moderately well-drained Black Earths on lower slopes and footslopes.

6.2 Location and Extent of Imported and Locally Derived Fill

No imported fill was identified on the site. However, it is assumed some minor importation of fill may have occurred during the construction of the residences and/or farm sheds. Some fill was located on the boundary with the Country Energy Substation. This fill was contained within the adjoining allotment and is most likely site won or locally sourced.

6.3 Site Bore Hole Tests

Not applicable to this study as all sampling was taken from surface samples.

6.4 Depth to Groundwater Table

No groundwater investigation was required in this study. As the western areas of the site were waterlogged in the vicinity of the drain, it is expected groundwater levels would be relatively shallow in these lower-lying sections in comparison to the expected water table heights within the elevated sections of the site to the east and the north.

6.5 Summary of Local Meteorology

The average annual rainfall in Lismore is 1343mm with the wettest months being November through to June. The driest months are July to October. The warmer months (mean minimum temperature >10°C) is from October to May.

7 SAMPLING AND ANALYSIS PLAN AND SAMPLING METHODOLOGY

7.1 Sampling, Analysis and Data Quality Objectives (DQOs)

The objective of this preliminary investigation is to gather information with regard to the type, location, concentration and distribution of contaminants to determine if the site represents a significant risk of harm to end users and nearby sensitive receptors. To determine this, soil sampling and laboratory analysis has been conducted upon surface soils collected from across the site.

7.2 Rationale

A systematic broadscale sampling grid of approximately 80m by 80m across the western portions (i.e. proposed development area) of the site resulted in seventy-four (74) surface (0 – 200mm depth) samples being taken (refer Fig. 4, Appendix 1). These individual samples were collected and homogenised into twenty (20) composite samples for analysis. Additionally, twenty (20) surface samples were taken in the vicinity of the residences and sheds (refer Fig. 5, Appendix 1).

Thirty (30) individual surface samples were taken in the vicinity of the dip site (refer Fig. 6, Appendix 1). These samples were taken at approximately 10 m intervals radiating out from the dip bath (i.e. samples taken up to approximately 40 m from the bath).

While the broadscale sampling density is considered less than the recommended guidelines (refer to Table 2 for relevant sampling density (in accordance with NSW EPA 1995)), the inclusion of targeted sampling within the sampling protocol is considered adequate based on the historical land use (i.e. cattle grazing) of the site.

Samples were analysed for a full range of heavy metals (as described in Table 1) and organochlorine (OC) pesticides (including Aldrin, Cis-chlordane, Trans-chlordane, HCB, DDD, DDE, DDT, Alpha-BHC, Beta-BHC, Delta-BHC, Lindane, Dieldrin, Endrin, Heptachlor, Heptachlor epoxide, Alpha-endosulfan, Beta-endosulfan, Endosulfan sulfate, Methoxychlor).

Total Petroleum Hydrocarbons (TPH) and BTEX compounds (Benzene, Toluene, Ethyl Benzene and Xylene) were analysed in targeted samples around the residences and sheds.

Organophosphate (OP) pesticides (includes Dichlorvos, Phosdrin, Demeton (total), Ethoprop, Monocrotophos, Phorate, Dimethoate, Diazinon, Disulfoton, Methyl parathion, Chloropyrifos, Ronnel, Parathion, Stirofos, Prothiofos, Azinophos methyl, Coumaphos, Fenitrothion, Fenthion, Malathion) were not analysed as the site history did not identify any likelihood of these pesticides occurring and no elevated levels of OC or arsenic were identified at the site (samples are stored for OP analysis if required). The bacterial decomposition of OP pesticide is very rapid and the occurrence of elevated levels of OP's in the environment is rare (i.e. based on over 1000 soils analysed in soils of Northern NSW by EAL).

Polychlorinated Biphenyls (PCBs) were not analysed, as a source of contamination was not identified (i.e. PCB sources identified from electrical supply industry or mining). Poly-Aromatic Hydrocarbons (PAH) were not analysed on the soils as these organic analytes are only typically analysed for service station sites, industrial sites or at sites with above or under ground onsite hydrocarbon storage.

Table 2: Minimum sampling points required for site characterisation based on detecting circular hot-spots by using a systematic sampling pattern (NSW EPA, 1995).

Size of Site (hectare) (1 hectare = 10,000m ²)	Size of Site (m ²)	Number of Sampling Points recommended	Equivalent Sampling Density (points per hectare)	Diameter of the hot spot that can be detected with 95% confidence (metre)
0.1	1000	6	60.0	15.2
0.2	2000	7	35.0	19.9
0.5	5000	13	26.0	23.1
1	10,000	21	21.0	25.7
1.5	15,000	25	16.7	28.9
2.0	20,000	30	15.0	30.5
3.0	30,000	40	13.3	32.4
4.0	40,000	50	12.5	33.4
5.0	50,000	55	11.0	35.6

7.3 Sampling Methodology

Suitably experienced staff from EAL undertook all soil sampling and field investigation works. Samples were collected using a hand auger and stainless steel spade, with soil being placed either in snap lock plastic sample bags or hexane-rinsed glass bottles for pesticides and TPH/BTEX analyses. The sampling procedure utilised in this investigation was in accordance with AS 4482.1 – 2005 and AS 4482.2 - 1999.

All soil samples were placed into an esky with ice bricks, and delivered to the Environmental Analysis Laboratory at Southern Cross University, Lismore. Metals analysis was conducted by EAL and quality control included blanks, duplicates and traceable certified NIST (National Institute of Standards Technology) reference soil in every sample batch. Analysis is conducted using a Perkin Elmer DV4300 ICPOES (Inductively Coupled Plasma Optical Emission Spectrometry) with confirmation and level analysis of all samples using a Perkin Elmer ELANDRC-e ICPMS (Inductively Coupled Plasma Mass Spectrometry). Chain of custody forms, laboratory quality assurance and laboratory quality control documentation are available on request. The analysis of pesticides and petroleum hydrocarbons was subcontracted to the NATA-registered Labmark laboratory (refer to Appendix 3 for subcontracted results with all QA/QC results).

8 BASIS FOR ASSESSMENT CRITERIA

The acceptable limits of the parameters tested are based on the NSW DEC (2006) *Contaminated Sites - Guidelines for the NSW Site Auditor Scheme (2nd Edition)*. In particular, Column 1 (residential), Column 3 (Parks/Open Space) and Column 4 (Commercial or Industrial) of Table 'Soil Investigation Levels for Urban Development Sites in NSW'. Column 1 represents Human - Based Investigation Levels (HBIL) for developments being 'Residential with gardens and accessible soil including children's daycare centres, preschools, primary schools, town houses or villas'. Column 3 represents Parks, recreational open space, playing fields including secondary schools. Column 4 represents Commercial or industrial land uses. The tested parameters are presented in Table 3.

Table 3: Soil investigation levels for urban redevelopment sites in NSW: Column 1 ‘residential’, Column 3 ‘parks/open space’ and Column 4 ‘commercial or industrial’ (NSW DEC 2006).

Substance	Acceptable Limit Individual Column 1 (mg/kg)	Acceptable Limit Individual Column 3 (mg/kg)	Acceptable Limit Individual Column 4 (mg/kg)	Modified Acceptable Limit Column 1 (mg/kg) (divided by 4 for composites of 4 samples)
Arsenic	100	200	500	25
Cadmium	20	40	100	5
Chromium (VI)	100	200	500	25
Copper	1000	2000	5000	250
Lead	300	600	1500	75
Manganese	1500	3000	7500	375
Nickel	600	600	3000	150
Zinc	7000	14000	35000	1750
Mercury	15	30	75	3.75
OC's (aldrin and dieldrin)	10	20	50	2.5
OC's (DDT, DDD, DDE)	200	400	1000	50
>C16-C35 (aromatics)	90	180	450	22.5
>C16- C35	5600	11200	28000	1400
>C35 (aliphatics)	56000	112000	280000	14000

8.1 Background Levels

Metals occur naturally within soils and are a natural constituent of geological materials that erode and assist in the formation of soils. The background levels of metals analysed, obtained from ANZECC and NHMRC (1992) Table 3 ‘Environmental Soil Quality Guidelines’ page 40, are presented in Table 4.

Table 4: Background ranges for potential contaminants.

Pollutant	Background Range (mg/kg)
Arsenic	0.2 – 30
Cadmium	0.04-2
Chromium	0.5 – 110 (<i>possible underestimate</i>)
Copper	1-190
Lead	<2 – 200
Manganese	4 – 12,600
Nickel	2-400
Zinc	2-180
Mercury	0.001-0.1

9 RESULTS

The results from the soil testing regime are shown below in Tables 5 to 11. The soil sampling numbers correlate with the soil sampling locations as shown on Figs. 4 to 6 (Appendix 1).

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Table 5: Summary of soil analysis results for Crawford Rd, East Lismore (Samples within Proposed Residential zone).

ANALYTE	LOR*	Sample Number								Composite Acceptable Limit Column 1	Expected Background Range
		C11 (39,40,47,48)	C 13 (43,44,51,52)	C 15 (55,56,62,63)	C 16 (49,57,64)	C 17 (50,58,59)	C 18 (65,66,70,71)	C19 (67,68,72)	C20 (69,73,74)		
Moisture %	< 1%	26	33	26	29	27	30	23	41	..	..
Metals Suite											
Silver (mg/kg)	< 0.1	0	0	0	0	0	0	0	0	na	na
Arsenic (mg/kg)	< 0.1	1	0	1	2	1	1	1	1	< 25	0.2 - 30
Lead (mg/kg)	< 0.1	7	8	6	19	52	8	9	252	< 75	< 2 - 200
Cadmium (mg/kg)	< 0.1	0	0	0	0	0	0	0	13	< 5	0.04 – 2.0
Chromium (mg/kg)	< 0.1	28	36	22	25	22	33	29	17	< 25	0.5 – 110
Copper (mg/kg)	< 0.1	18	18	47	25	20	17	18	60	< 250	1 - 190
Manganese (mg/kg)	< 0.1	3007	2816	1181	2384	2055	1912	2713	4605	< 375	4 – 12,600
Nickel (mg/kg)	< 0.1	21	30	20	22	15	22	20	29	< 150	2 – 400
Selenium (mg/kg)	< 0.1	1	1	1	1	1	1	1	1	na	na
Zinc (mg/kg)	< 0.1	102	120	142	176	166	99	93	1293	< 1750	2 – 180
Mercury (mg/kg)	< 0.01	0.09	0.10	0.07	0.10	0.11	0.27	0.09	5.26	< 3.75	0.001 – 0.1
Iron (%)	< 1	8.10	6.41	13.38	7.51	5.17	7.01	8.26	7.87	na	na
Aluminium (%)	< 1	3.27	3.81	3.02	2.78	3.06	3.16	3.68	3.42	na	na
Pesticide Analysis Screen											
4,4 DDT (mg/kg)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 50	< 0.2
Methoxychlor (mg/kg)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 2.5	< 0.2
Other Organochlorine Pesticides (mg/kg)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 2.5	< 0.05

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Table 6: Summary of soil analysis results for Crawford Rd, East Lismore (Samples within Proposed Open Space zone).

ANALYTE	LOR*	Sample Number					Individual Acceptable Limit Column 3	Composite Acceptable Limit Column 3	Composite Acceptable Limit Column 1	Expected Background Range
		C1 (1,2,6,7)	C 5 (11,12,16,17)	C 6 (22,23,29,30)	C 10 (37,38,45,46)	C 14 (53,54,60,61)				
Moisture %	< 1%	35	34	34	37	44	..	..	..	..
Metals Suite										
Silver (mg/kg)	< 0.1	0	0	0	0	0	na	na	na	na
Arsenic (mg/kg)	< 0.1	0	0	0	0	0	200	< 50	< 25	0.2 - 30
Lead (mg/kg)	< 0.1	10	5	7	7	24	600	< 150	< 75	< 2 - 200
Cadmium (mg/kg)	< 0.1	0	0	0	0	1	40	< 10	< 5	0.04 – 2.0
Chromium (mg/kg)	< 0.1	21	23	28	28	21	200	< 50	< 25	0.5 – 110
Copper (mg/kg)	< 0.1	14	13	16	16	25	2000	< 500	< 250	1 - 190
Manganese (mg/kg)	< 0.1	539	306	531	782	174	3000	< 750	< 375	4 – 12,600
Nickel (mg/kg)	< 0.1	15	14	17	18	15	600	< 150	< 150	2 – 400
Selenium (mg/kg)	< 0.1	1	1	1	1	1	na	na	na	na
Zinc (mg/kg)	< 0.1	85	69	77	98	402	14000	< 3500	< 1750	2 – 180
Mercury (mg/kg)	< 0.01	0.09	0.10	0.07	0.08	0.10	30	< 7.5	< 3.75	0.001 – 0.1
Iron (%)	< 1	3.83	3.53	3.86	4.03		na	na	na	na
Aluminium (%)	< 1	3.15	3.31	3.46	3.09		na	na	na	na
Pesticide Analysis Screen										
4,4 DDT (mg/kg)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	400	< 100	< 50	< 0.2
Methoxychlor (mg/kg)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	20	< 5	< 2.5	< 0.2
Other Organochlorine Pesticides (mg/kg)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	20	< 5	< 2.5	< 0.05

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Table 7: Summary of soil analysis results for Crawford Rd, East Lismore (Samples within Proposed Industrial zone).

ANALYTE	LOR*	Sample Number							Composite Acceptable Limit Column 4	Composite Acceptable Limit Column 1	Expected Background Range
		C2 (3,4,8,9)	C 3 (5,10,15)	C 4 (13,14,18,19)	C 7 (24,25,31,32)	C 8 (20,21,26,27)	C 9 (28,35,36)	C 12 (28,35,36)			
Moisture %	< 1%	35	34	32	28	25	29	24	..	..	..
Metals Suite											
Silver (mg/kg)	< 0.1	0	0	0	0	0	0	1	na	na	na
Arsenic (mg/kg)	< 0.1	0	1	1	0	1	0	1	< 125	< 25	0.2 - 30
Lead (mg/kg)	< 0.1	8	7	7	7	8	6	8	< 375	< 75	< 2 - 200
Cadmium (mg/kg)	< 0.1	0	0	0	0	0	0	0	< 25	< 5	0.04 – 2.0
Chromium (mg/kg)	< 0.1	17	21	20	26	37	22	29	< 125	< 25	0.5 – 110
Copper (mg/kg)	< 0.1	15	22	20	14	21	19	15	< 1250	< 250	1 - 190
Manganese (mg/kg)	< 0.1	803	1928	2062	1775	1992	1737	4785	< 1875	< 375	4 – 12,600
Nickel (mg/kg)	< 0.1	14	21	23	17	33	23	21	< 750	< 150	2 – 400
Selenium (mg/kg)	< 0.1	2	1	2	1	1	1	1	na	na	na
Zinc (mg/kg)	< 0.1	70	125	108	81	115	124	104	< 8750	< 1750	2 – 180
Mercury (mg/kg)	< 0.01	0.07	0.26	0.31	0.09	0.10	0.05	0.07	< 18.75	< 3.75	0.001 – 0.1
Iron (%)	< 1	5.40	9.11	8.05	5.73	8.63	5.68	7.50	na	na	na
Aluminium (%)	< 1	2.81	2.63	2.86	2.87	3.19	2.59	2.85	na	na	na
Pesticide Analysis Screen											
4,4 DDT (mg/kg)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 250	< 50	< 0.2
Methoxychlor (mg/kg)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 12.5	< 2.5	< 0.2
Other Organochlorine Pesticides (mg/kg)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 12.5	< 2.5	< 0.05

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Table 8: Summary of soil analysis results for Crawford Rd, East Lismore (Targeted samples around houses and sheds within Residential zone).

ANALYTE	Sample Number										Individual Acceptable Limit Column 1	Expected Background Range
	TS 26	TS 27	TS 28	TS 29	TS 30	TS 32	TS 33	TS 35	TS 36	TS 37		
Moisture %	21	24	15	16	9	24	27	9	20	24	..	..
Metals Suite												
Silver (mg/kg)	..	1	..	0	..	0	..	0	..	0	na	na
Arsenic (mg/kg)	..	1	..	1	..	1	..	1	..	6	< 100	0.2 - 30
Lead (mg/kg)	..	43	..	25	..	76	..	7	..	43	< 300	< 2 - 200
Cadmium (mg/kg)	..	2	..	0	..	0	..	0	..	0	< 20	0.04 – 2.0
Chromium (mg/kg)	..	16	..	16	..	22	..	16	..	25	< 100	0.5 – 110
Copper (mg/kg)	..	32	..	33	..	25	..	33	..	75	< 1000	1 - 190
Manganese (mg/kg)	..	1277	..	1118	..	2214	..	1045	..	745	< 1500	4 – 12,600
Nickel (mg/kg)	..	33	..	24	..	26	..	27	..	32	< 600	2 – 400
Selenium (mg/kg)	..	1	..	1	..	1	..	1	..	1	na	na
Zinc (mg/kg)	..	1721	..	197	..	236	..	201	..	426	< 7000	2 – 180
Mercury (mg/kg)	..	0.07	..	0.03	..	0.08	..	0.02	..	0.06	< 15	0.001 – 0.1
Iron (%)	..	8.61	..	7.77	..	10.71	..	7.58	..	4.89	na	na
Aluminium (%)	..	2.11	..	2.12	..	2.97	..	2.02	..	1.55	na	na
Pesticide Analysis Screen												
4,4 DDT (mg/kg)	..	<0.2	..	<0.2	..	<0.2	..	<0.2	..	<0.2	< 200	< 0.2
Methoxychlor (mg/kg)	..	<0.2	..	<0.2	..	<0.2	..	<0.2	..	<0.2	< 10	< 0.2
Other Organochlorine Pesticides (mg/kg)	..	<0.05	..	<0.05	..	<0.05	..	<0.05	..	<0.05	< 10	< 0.05
BTEX												
Benzene (mg/kg)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	< 0.25	..
Toluene (mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 130	..
Ethylbenzene (mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 50	..
Meta-and Para-Xylene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ortho-Xylene (mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylene (mg/kg)	< 25	..

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ANALYTE	Sample Number										Individual Acceptable Limit Column 1	Expected Background Range
	TS 26	TS 27	TS 28	TS 29	TS 30	TS 32	TS 33	TS 35	TS 36	TS 37		
Total Petroleum Hydrocarbons												
C6 – C9 Fraction (mg/kg)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<65	..
C10–C14 Fraction (mg/kg)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	..	..
C15–C28 Fraction (mg/kg)	<100	<100	<100	<100	340	<100	<100	<100	<100	110	..	..
C29–C36 Fraction (mg/kg)	<100	<100	<100	<100	1200	120	120	<100	180	250
Sum of C10 – C36 (mg/kg)	1540	120	120	..	180	360	< 1000	..

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Table 8 (cont.): Summary of soil analysis results for Crawford Rd, East Lismore (Targeted samples around houses and sheds within Residential zone).

ANALYTE	Sample Number										Individual Acceptable Limit Column 1	Expected Background Range
	TS 38	TS 39	TS 40	TS 41	TS 43	TS 44	TS 45	TS 46	TS 47	TS 49		
Moisture %	22	33	21	19	20	4	23	19	27	23	..	..
Metals Suite												
Silver (mg/kg)	..	0	..	0	..	0	..	0	..	0	na	na
Arsenic (mg/kg)	..	2	..	5	..	1	..	1	..	2	< 100	0.2 - 30
Lead (mg/kg)	..	58	..	78	..	15	..	59	..	82	< 300	< 2 - 200
Cadmium (mg/kg)	..	1	..	0	..	0	..	0	..	1	< 20	0.04 – 2.0
Chromium (mg/kg)	..	30	..	22	..	12	..	30	..	23	< 100	0.5 – 110
Copper (mg/kg)	..	34	..	24	..	8	..	38	..	90	< 1000	1 - 190
Manganese (mg/kg)	..	1171	..	753	..	185	..	1772	..	1220	< 1500	4 – 12,600
Nickel (mg/kg)	..	32	..	23	..	8	..	25	..	24	< 600	2 – 400
Selenium (mg/kg)	..	1	..	1	..	0	..	1	..	1	na	na
Zinc (mg/kg)	..	2270	..	248	..	103	..	193	..	312	< 7000	2 – 180
Mercury (mg/kg)	..	0.07	..	0.07	..	0.01	..	0.08	..	0.10	< 15	0.001 – 0.1
Iron (%)	..	13.54	..	4.84	..	1.95	..	14.11	..	7.80	na	na
Aluminium (%)	..	3.88	..	3.13	..	0.50	..	3.26	..	2.76	na	na
Pesticide Analysis Screen												
4,4 DDD (mg/kg)	..	<0.5	..	<0.5	..	<0.5	..	0.06	..	<0.5		
4,4 DDE (mg/kg)	..	<0.5	..	<0.5	..	<0.5	..	0.12	..	<0.5		
4,4 DDT (mg/kg)	..	<0.2	..	<0.2	..	<0.2	..	<0.2	..	<0.2	< 200	< 0.2
Methoxychlor (mg/kg)	..	<0.2	..	<0.2	..	<0.2	..	<0.2	..	<0.2	< 10	< 0.2
Other Organochlorine Pesticides (mg/kg)	..	<0.05	..	<0.05	..	<0.05	..	<0.05	..	<0.05	< 10	< 0.05
BTEX												
Benzene (mg/kg)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	< 0.25	..
Toluene (mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 130	..
Ethylbenzene (mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 50	..
Meta-and Para-Xylene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ortho-Xylene (mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylene (mg/kg)	< 25	..

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ANALYTE	Sample Number										Individual Acceptable Limit Column 1	Expected Background Range	
	TS 38	TS 39	TS 40	TS 41	TS 43	TS 44	TS 45	TS 46	TS 47	TS 49			
Total Petroleum Hydrocarbons													
C6 – C9 Fraction (mg/kg)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	< 65	..
C10–C14 Fraction (mg/kg)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	..	..
C15–C28 Fraction (mg/kg)	400	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	..	..
C29–C36 Fraction (mg/kg)	630	<100	<100	150	<100	<100	<100	<100	<100	<100	<100
Sum of C10 – C36 (mg/kg)	1030	150	< 1000	..

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Table 9: Summary of soil reanalysis results for specific samples within Residential zone, Crawford Rd, East Lismore.

ANALYTE	LOR*	Sample Number								Individual Acceptable Limit Column 1	Expected Background Range
		C20			SP 74A	SP 74B	SP 74C	SP 74D	SP 74E		
		SP 69	SP 73	SP 74							
Metals Suite											
Silver (mg/kg)	< 0.1	0.11	0.12	0.48	0.15	0.16	0.12	0.12	0.11	na	na
Arsenic (mg/kg)	< 0.1	2.84	3.09	5.22	1.10	1.08	1.12	1.23	1.27	< 100	0.2 - 30
Lead (mg/kg)	< 0.1	11.95	13.48	458.30	44.1	10.1	8.98	9.12	5.94	< 300	< 2 - 200
Cadmium (mg/kg)	< 0.1	0.36	0.22	30.51	0.258	0.244	0.142	0.134	0.099	< 20	0.04 – 2.0
Chromium (mg/kg)	< 0.1	17.6	23.5	15.8	15.1	15.8	14.6	17.1	17.3	< 100	0.5 – 110
Copper (mg/kg)	< 0.1	30.2	26.1	210.2	27.7	27.9	24.7	27.9	26.4	< 1000	1 - 190
Manganese (mg/kg)	< 0.1	6742.1	712.2	11934.9	3950	6269	4364	2629	4527	< 1500	4 – 12,600
Nickel (mg/kg)	< 0.1	34.7	23.6	40.7	29.2	32.1	32.2	25.1	28.4	< 600	2 – 400
Selenium (mg/kg)	< 0.1	1.23	1.13	1.97	1.66	1.54	1.08	1.09	1.56	na	na
Zinc (mg/kg)	< 0.1	188.8	166.7	7592.0	271	215	170	172	148	< 7000	2 – 180
Mercury (mg/kg)	< 0.01	0.047	0.065	13.068	0.061	0.048	0.033	0.038	0.059	< 15	0.001 – 0.1
Iron (%)	< 1	15.09	4.52	14.68	13.2	13.3	12.1	13.5	16.2	na	na
Aluminium (%)	< 1	3.50	3.20	3.68	4.03	3.89	3.62	3.43	4.76	na	na

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Table 10: Summary of soil analysis results for Crawford Rd, East Lismore (Samples within Dip Site area/Industrial zone).

ANALYTE	Sample Number									Composite Acceptable Limit Column 4	Composite Acceptable Limit Column 1
	DC 1 (DT3,4,11,12)	DC 2 (DT13-15)	DC 3 (TP17-20)	DC 4 (TP16, 21,22,DT5)	DC 5 (TP23-25)	DC 6 (DT1,TP1,2)	DC 7 (TP 3-5)	DC 8 (DT2,TP6,7)	DC9 (TP8-10)		
Moisture %	24	29	26	29	36	14	30	10	42	..	..
Metals Suite											
Silver (mg/kg)	0	0	1	0	0	0	0	0	0	na	na
Arsenic (mg/kg)	1	3	1	1	1	181	168	16	4	< 125	< 25
Lead (mg/kg)	5	6	6	10	7	5	6	4	6	< 375	< 75
Cadmium (mg/kg)	0	0	0	0	0	0	0	0	0	< 25	< 5
Chromium (mg/kg)	14	20	21	20	20	19	18	15	14	< 125	< 25
Copper (mg/kg)	25	24	21	20	15	26	21	25	23	< 1250	< 250
Manganese (mg/kg)	1304	1629	1892	2593	1392	949	1131	882	1210	< 1875	< 375
Nickel (mg/kg)	24	22	23	23	18	30	24	31	23	< 750	< 150
Selenium (mg/kg)	1	1	1	1	1	1	1	1	1	na	na
Zinc (mg/kg)	124	161	114	132	101	228	128	142	127	< 8750	< 1750
Mercury (mg/kg)	0.07	0.08	0.07	0.12	0.07	0.05	0.06	0.04	0.05	< 18.75	< 3.75
Iron (%)	7.34	5.85	6.93	8.19	7.12	6.73	6.36	6.21	6.88	na	na
Aluminium (%)	3.26	3.05	2.94	3.28	3.32	1.93	2.63	1.62	2.81	na	na
Pesticide Analysis Screen											
4,4 DDD (mg/kg)	..	..	..	..	..	0.06	..	..	..	< 250	< 50
4,4 DDE (mg/kg)	..	..	..	..	..	180.00	..	0.08	..	< 250	< 50
4,4 DDT (mg/kg)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	6.60	< 0.2	< 0.2	< 0.2	< 250	< 50
Methoxychlor (mg/kg)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 12.5	< 2.5
Other Organochlorine Pesticides (mg/kg)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 12.5	< 2.5

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Table 11: Summary of soil reanalysis results for Crawford Rd, East Lismore (Samples within Dip Site area/Industrial zone).

ANALYTE	Sample Number						Individual Acceptable Limit Column 4	Expected Background Range
	DC 6			DC 7				
	DT 1	TP 1	TP 2	TP 3	TP 4	TP 5		
Metals Suite								
Silver (mg/kg)	0.11	0.10	0.79	0.20	0.11	0.11	na	na
Arsenic (mg/kg)	48.96	367.08	35.72	20.46	440.32	188.0	< 500	0.2 - 30
Lead (mg/kg)	3.64	5.63	3.91	2.36	7.41	12.95	< 1500	< 2 - 200
Cadmium (mg/kg)	0.24	0.29	0.22	0.12	0.12	0.46	< 100	0.04 – 2.0
Chromium (mg/kg)	19.7	19.6	17.0	18.6	18.2	18.9	< 500	0.5 – 110
Copper (mg/kg)	32.7	27.5	28.4	31.4	18.7	19.5	< 5000	1 - 190
Manganese (mg/kg)	1086.5	1087.5	941.6	1100.1	1332.3	1573.7	< 7500	4 – 12,600
Nickel (mg/kg)	36.9	30.2	31.3	36.7	16.7	20.0	< 3000	2 – 400
Selenium (mg/kg)	0.67	0.82	0.74	0.64	1.15	1.05	na	na
Zinc (mg/kg)	172.4	440.3	174.7	155.8	118.9	244.6	< 35000	2 – 180
Mercury (mg/kg)	0.096	0.58	0.033	0.015	0.048	0.186	< 75	0.001 – 0.1
Iron (%)	7.58	7.15	6.28	7.27	6.03	6.94	na	na
Aluminium (%)	1.66	1.74	1.32	1.35	2.52	2.73	na	na

10 SITE CHARACTERISATION

The potential sources of contamination identified at the subject site are considered to be from agricultural and residential activities on site (refer Table 1). Broadscale contamination was considered to be unlikely given the predominant land use was cattle grazing and subsequently the broadscale application of pesticides or herbicides is not likely. Broadscale sampling results further confirmed limited contamination on the site (refer Tables 12 to 14 for summary of all results and direct comparison to relevant guideline values).

Table 12: Ranges for potential contaminants within proposed Residential zone at Crawford Rd, East Lismore and comparison to relevant Residential guideline values.

Pollutant	Average concentration (mg/kg)	Concentration Range (mg/kg)	Composite Acceptable Limit (mg/kg) for Residential with Accessible Gardens
Arsenic	1.0	1.0 – 2.0	<25
Lead	45.13	6.0 - 252	<75
Cadmium	1.63	0.0 – 13.0	<5
Copper	27.88	17.0 – 60.0	<250
Nickel	22.38	15.0 – 30.0	<150
Zinc	273.88	93.0 – 1293	<1750
Mercury	0.76	0.1 – 5.26	<3.75
Other Organochlorines	<0.05	..	<2.5

Table 13: Ranges for potential contaminants within proposed Open Space zone at Crawford Rd, East Lismore and comparison to relevant Open space guideline.

Pollutant	Average concentration (mg/kg)	Concentration Range (mg/kg)	Composite Acceptable Limit (mg/kg) for Open Space
Arsenic	0.0	0	<50
Lead	10.6	5.0 – 24.0	<150
Cadmium	0.2	0.0 – 1.0	<10
Copper	16.8	13.0 – 25.0	<500
Nickel	15.8	14.0 – 18.0	<150
Zinc	146.2	69.0 – 402.0	<3500
Mercury	0.09	0.07 – 0.1	<7.5
Other Organochlorines	<0.05	..	<5

Elevated levels of manganese and chromium were identified in a number of the composite samples (refer Tables 5 to 7). In most instances, these levels breached the limit for residential purposes, however, few breached the respective Open Space or Commercial/Industrial limits for the respective samples. No sources of manganese or chromium contamination for the site are evident. Both manganese and chromium are often found in significant background concentrations in the volcanic basalt derived soils in this region (Lancaster 2006). Data can be provided on request by EAL showing the high background manganese (1,780ppm Mn average of 800 soils; range 4 – 12,600ppm) and chromium (55ppm Cr average of 800 soils; range 0.1 – 110ppm) concentrations in the region and correlation with each other and with iron and aluminium (dominant metals in clay minerals). The NSW EPA 1995 guidelines allows the option of removing background concentrations from site assessment levels hence in many cases reducing potentially elevated levels to negligible levels of no concern.

*Environmental Analysis Laboratory –Contaminated Land Assessment***Table 14: Ranges for potential contaminants within proposed Industrial zone at Crawford Rd, East Lismore and comparison to relevant Industrial guideline.**

Pollutant	Average concentration (mg/kg)	Concentration Range (mg/kg)	Composite Acceptable Limit (mg/kg) for Open Space
Arsenic	0.6	0 – 1.0	<125
Lead	7.3	6.0 – 8.0	<375
Cadmium	0	0.0	<25
Copper	18.0	14.0 – 22.0	<1250
Nickel	21.7	14.0 – 33.0	<750
Zinc	103.9	70.0 – 125.0	<8750
Mercury	0.14	0.05 – 0.31	<18.75
Other Organochlorines	<0.05	..	<12.5

With the exception of composite sample C20, all other metal concentrations in the samples analysed were well below the DEC (2006) guidelines for each of the correspondingly zoned areas for this assessment of contamination.

Concentrations for Lead and Mercury recorded for Composite Sample 20 were found to be above the adopted acceptable limit (Column 1, Residential) with levels of Zinc also found to be elevated above background levels (Refer Table 5). Further analysis of the individual samples identified soils collected from individual sample point SP74 had concentrations of Lead, Cadmium, Manganese and Zinc above the adopted Residential guideline values and Copper and Mercury were found at levels elevated above expected background values. Additional sampling was undertaken around SP74 to determine the lateral extent of the contamination (Refer Fig. 4; Appendix 1). All metal concentrations in the additional samples analysed were well below the DEC (2006) Residential guidelines with the exception of Manganese. The level of Manganese can be attributed to natural background levels in the volcanic basalt derived soils in this region (Lancaster 2006). Elevated levels of Lead and Zinc and higher levels of Copper and Mercury in the original sample (SP74) could not be attributed to any obvious contamination source as no buildings or remnants were located in the area (refer Plate 8, Appendix 2). Lead and Zinc is often associated with paint, while Copper and Mercury are associated with fungicides for horticultural land uses. It is therefore possible the contamination has resulted from the disposal of paint and fungicides in the area but no anecdotal evidence is available to confirm this assumption. Further, the result could be considered an anomaly. At the least, the contamination is restricted to a very small area as the sample taken as close as possible to the original location (74E) did not record elevated Lead or Zinc levels nor did other samples taken within a 10m circumference of the original sample (i.e. SP74).

A number of targeted samples were collected in the vicinity of the houses and sheds located within the proposed Residential zone of the site (Refer Table 8). All metal concentrations in the samples analysed were well below the DEC (2006) guideline values for Residential land uses with the exception of two samples exhibiting elevated Manganese levels. As discussed previously, these levels are considered natural background levels for the soils at the site. Zinc was also recorded at elevated levels to expected background values. These levels were well below the adopted acceptable limit for this assessment.

Concentrations of TPH were recorded at levels that breached the adopted guideline values for Service Station sites (EPA 1994) in two samples taken in close proximity to sheds (Refer Table 8). If samples had been reanalysed for distribution of aromatics and aliphatics it is likely the analysis would confirm the dominance of aliphatics present as the portion of aliphatics is much greater and aromatics tend to volatilise with time and be more readily biodegradable and water soluble. Thus, the Column 1 Residential limit of 56,000 mg/kg (DEC 2006) are considered appropriate and thereby the levels found do not breach this limit. Further, the TPH contamination found would most likely be attributed to activities such as oil leaks from tractors/farm machinery while parked and/or during maintenance works and would be expected be confined to very small areas. That is, it is unlikely the contamination would be distributed across a wide surface area or be dispersed vertically through the soil profile.

No pesticides were present above analytical detection limits either the composite or targeted samples analysed.

Analysis of samples taken in the vicinity of the decommissioned Maize Grove dip site showed no elevated levels of metals or pesticides for the majority of the investigated area. The exceptions were all samples showed elevated levels of Manganese to varying intensity (refer Table 10) which can be attributed to natural background levels. Elevated Arsenic levels were found in Composite samples DC6 and DC7. Further reanalysis of these samples (i.e. DT1 and TP 1 to 5) showed that while Arsenic levels were elevated they did not breach the acceptable DEC (2006) Column 4, Commercial/Industrial limit. However, as a precautionary measure it is advised the area is excluded for development if a subsequent development proposal allows. The topography of the area is relatively flat and as Arsenic typically binds strongly to soil. The spread of contamination is considered limited to the area assessed and the remaining area within the 200m buffer zone would be suitable to further development. The dip site area should be fenced off, clearly marked and access excluded. If a specific industrial land use is proposed for the area, it is advised further assessment is undertaken to determine the allowable activity and extent of the footprint or the ultimate requirement for any remedial activities. For example, the area may be well suited to the placement of an industrial shed which would effectively cap the contamination. The sizing and shape of such a shed and access would need to ensure the contaminated area is contained beneath the development footprint and the remaining area would need to be validated.

11 CONCLUSIONS AND RECOMMENDATIONS

The soil-sampling regime was based on a systematic sampling pattern combined with targeted sampling around buildings on the site and a decommissioned dip site. The initial soil analysis confirmed the site generally is not contaminated on a broadscale basis but further investigation in isolated areas was warranted.

Composite Sample 20 analysis results indicated lead and mercury levels above the modified Column 1 HBIL and therefore the analysis of individual soil was required to further characterise the site. Further analysis of the individual samples (69, 73 and 74) showed that only Sample 74 exceeded the adopted limit (300 mg/kg) for individual samples for Lead as defined under Column 1 HBIL. Mercury levels in this sample were shown to be elevated, but didn't breach the limit. However, Zinc levels did exceed the acceptable limit (7000 mg/kg) and subsequently further sampling of the area was undertaken. These subsequent results could not identify any further contamination or potential source of contamination. It is concluded that this contamination is a result of potential disposal of paint or fungicides and is very isolated and does not warrant any further investigation.

Similarly, targeted sampling around building on the site did not generally result in acceptable limits being breached. Levels of TPH near tow (2) farm sheds just breached the acceptable limit for Service Station sites. It is concluded that these levels are inconsequential as if further analysis is undertaken the TPH found is likely to be from the aliphatic fraction and the Column 1 HBIL may be utilised of which the levels found do not breach.

Analysis of samples taken in the vicinity of the decommissioned Maize Grove dip site in general showed no elevated levels of metals or pesticides for the majority of the investigated area. The exception was elevated Arsenic levels found in Composite samples DC6 and DC7. Further reanalysis of these samples (i.e. DT1 and TP 1 to 5) showed that while Arsenic levels were elevated (above expected background values) however they did not breach the acceptable Column 4 HBIL. However, it is recommended as a precautionary measure, the area is excluded for development if a subsequent development proposal allows. The dip site area should be fencing off and access excluded. If a specific industrial land use is proposed for the area, it is advised further assessment is undertaken to determine the allowable activity and extent of the footprint. For example, the area may be well suited to the placement of an industrial shed which would effectively cap the contamination. The sizing and shape of such a shed and access would need to ensure the contaminated area is contained beneath the development footprint and the remaining area would need to be validated.

Based on the findings of this preliminary investigation, should the site be utilised for residential purposes (residential dwelling construction, domestic gardens etc), Open space and Industrial/Commercial purposes (as indicated in Fig. 2, Appendix 1) the site is generally not considered to represent a significant risk of harm to end users of the proposed development. A detailed investigation of the entire site is not recommended. Rather, some supplementary (validation) sampling in the locality of the decommissioned dip site is recommended *if* the area is to be utilised for an industrial/commercial purpose. Subsequent management options can thereby be determined.

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Summary of Experience and Qualifications.

The Environmental Analysis Laboratory, which is part of Southern Cross University, consists of a large range of analysts, chemists, environmental managers and scientists. The qualifications, contained by the persons of the company, include:

- PhD (*Horticulture*)
- Bachelor (*Applied Science with Honours*), (*Environmental Science with Honours*), (*Applied Science*), (*Science*), (*Science in Applied Physical Geography with Honours*), (*Agricultural Science with Honours*)
- Diploma (*Chemistry*)
- Certificate 3 (*Lab Technician*)

We have a wide range of experience and worked on a number of varied projects, which include:

- Contamination Assessment Reports for Residential, Industrial and Commercial Sites
- Acid Sulfate soil assessment and management
- Petrochemical assessment and rehabilitation
- Analysis and Rehabilitation of dipsites
- Assessment of former banana plantations
- Assessment of disposal and reuse of Biosolids
- Assessment of general agricultural and residential sites.

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Disclaimer

The Environmental Analysis Laboratory (EAL) as part of Southern Cross University has conducted work concerning the environmental status of the property, which is the subject of this report, and has prepared this report on the basis of that assessment.

The work was conducted, and the report has been prepared, in response to specific instructions from the client or a representative of the client to whom this report is addressed, within the time and budgetary requirements of the client, and in reliance on certain data and information made available to EAL. The analysis, evaluations, opinions and conclusions presented in this report are based on that information, and they could change if the information is in fact inaccurate or incomplete.

EAL has made no allowance to update this report and has not taken into account events occurring after the time its assessment was conducted.

This report is intended for the sole use of the client and only for the purpose for which it was prepared. Any representation contained in the report is made only to the client unless otherwise noted in the report. Any third party who relies on this report or on any representation contained in it does so at their own risk.

APPENDIX 1: FIGURES



Figure 1: Location of the study site within Lismore Source Google maps - <http://maps.google.com.au/maps>

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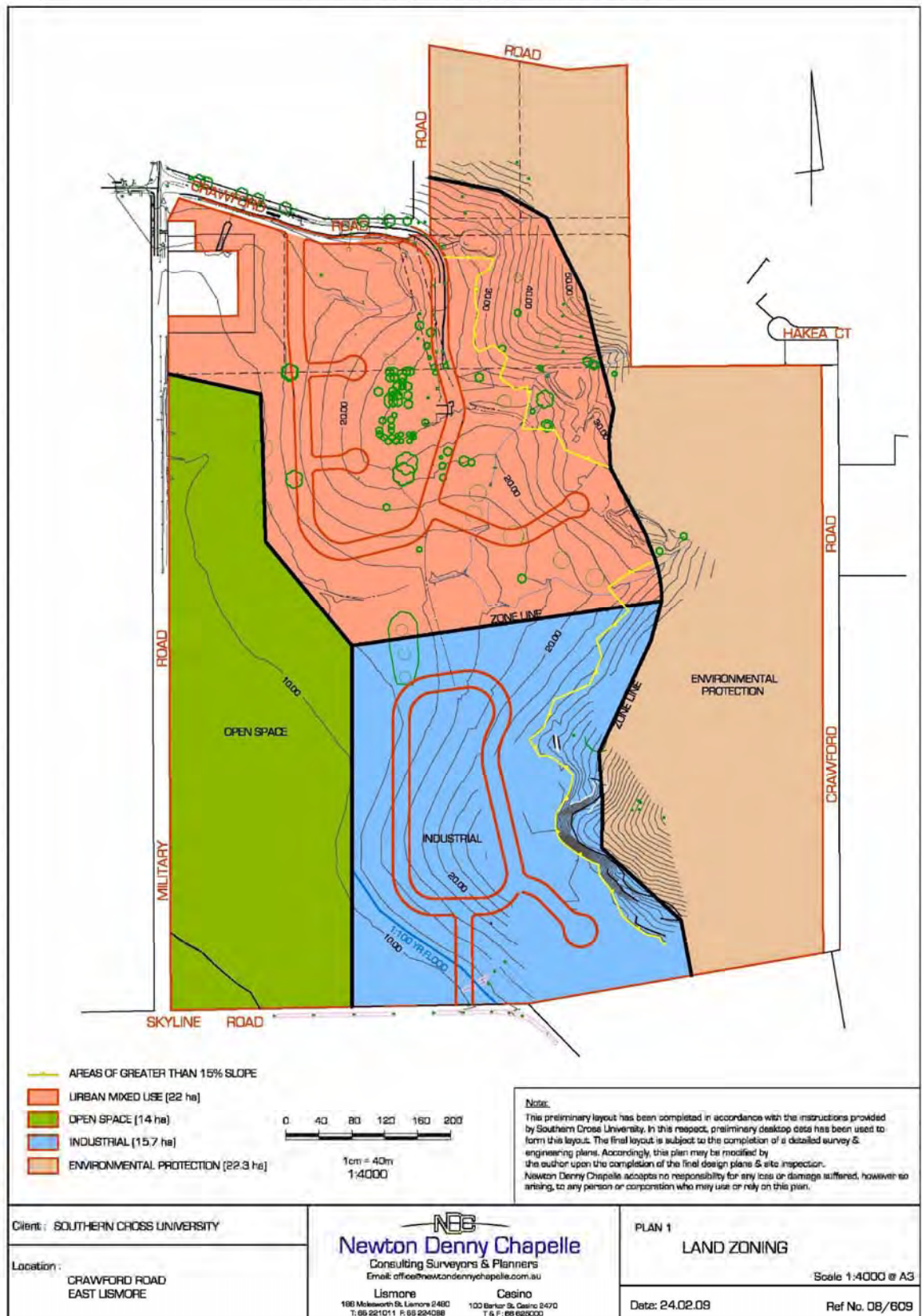


Figure 2: Proposed Land Zoning Layout Source: Newton Denny Chapelle

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Figure 3: Site Layout features

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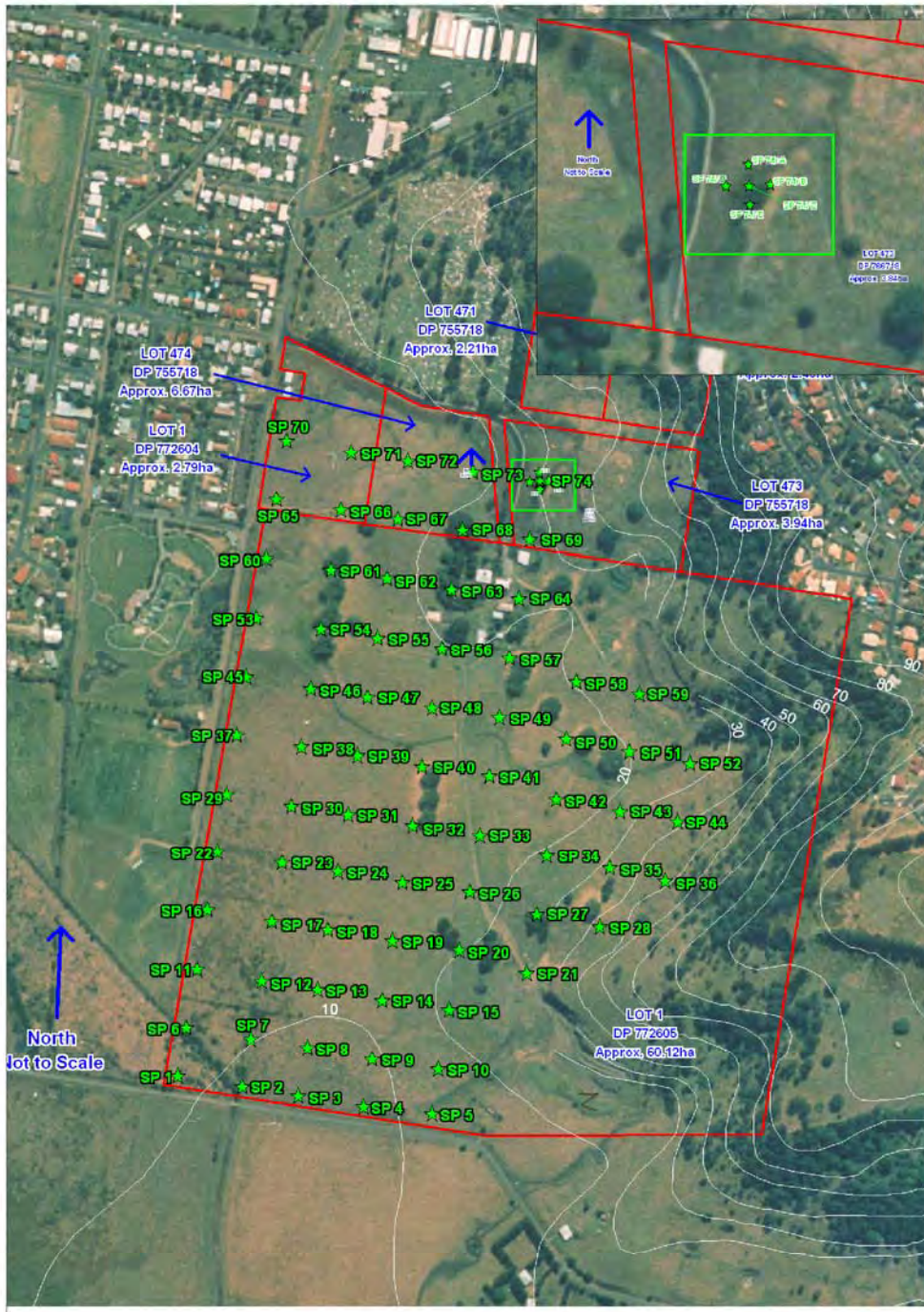


Figure 4: Broadscale sampling locations

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Figure 5: Targeted sampling locations in the vicinity of house and sheds.

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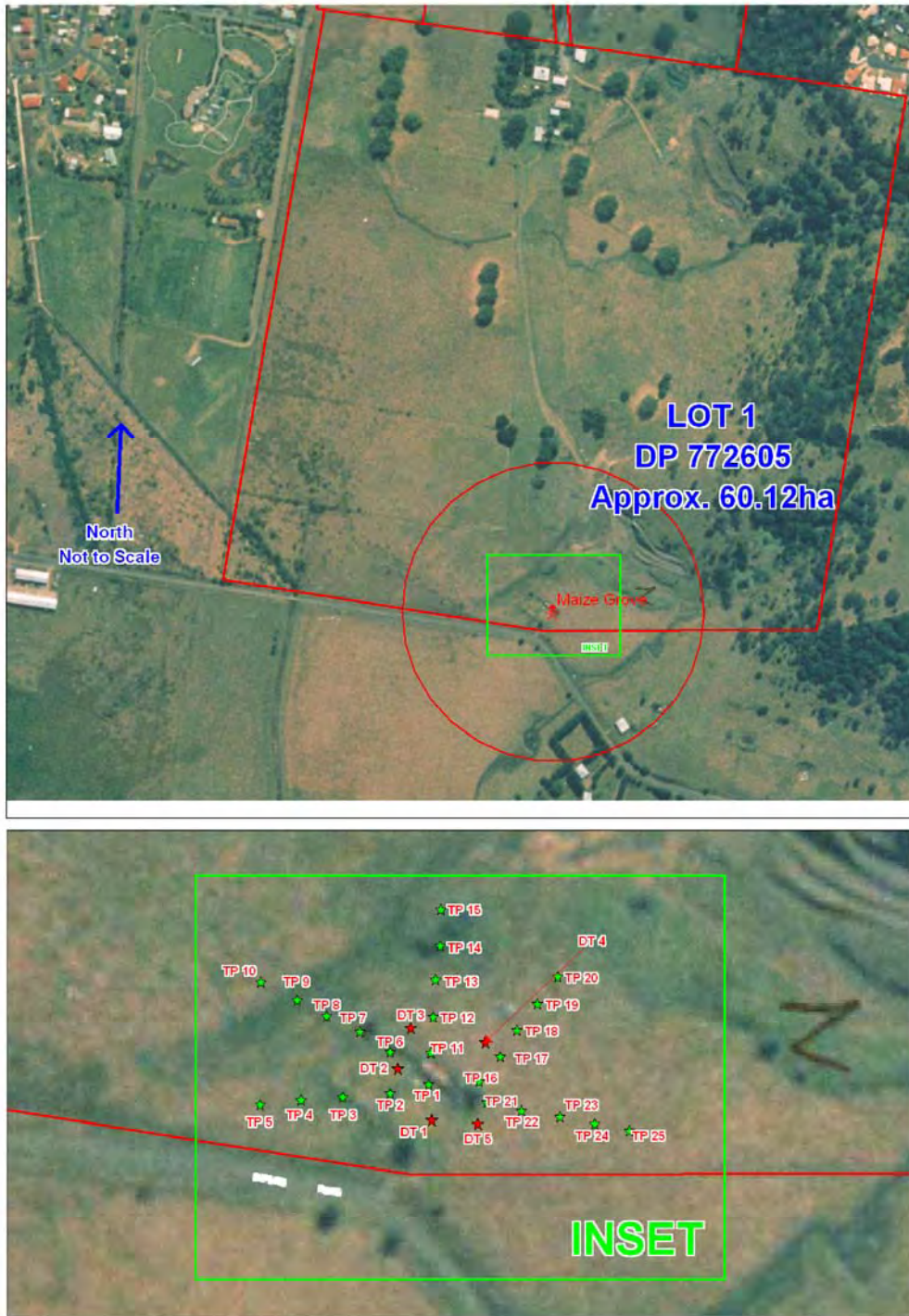


Figure 6: Dip site sampling locations

APPENDIX 2: PHOTOGRAPHS OF THE SITE



Plate 1: Northerly view of quarry face.



Plate 2 (above): Signage on Dip Site



Plate 3 (right): Remnants of Maize Grove Dip Site

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Plate 4: General view of cattle grazing paddock.



**Plate 5 (left) and Plate 6 (below):
General views of condition of
farm sheds located on the site.**



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Plate 7: Westerly view towards Country Energy's substation.



Plate 8: Westerly view of Sampling Point 74 (marked with shovel in left of frame).

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**APPENDIX 3: LABORAOTRY CERTIFICATES, COC AND SUBCONTRACTED RESULTS
WITH QC/QA INFO**

RESULTS OF SOIL ANALYSIS (Page 1 of 1)

127 soil samples supplied by Southern Cross University on 26th & 27th February 2009 - Lab Job No. A2329
 Soil samples supplied were composited by EAL into 29 composite samples + 20 individual samples for analysis
 Analysis requested by Mike Cooper/Geoff Coltee Your Job: XXXX

ANALYTE	METHOD REFERENCE	Composite Sample C1 1,2,6,7	Composite Sample C2 3,4,8,9	Composite Sample C3 5,10,15	Composite Sample C4 13,14,18,19	Composite Sample C5 11,12,16,17	Composite Sample C6 22,23,29,30	Composite Sample C7 24,25,31,32	Composite Sample C8 20,21,26,27	Composite Sample C9 28,35,36	Composite Sample C10 37,38,45,46	Composite Acceptable Limit Column 1	Individual Acceptable Limit Column 1	Background Range
	Job No.	A2329/1	A2329/2	A2329/3	A2329/4	A2329/5	A2329/6	A2329/7	A2329/8	A2329/9	A2329/10	See note 1	See note 1	See note 2
MOISTURE %	c	35	35	34	32	34	34	28	25	29	37	..	..	..
SILVER (mg/Kg DW)	a	0	0	0	0	0	0	0	0	0	0	na	na	na
ARSENIC (mg/Kg DW)	a	0	0	1	1	0	0	0	1	0	0	<25	< 100	0.2-30
LEAD (mg/Kg DW)	a	10	8	7	7	5	7	7	8	6	7	<75	< 300	<2-200
CADMIUM (mg/Kg DW)	a	0	0	0	0	0	0	0	0	0	0	<5	< 20	0.04-2.0
CHROMIUM (mg/Kg DW)	a	21	17	21	20	23	28	26	37	22	28	..	..	..
COPPER (mg/Kg DW)	a	14	15	22	20	13	16	14	21	19	16	<250	< 1000	1-190
MANGANESE (mg/Kg DW)	a	539	803	1928	2062	306	531	1775	1992	1737	782	..	..	..
NICKEL (mg/Kg DW)	a	15	14	21	23	14	17	17	33	23	18	<150	< 600	2-400
SELENIUM (mg/Kg DW)	a	1	2	1	2	1	1	1	1	1	1	na	na	na
ZINC (mg/Kg DW)	a	85	70	125	108	69	77	81	115	124	98	<1750	< 7000	2-180
MERCURY (mg/Kg DW)	a	0.09	0.07	0.26	0.31	0.10	0.07	0.09	0.10	0.05	0.08	<3.75	< 15	0.001-0.1
IRON (% DW)	a	3.83	5.40	9.11	8.05	3.53	3.86	5.73	8.63	5.68	4.03	na	na	na
ALUMINIUM (% DW)	a	3.15	2.81	2.63	2.86	3.31	3.46	2.87	3.19	2.59	3.09	na	na	na
PESTICIDE ANALYSIS SCREEN														
4, 4 DDT (mg/Kg)	c	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<50	< 200	<0.2
Methoxychlor (mg/kg)	c	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<2.5	< 10	<0.2
Other Organochlorine Pesticides (mg/Kg)	c	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<2.5	< 10	<0.05

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ANALYTE	METHOD REFERENCE	Composite Sample C11	Composite Sample C12	Composite Sample C13	Composite Sample C14	Composite Sample C15	Composite Sample C16	Composite Sample C17	Composite Sample C18	Composite Sample C19	Composite Sample C20	Composite Acceptable Limit Column 1	Individual Acceptable Limit Column n 1	Background Range
		39,40,47,48	33,34,41,42	43,44,51,52	53,54,60,61	55,56,62,63	49,57,64	50,58,59	65,66,70,71	67,68,72	69,73,74	See note 1	See note 1	See note 2
	Job No.	A2329/11	A2329/12	A2329/13	A2329/14	A2329/15	A2329/16	A2329/17	A2329/18	A2329/19	A2329/20			
MOISTURE %	c	26	24	33	44	26	29	27	30	23	41	..	..	..
SILVER (mg/Kg DW)	a	0	1	0	0	0	0	0	0	0	0	na	na	na
ARSENIC (mg/Kg DW)	a	1	1	0	0	1	2	1	1	1	1	<25	< 100	0.2-30
LEAD (mg/Kg DW)	a	7	8	8	24	6	19	52	8	9	252	<75	< 300	<2-200
CADMIUM (mg/Kg DW)	a	0	0	0	1	0	0	0	0	0	13	<5	< 20	0.04-2.0
CHROMIUM (mg/Kg DW)	a	28	29	36	21	22	25	22	33	29	17	..	..	..
COPPER (mg/Kg DW)	a	18	15	18	25	47	25	20	17	18	60	<250	< 1000	1-190
NICKEL (mg/Kg DW)	a	3007	4785	2816	174	1181	2384	2055	1912	2713	4605	..	..	..
SELENIUM (mg/Kg DW)	a	21	21	30	15	20	22	15	22	20	29	<150	< 600	2-400
ZINC (mg/Kg DW)	a	1	1	1	1	1	1	1	1	1	1	na	na	na
MERCURY (mg/Kg DW)	a	102	104	120	402	142	176	166	99	93	1293	<1750	< 7000	2-180
IRON (% DW)	a	0.09	0.07	0.10	0.10	0.07	0.10	0.11	0.27	0.09	5.26	<3.75	< 15	0.001-0.1
ALUMINIUM (% DW)	a	8.10	7.50	6.41	3.13	13.38	7.51	5.17	7.01	8.26	7.87	na	na	na
PESTICIDE ANALYSIS SCREEN														
4, 4 DDT (mg/Kg)	c	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<50	< 200	<0.2
Methoxychlor (mg/Kg)	c	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<2.5	< 10	<0.2
Other Organochlorine Pesticides (mg/Kg)	c	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<2.5	< 10	<0.05

ANALYTE	METHOD REFERENCE	Composite Sample DC1	Composite Sample DC2	Composite Sample DC3	Composite Sample DC4	Composite Sample DC5	Composite Sample DC6	Composite Sample DC7	Composite Sample DC8	Composite Sample DC9	BLANK	Composite Acceptable Limit Column 1	Individual Acceptable Limit Column n 1	Background Range
		DT3,DT4,11,12	TP13,14,15	TP17,18,19,20	TP16,21,22,DT5	TP23,24,25	DT1,TP1,2	TP3,4,5	DT2,TP6,7	TP8,9,10	See note 1	See note 1	See note 2	
	Job No.	A2329/21	A2329/22	A2329/23	A2329/24	A2329/25	A2329/26	A2329/27	A2329/28	A2329/29				
MOISTURE %	c	24	29	26	29	36	14	30	10	42		..	..	..
SILVER (mg/Kg DW)	a	0	0	1	0	0	0	0	0	0		na	na	na
ARSENIC (mg/Kg DW)	a	1	3	1	1	1	181	168	16	4		<25	< 100	0.2-30
LEAD (mg/Kg DW)	a	5	6	6	10	7	5	6	4	6		<75	< 300	<2-200
CADMIUM (mg/Kg DW)	a	0	0	0	0	0	0	0	0	0		<5	< 20	0.04-2.0
CHROMIUM (mg/Kg DW)	a	14	20	21	20	20	19	18	15	14		..	..	..
COPPER (mg/Kg DW)	a	25	24	21	20	15	26	21	25	23		<250	< 1000	1-190
MANGANESE (mg/Kg DW)	a	1304	1629	1892	2593	1392	949	1131	882	1210		..	..	..
NICKEL (mg/Kg DW)	a	24	22	23	23	18	30	24	31	23		<150	< 600	2-400
SELENIUM (mg/Kg DW)	a	1	1	1	1	1	1	1	1	1		na	na	na
ZINC (mg/Kg DW)	a	124	161	114	132	101	228	128	142	127		<1750	< 7000	2-180
MERCURY (mg/Kg DW)	a	0.07	0.08	0.07	0.12	0.07	0.05	0.06	0.04	0.05		<3.75	< 15	0.001-0.1
IRON (% DW)	a	7.34	5.85	6.93	8.19	7.12	6.73	6.36	6.21	6.88		na	na	na
ALUMINIUM (% DW)	a	3.26	3.05	2.94	3.28	3.32	1.93	2.63	1.62	2.81		na	na	na
PESTICIDE ANALYSIS SCREEN														
4,4-DDD (mg/Kg)	c	..	..	..	..	..	0.06	..	..	..	
4,4-DDE (mg/Kg)	c	..	..	..	..	..	180.00	..	0.08	..				
4, 4 DDT (mg/Kg)	c	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		<50	< 200	<0.2
Methoxychlor (mg/Kg)	c	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		<2.5	< 10	<0.2
Other Organochlorine Pesticides (mg/Kg)	c	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		<2.5	< 10	<0.05

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ANALYTE	METHOD REFERENCE	Sample 30 TS26	Sample 31 TS27	Sample 32 TS28	Sample 33 TS29	Sample 34 TS30	Sample 35 TS31	Sample 36 TS32	Sample 37 TS35	Sample 38 TS36	Sample 39 TS37	Composite Acceptable Limit Column 1	Individual Acceptable Limit Column 1	Background Range
	Job No.	A2329/30	A2329/31	A2329/32	A2329/33	A2329/34	A2329/35	A2329/36	A2329/37	A2329/38	A2329/39	See note 1	See note 1	See note 2
MOISTURE %	c	21	24	15	16	9	24	27	9	20	24	..	..	..
SILVER (mg/Kg DW)	a	..	1	..	0	..	0	..	0	..	0	na	na	na
ARSENIC (mg/Kg DW)	a	..	1	..	1	..	1	..	1	..	6	<25	< 100	0.2-30
LEAD (mg/Kg DW)	a	..	43	..	25	..	76	..	7	..	43	<75	< 300	<2-200
CADMIUM (mg/Kg DW)	a	..	2	..	0	..	0	..	0	..	0	<5	< 20	0.04-2.0
CHROMIUM (mg/Kg DW)	a	..	16	..	16	..	22	..	16	..	25	..	..	..
COPPER (mg/Kg DW)	a	..	32	..	33	..	25	..	33	..	75	<250	< 1000	1-190
MANGANESE (mg/Kg DW)	a	..	1277	..	1118	..	2214	..	1045	..	745	..	..	..
NICKEL (mg/Kg DW)	a	..	33	..	24	..	26	..	27	..	32	<150	< 600	2-400
SELENIUM (mg/Kg DW)	a	..	1	..	1	..	1	..	1	..	1	na	na	na
ZINC (mg/Kg DW)	a	..	1721	..	197	..	236	..	201	..	426	<1750	< 7000	2-180
MERCURY (mg/Kg DW)	a	..	0.07	..	0.03	..	0.08	..	0.02	..	0.06	<3.75	< 15	0.001-0.1
IRON (% DW)	a	..	8.61	..	7.77	..	10.71	..	7.58	..	4.89	na	na	na
ALUMINIUM (% DW)	a	..	2.11	..	2.12	..	2.97	..	2.02	..	1.55	na	na	na
PESTICIDE ANALYSIS SCREEN														
4, 4 DDT (mg/Kg)	c	..	< 0.2	..	< 0.2	..	< 0.2	..	< 0.2	..	< 0.2	<50	< 200	<0.2
Methoxychlor (mg/kg)	c	..	< 0.2	..	< 0.2	..	< 0.2	..	< 0.2	..	< 0.2	<2.5	< 10	<0.2
Other Organochlorine Pesticides (mg/Kg)	c	..	< 0.05	..	< 0.05	..	< 0.05	..	< 0.05	..	< 0.05	<2.5	< 10	<0.05
BTEX														
Benzene (mg/Kg)	c	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	..	..	..
Toluene (mg/Kg)	c	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	..	..	..
Ethylbenzene (mg/Kg)	c	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	..	..	..
Meta-and-Para-Xylene (mg/Kg)	c	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	..	..	..
Ortho-Xylene (mg/Kg)	c	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	..	..	..
Total Xylene (mg/Kg)	c	..	..	..	..	..	..	..	..	..	..	..	..	..
Total Petroleum Hydrocarbons														
C6 - C9 Fraction (mg/Kg)	c	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	..	..	..
C10-C14 Fraction (mg/Kg)	c	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	..	..	..
C15-C28 Fraction (mg/Kg)	c	< 100	< 100	< 100	< 100	340	< 100	< 100	< 100	< 100	110	..	..	..
C29-C36 Fraction (mg/Kg)	c	< 100	< 100	< 100	< 100	1200	120	120	< 100	180	250
Sum of C10-C36 (mg/Kg)	c	1540	120	120	..	180	360

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This report supercedes reports issued on: N/A

Laboratory Identification	200385	200386	200387	200388	200389	200390	200391	200392	200393	200394
Sample Identification	A2329/30	A2329/31	A2329/32	A2329/33	A2329/34	A2329/35	A2329/36	A2329/37	A2329/38	A2329/39
Depth (m)	--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09
Method : E002.2										
BTEX by P&T	EQL									
Benzene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- and para-Xylene	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
ortho-Xylene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylene	--	--	--	--	--	--	--	--	--	--
CDFB (Surr @ 10mg/kg)	--	95%	93%	96%	92%	96%	88%	90%	92%	89%
Method : E003.2										
Volatile TPH by P&T (vTPH)	EQL									
C6 - C9 Fraction	10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E003.2: 8-10g soil extracted with 20ml methanol. Analysis by P&T/GC/FID.
 E002.2: 8-10g soil extracted with 20ml methanol. Analysis by P&T/GC/PID/MSD.

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Laboratory Identification		200395	200396	200397	200398	200399	200400	200401	200402	200403	200404
Sample Identification		A2329/40	A2329/41	A2329/42	A2329/43	A2329/44	A2329/45	A2329/46	A2329/47	A2329/48	A2329/49
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date		9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date		10/3/09	10/3/09	10/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09
Method : E002.2											
BTEX by P&T		EQL									
Benzene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- and para-Xylene	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
ortho-Xylene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylene	--	--	--	--	--	--	--	--	--	--	--
CDFB (Surr @ 10mg/kg)	--	80%	85%	83%	88%	88%	100%	86%	89%	86%	85%
Method : E003.2											
Volatile TPH by P&T (vTPH)		EQL									
C6 - C9 Fraction	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E003.2: 8-10g soil extracted with 20ml methanol. Analysis by P&T/GC/FID.

E002.2: 8-10g soil extracted with 20ml methanol. Analysis by P&T/GC/PID/MSD.

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Laboratory Identification		200386d	200386r	200394d	200394r	200388s	lcs	mb			
Sample Identification		QC	QC	QC	QC	QC	QC	QC			
Depth (m)		--	--	--	--	--	--	--			
Sampling Date recorded on COC		--	--	--	--	--	--	--			
Laboratory Extraction (Preparation) Date		9/3/09	--	9/3/09	--	9/3/09	9/3/09	9/3/09			
Laboratory Analysis Date		10/3/09	--	10/3/09	--	11/3/09	9/3/09	9/3/09			
Method ; E002.2											
BTEX by P&T		EQL									
Benzene	0.2	<0.2	--	<0.2	--	96%	102%	<0.2			
Toluene	0.5	<0.5	--	<0.5	--	96%	103%	<0.5			
Ethylbenzene	0.5	<0.5	--	<0.5	--	91%	99%	<0.5			
meta- and para-Xylene	1	<1	--	<1	--	94%	103%	<1			
ortho-Xylene	0.5	<0.5	--	<0.5	--	93%	102%	<0.5			
Total Xylene	--	--	--	--	--	--	--	--			
<i>CDFB (Surr @ 10mg/kg)</i>	--	92%	1%	94%	3%	94%	102%	102%			
Method ; E003.2											
Volatile TPH by P&T (vTPH)		EQL									
C6 - C9 Fraction	10	<10	--	<10	--	94%	105%	<10			

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

E003.2: 8-10g soil extracted with 20ml methanol. Analysis by P&T/GC/FID.
 E002.2: 8-10g soil extracted with 20ml methanol. Analysis by P&T/GC/PID/MSD.

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Laboratory Identification	200385	200386	200387	200388	200389	200390	200391	200392	200393	200394
Sample Identification	A2329/30	A2329/31	A2329/32	A2329/33	A2329/34	A2329/35	A2329/36	A2329/37	A2329/38	A2329/39
Depth (m)	--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09
Method : E006.2										
Petroleum Hydrocarbons (TPH)	EQL									
C10 - C14 Fraction	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	<100	<100	<100	<100	340	<100	<100	<100	110
C29 - C36 Fraction	100	<100	<100	<100	<100	1200	120	120	<100	180
Sum of TPH C10 - C36	--	--	--	--	--	1540	120	120	--	360

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

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

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Laboratory Identification		200395	200396	200397	200398	200399	200400	200401	200402	200403	200404
Sample Identification		A2329/40	A2329/41	A2329/42	A2329/43	A2329/44	A2329/45	A2329/46	A2329/47	A2329/48	A2329/49
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date		9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date		10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	11/3/09	11/3/09
Method : E006.2											
Petroleum Hydrocarbons (TPH)		EQL									
C10 - C14 Fraction	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	400	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	100	630	<100	<100	150	<100	<100	<100	<100	<100	<100
Sum of TPH C10 - C36	--	1030	--	--	150	--	--	--	--	--	--

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

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

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Laboratory Identification		200386d	200386r	200394d	200394r	200388s	lcs	mb			
Sample Identification		QC	QC	QC	QC	QC	QC	QC			
Depth (m)		--	--	--	--	--	--	--			
Sampling Date recorded on COC		--	--	--	--	--	--	--			
Laboratory Extraction (Preparation) Date		9/3/09	--	9/3/09	--	9/3/09	9/3/09	9/3/09			
Laboratory Analysis Date		10/3/09	--	10/3/09	--	10/3/09	9/3/09	9/3/09			
Method : E006.2											
Petroleum Hydrocarbons (TPH)		EQL									
C10 - C14 Fraction	50	<50	--	<50	--	--	--	<50			
C15 - C28 Fraction	100	<100	--	<100	--	95%	90%	<100			
C29 - C36 Fraction	100	<100	--	190	27%	--	--	<100			
Sum of TPH C10 - C36	--	--	--	190	62%	--	--	--			

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

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

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Laboratory Identification		200356	200357	200358	200359	200360	200361	200362	200363	200364	200365
Sample Identification		A2329/1	A2329/2	A2329/3	A2329/4	A2329/5	A2329/6	A2329/7	A2329/8	A2329/9	A2329/10
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date		9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date		11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09
Method : E013.2											
Organochlorine Pesticides (OC)		EQL									
a-BHC	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	0.05	<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	<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	<0.05
d-BHC	0.05	<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	<0.05
Aldrin	0.05	<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	<0.05
trans-chlordane	0.05	<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	<0.05
cis-chlordane	0.05	<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	<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	<0.05
Endrin	0.05	<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	<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	<0.05
Endosulfan sulphate	0.05	<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	<0.2
Methoxychlor	0.2	<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)	--	85%	78%	77%	85%	73%	108%	80%	78%	79%	75%

Results expressed in mg/kg dry weight unless otherwise specified
 Comments: ## Percent recovery not available due to interference from the sample.

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

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Laboratory Identification		200366	200367	200368	200369	200370	200371	200372	200373	200374	200375
Sample Identification		A2329/11	A2329/12	A2329/13	A2329/14	A2329/15	A2329/16	A2329/17	A2329/18	A2329/19	A2329/20
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date		9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date		11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09
Method : E013.2											
Organochlorine Pesticides (OC)	EQL										
a-BHC	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	0.05	<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	<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	<0.05
d-BHC	0.05	<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	<0.05
Aldrin	0.05	<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	<0.05
trans-chlordane	0.05	<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	<0.05
cis-chlordane	0.05	<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	<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	<0.05
Endrin	0.05	<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	<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	<0.05
Endosulfan sulphate	0.05	<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	<0.2
Methoxychlor	0.2	<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)	--	80%	75%	73%	66%	74%	125%	83%	73%	76%	100%

Results expressed in mg/kg dry weight unless otherwise specified

Comments ## Percent recovery not available due to interference from the sample.

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

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This report supercedes reports issued on: N/A

Laboratory Identification	200376	200377	200378	200379	200380	200381	200382	200383	200384	200386
Sample Identification	A2329/21	A2329/22	A2329/23	A2329/24	A2329/25	A2329/26	A2329/27	A2329/28	A2329/29	A2329/31
Depth (m)	--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	12/3/09	12/3/09	11/3/09	11/3/09	11/3/09
Method : E013.2										
Organochlorine Pesticides (OC)	EQL									
a-BHC	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	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	1.80	<0.05	0.08	<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	0.06	<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	6.6	<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)	--	76%	75%	70%	71%	71%	##	121%	73%	70%

Results expressed in mg/kg dry weight unless otherwise specified

Comments: ## Percent recovery not available due to interference from the sample.

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

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This report supercedes reports issued on: N/A

Laboratory Identification	200388	200390	200392	200394	200396	200398	200400	200402	200404	200356d
Sample Identification	A2329/33	A2329/35	A2329/37	A2329/39	A2329/41	A2329/43	A2329/45	A2329/47	A2329/49	QC
Depth (m)	--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	--
Laboratory Extraction (Preparation) Date	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date	11/3/09	12/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09	11/3/09
Method : E013.2										
Organochlorine Pesticides (OC)	EQL									
a-BHC	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	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	0.12	<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	0.06	<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)	--	74%	121%	80%	118%	71%	73%	97%	110%	103%

Results expressed in mg/kg dry weight unless otherwise specified
 Comments: ## Percent recovery not available due to interference from the sample.

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

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This report supercedes reports issued on: N/A

Laboratory Identification		200356r	200366d	200366r	200386d	200386r	200394d	200394r	200357s	200388s	lcs
Sample Identification		QC	QC	QC	QC	QC	QC	QC	QC	QC	QC
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		--	--	--	--	--	--	--	--	--	--
Laboratory Extraction (Preparation) Date		--	9/3/09	--	9/3/09	--	9/3/09	--	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date		--	11/3/09	--	11/3/09	--	11/3/09	--	11/3/09	11/3/09	9/3/09
Method : E013.2											
Organochlorine Pesticides (OC)		EQL									
a-BHC	0.05	--	<0.05	--	<0.05	--	<0.05	--	90%	84%	95%
Hexachlorobenzene	0.05	--	<0.05	--	<0.05	--	<0.05	--	90%	89%	97%
b-BHC	0.05	--	<0.05	--	<0.05	--	<0.05	--	95%	86%	98%
g-BHC (Lindane)	0.05	--	<0.05	--	<0.05	--	<0.05	--	89%	85%	98%
d-BHC	0.05	--	<0.05	--	<0.05	--	<0.05	--	94%	93%	106%
Heptachlor	0.05	--	<0.05	--	<0.05	--	<0.05	--	92%	91%	96%
Aldrin	0.05	--	<0.05	--	<0.05	--	<0.05	--	86%	83%	94%
Heptachlor epoxide	0.05	--	<0.05	--	<0.05	--	<0.05	--	93%	95%	98%
trans-chlordane	0.05	--	<0.05	--	<0.05	--	<0.05	--	85%	80%	96%
Endosulfan I	0.05	--	<0.05	--	<0.05	--	<0.05	--	89%	85%	98%
cis-chlordane	0.05	--	<0.05	--	<0.05	--	<0.05	--	89%	84%	97%
Dieldrin	0.05	--	<0.05	--	<0.05	--	<0.05	--	109%	108%	106%
4,4-DDE	0.05	--	<0.05	--	<0.05	--	<0.05	--	117%	115%	106%
Endrin	0.05	--	<0.05	--	<0.05	--	<0.05	--	87%	88%	130%
Endosulfan II	0.05	--	<0.05	--	<0.05	--	<0.05	--	89%	83%	99%
4,4-DDD	0.05	--	<0.05	--	<0.05	--	<0.05	--	89%	83%	101%
Endosulfan sulphate	0.05	--	<0.05	--	<0.05	--	<0.05	--	122%	115%	130%
4,4-DDT	0.2	--	<0.2	--	<0.2	--	<0.2	--	88%	88%	99%
Methoxychlor	0.2	--	<0.2	--	<0.2	--	<0.2	--	99%	101%	103%
DBC (Surr @ 0.2mg/kg)	--	33%	83%	4%	75%	7%	116%	2%	89%	82%	97%

Results expressed in mg/kg dry weight unless otherwise specified
 Comments: ## Percent recovery not available due to interference from the sample.

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

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Laboratory Identification		mb								
Sample Identification		QC								
Depth (m)		--								
Sampling Date recorded on COC		--								
Laboratory Extraction (Preparation) Date		9/3/09								
Laboratory Analysis Date		9/3/09								
Method : E013.2										
Organochlorine Pesticides (OC)		EQL								
a-BHC		0.05	<	0.05						
Hexachlorobenzene		0.05	<	0.05						
b-BHC		0.05	<	0.05						
g-BHC (Lindane)		0.05	<	0.05						
d-BHC		0.05	<	0.05						
Heptachlor		0.05	<	0.05						
Aldrin		0.05	<	0.05						
Heptachlor epoxide		0.05	<	0.05						
trans-chlordane		0.05	<	0.05						
Endosulfan I		0.05	<	0.05						
cis-chlordane		0.05	<	0.05						
Dieldrin		0.05	<	0.05						
4,4-DDE		0.05	<	0.05						
Endrin		0.05	<	0.05						
Endosulfan II		0.05	<	0.05						
4,4-DDD		0.05	<	0.05						
Endosulfan sulphate		0.05	<	0.05						
4,4-DDT		0.2	<	0.2						
Methoxychlor		0.2	<	0.2						
DBC (Surv @ 0.2mg/kg)		--		88%						

Results expressed in mg/kg dry weight unless otherwise specified

Comments: ## Percent recovery not available due to interference from the sample.

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

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This report supercedes reports issued on: N/A

Laboratory Identification	200356	200357	200358	200359	200360	200361	200362	200363	200364	200365
Sample Identification	A2329/1	A2329/2	A2329/3	A2329/4	A2329/5	A2329/6	A2329/7	A2329/8	A2329/9	A2329/10
Depth (m)	--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09
Method : E005.2										
Moisture	EQL									
Moisture	--	35	35	34	32	34	34	28	25	29

Results expressed in % w/w unless otherwise specified

Comments:

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

Laboratory Identification	200366	200367	200368	200369	200370	200371	200372	200373	200374	200375
Sample Identification	A2329/11	A2329/12	A2329/13	A2329/14	A2329/15	A2329/16	A2329/17	A2329/18	A2329/19	A2329/20
Depth (m)	--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09
Method : E005.2										
Moisture	EQL									
Moisture	--	26	24	33	44	26	29	27	30	23

Results expressed in % w/w unless otherwise specified

Comments:

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

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Laboratory Identification	200376	200377	200378	200379	200380	200381	200382	200383	200384	200385
Sample Identification	A2329/21	A2329/22	A2329/23	A2329/24	A2329/25	A2329/26	A2329/27	A2329/28	A2329/29	A2329/30
Depth (m)	--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09
Method : E005.2										
Moisture	EQL									
Moisture	--	24	29	26	29	36	14	30	10	42

Results expressed in % w/w unless otherwise specified
 Comments:

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

Laboratory Identification	200386	200387	200388	200389	200390	200391	200392	200393	200394	200395
Sample Identification	A2329/31	A2329/32	A2329/33	A2329/34	A2329/35	A2329/36	A2329/37	A2329/38	A2329/39	A2329/40
Depth (m)	--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09
Laboratory Extraction (Preparation) Date	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09
Method : E005.2										
Moisture	EQL									
Moisture	--	24	15	16	9	24	27	9	20	24

Results expressed in % w/w unless otherwise specified
 Comments:

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

Environmental Analysis Laboratory –Contaminated Land Assessment



Laboratory Report No: E041980
Client Name: Environmental Analysis Laboratory
Contact Name: Environmental Analysis Laboratory
Client Reference: Soil Analysis

Page: 15 of 15
 plus cover page
Date: 16/03/09

Final
Certificate
 of Analysis

This report supercedes reports issued on: N/A

Laboratory Identification		200396	200397	200398	200399	200400	200401	200402	200403	200404	200356d
Sample Identification		A2329/41	A2329/42	A2329/43	A2329/44	A2329/45	A2329/46	A2329/47	A2329/48	A2329/49	QC
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	2/3/09	--
Laboratory Extraction (Preparation) Date		9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09	9/3/09
Laboratory Analysis Date		10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09	10/3/09
Method : E005.2	EQL --										
Moisture		33	21	19	20	4	23	19	27	23	35

Results expressed in % w/w unless otherwise specified

Comments:

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

Laboratory Identification		200356r	200366d	200366r	200386d	200386r	200394d	200394r			
Sample Identification		QC	QC	QC	QC	QC	QC	QC			
Depth (m)		--	--	--	--	--	--	--			
Sampling Date recorded on COC		--	--	--	--	--	--	--			
Laboratory Extraction (Preparation) Date		--	9/3/09	--	9/3/09	--	9/3/09	--			
Laboratory Analysis Date		--	10/3/09	--	10/3/09	--	10/3/09	--			
Method : E005.2	EQL --										
Moisture		0%	24	8%	22	9%	18	29%			

Results expressed in % w/w unless otherwise specified

Comments:

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

Environmental Analysis Laboratory - Contaminated Land Assessment

MELBOURNE Ph: (03) 9538 2277 Fax: (03) 9538 2278 1868 Dandenong Road Clayton VIC 3168 E: enviro.melbourne@labmark.com.au
 BRISBANE Ph: (07) 3902 4600 Fax: (07) 3902 4646 1/21 Smallwood Place Murrumbidgee QLD 4172 E: enviro.brisbane@labmark.com.au
 SYDNEY Ph: (02) 9476 6533 Fax: (02) 9476 8219 Unit 1/8 Leighton Place Asquith NSW 2077 E: enviro.sydney@labmark.com.au
 1300 0 LABMARK ENVIRONMENTAL LABORATORIES

Environmental Analysis Request - Chain Of Custody (COC)

Company: ENVIRONMENTAL ANALYSIS LABORATORY Project Name: _____ COC Number*: _____
 Address: S.C.U MILITARY ROAD Project Number: _____ #The COC number will act as a purchase order number if not supplied
 EAST LISMORE 2480 Quote Reference: _____ Purchase Order No: _____
 Contact: GRAHAM LANCASTER Send Results to: _____ (email)
 Telephone: 02 66 20 36 78 Fax: 02 66 20 39 57 Results Required by*: 24 hrs 48 hrs 5 Day Other
 Email: eal@scu.edu.au * Note: TAT of less than 5 days must be pre-arranged with the laboratory and surcharges may apply.

SAMPLE DESCRIPTION				ANALYSIS REQUIRED																
Lab ID	Sample ID	Date & Time Sampled	Soil / Water / Other	Comments*	COMPOSITE	TPH - OC-C9	TPH - C10-C36	MAHs	BTEX	PAHs	PCBs	DOCs	OPs	Total Phenolics	Speciated Phenols	Metals - Std 17	Metals - Specify **	Mercury	VICEPA 448.3 Screen	
56	A2329/1	2/3	S																	
57																				
58																				
59																				
60																				
61																				
62																				
63																				
64																				
65																				
66																				
67																				
68																				
69																				
70																				
71																				
72	A2329/12		S																	
Totals:																				

Please Provide Field PID Readings where possible

Chain of Custody: Relinquished by: Christine Date/Time: 5/3/09
 Received by: [Signature] Date/Time: 5/3/09 1205
 Relinquished by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____
 Relinquished by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____

Special Requirements (eg. OHS issues etc.) _____
 Sample Receipt Advice (Lab Use Only):
 All Samples Received in Good Condition
 All Documentation in Proper Order
 Samples Received with an Attempt to Chill
 Samples Received Within Holding Times
 Average sample temp on receipt: (°C) 14.5
 For enquires please quote Ref. No. 6041980

Document Number: LM-FOR-ADM-021 Issue date: 5th June 2008 Page 1 of 1

Environmental Analysis Laboratory – Contaminated Land Assessment

MELBOURNE BRISBANE SYDNEY **pg 2** **1300 0 LABMARK** **LabMark** ENVIRONMENTAL LABORATORIES

Ph: (03) 9538 2277 Fax: (03) 9538 2278 1568 Dandenong Road Clayton VIC 3168 E: enviro.melbourne@labmark.com.au
 Ph: (07) 3902 4600 Fax: (07) 3902 4646 1/21 Smallwood Place Murarie QLD 4172 E: enviro.brisbane@labmark.com.au
 Ph: (02) 9478 6633 Fax: (02) 9478 6219 Unit 1/8 Leighton Place Asquith NSW 2077 E: enviro.sydney@labmark.com.au

Environmental Analysis Request – Chain Of Custody (COC)

Company: **ENVIRONMENTAL ANALYSIS LABORATORY** Project Name: _____ COC Number*: _____
 Address: **S-C-U MILITARY ROAD** Project Number: _____ #The COC number will act as a purchase order number if not supplied
EAST LISMORE 2480 Quote Reference: _____ Purchase Order No: _____
 Contact: **GRAHAM LANCASTER** Send Results to: _____ (email)
 Telephone: **02 66 20 36 78** Fax: **02 66 20 39 57** Results Required by*: 24 hrs 48 hrs 5 Day Other
 Email: **real@scu.edu.au** * Note: TAT of less than 5 days must be pre-arranged with the laboratory and surcharges may apply.

SAMPLE DESCRIPTION				ANALYSIS REQUIRED																
Lab ID	Sample ID	Date & Time Sampled	Soil / Water / Other	Comments*	COMPOSITE	TPH - C6-C9	TPH - C10-C36	MAHs	BTEX	PAHs	PCBs	DOCs	OPs	Total Phenolics	Speciated Phenols	Metals - Std 17	Metals - Specify **	Mercury	VISEPA 418.3 Screen	
0328	A2329/13	2/3	S																	
0329		4																		
0330		5																		
0331		6																		
0332		7																		
0333		8																		
0334		9																		
0335		20																		
0336		21																		
0337		22																		
0338		23																		
0339	A2329/24	24																		
# Please Provide Field PID Readings where possible					Totals:															

** METALS (Please circle): Al; Sb; As; Ba; Be; Bi; B; Cd; Ca; Cs; Cr; Co; Cu; Fe; Pb; Li; Mg; Mn; Mo; Ni; Pd; P; Pt; K; Se; Si; Ag; Na; Sr; S; Ti; Th; Sn; Tl; W; U; V; Zn

Chain of Custody

Relinquished by: Christine Date/Time: 5/3/09 Special Requirements (eg. CHS issues etc.): _____ Sample Receipt Advice (Lab Use Only)

Received by: [Signature] Date/Time: 5/3/09 10:05 All Samples Received in Good Condition

Relinquished by: _____ Date/Time: _____ All Documentation in Proper Order

Received by: _____ Date/Time: _____ Samples Received with an Attempt to Chill

Relinquished by: _____ Date/Time: _____ Samples Received Within Holding Times

Received by: _____ Date/Time: _____ Average sample temp on receipt (°C) 14.5

For enquires please quote Ref. No. E041980

Environmental Analysis Laboratory - Contaminated Land Assessment

MELBOURNE BRISBANE SYDNEY
 Ph: (03) 9538 2277 Fax: (03) 9538 2278 1858 Dandenong Road Clayton VIC 3168 E: enviro.melbourne@labmark.com.au
 Ph: (07) 3902 4600 Fax: (07) 3902 4640 1/21 Smallwood Place Murarie QLD 4172 E: enviro.brisbane@labmark.com.au
 Ph: (02) 9478 6533 Fax: (02) 9478 6219 Unit 1/8 Leighton Place Asquith NSW 2077 E: enviro.sydney@labmark.com.au
 1300 0 LABMARK ENVIRONMENTAL LABORATORIES

Environmental Analysis Request - Chain Of Custody (COC)

Company: ENVIRONMENTAL ANALYSIS LABORATORY Project Name: _____ COC Number^a: _____
 Address: S-C-U MILITARY ROAD Project Number: _____ #The COC number will act as a purchase order number if not supplied
 Contact: GRAHAM LANCASTER Quote Reference: _____ Purchase Order No: _____
 Telephone: 02 66 20 36 78 Fax: 02 66 20 39 57 Send Results to: _____ (email)
 Email: eal@scu.edu.au Results Required by: 24 hrs 48 hrs 5 Day Other
* Note: TAT of less than 5 days must be pre-arranged with the laboratory and surcharges may apply.

SAMPLE DESCRIPTION				ANALYSIS REQUIRED																
Lab ID	Sample ID	Date & Time Sampled	Soil / Water / Other	Comments ^a	COMPOSITE	TPH - C6-C9	TPH - C10-C16	MAHs	BTEX	PAHs	PCBs	OCs	OPs	Total Phenolics	Speciated Phenolics	Metals - Std 17	Metals - Specify **	Mercury	VeEPA 448.3 Screen	
023136	A2329/25	2/03	S																	
023137																				
023138																				
023139																				
023140																				
023141																				
023142																				
023143																				
023144																				
023145																				
023146																				
023147																				
023148																				
023149																				
023150																				
023151																				
023152																				
023153																				
023154																				
023155																				
023156																				
023157																				
023158																				
023159																				
023160																				
023161	A2324/36																			
# Please Provide Field PID Readings where possible					Totals:	7	7		7			8								

** METALS (Please circle): Al; Sb; As; Ba; Be; Bi; B; Cd; Ca; Cs; Cr; Co; Cu; Fe; Pb; Li; Mg; Mn; Mo; Ni; Pd; P; Pt; K; Se; Si; Ag; Na; Sr; S; Ti; Th; Sn; Tl; W; U; V; Zn

Chain of Custody
 Relinquished by: Christine Date/Time: 5/3/09
 Received by: [Signature] Date/Time: 4/3/09 1001
 Relinquished by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____
 Relinquished by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____

Special Requirements (eg. OHS issues etc.) _____
 Sample Receipt Advice (Lab Use Only)
 All Samples Received in Good Condition
 All Documentation in Proper Order
 Samples Received with an Attempt to Chill
 Samples Received Within Holding Times
 Average sample temp on receipt: (°C) 14.5
 For enquires please quote Ref. No. E041980

Document Number: LM-FOR-ADM-02195 Date of Issue: 5 June 2005 Page 3 of 4

Environmental Analysis Laboratory – Contaminated Land Assessment

MELBOURNE Ph: (03) 9538 2277 Fax: (03) 9538 2278 1868 Dandenong Road Clayton VIC 3168 E: enviro.melbourne@labmark.com.au
 BRISBANE Ph: (07) 3902 4600 Fax: (07) 3902 4640 121 Smallwood Place Murarrie QLD 4172 E: enviro.brisbane@labmark.com.au
 SYDNEY Ph: (02) 9476 6533 Fax: (02) 9476 8219 Unit 1/6 Leighton Place Asquith NSW 2077 E: enviro.sydney@labmark.com.au
 1300 0 LABMARK ENVIRONMENTAL LABORATORIES

Environmental Analysis Request – Chain Of Custody (COC)

Company: ENVIRONMENTAL ANALYSIS LABORATORY Project Name: _____ COC Number*: _____
 Address: S-C-U MILITARY ROAD Project Number: _____ #The COC number will act as a purchase order number if not supplied
 EAST LISMORE 2480 Quote Reference: _____ Purchase Order No: _____
 Contact: GRAHAM LANCASTER Send Results to: _____ (email)
 Telephone: 02 66 20 36 78 Fax: 02 66 20 39 57 Results Required by*: 24 hrs 48 hrs 5 Day Other
 Email: g.l@scu.edu.au * Note: TAT of less than 5 days must be pre-arranged with the laboratory and surcharges may apply.

SAMPLE DESCRIPTION				ANALYSIS REQUIRED																		
Lab ID	Sample ID	Date & Time Sampled	Soil / Water / Other	Comments*	COMPOSITE	TPH - C6-C9	TPH - C10-C38	MAHs	BTEX	PAHs	PCBs	OCs	OPs	Total Phenolics	Specialised Phenols	Metals - Std 17	Metals - Specify **	Mercury	MetEPA 448.3 Screen			
00392	A2329/37	2/03	S			X	X	X	X	X	X	X	X									
00393	38					X	X	X	X	X	X	X	X									
00394	39					X	X	X	X	X	X	X	X									
00395	40					X	X	X	X	X	X	X	X									
00396	41					X	X	X	X	X	X	X	X									
00397	42					X	X	X	X	X	X	X	X									
00398	43					X	X	X	X	X	X	X	X									
00399	44					X	X	X	X	X	X	X	X									
00400	45					X	X	X	X	X	X	X	X									
00401	46					X	X	X	X	X	X	X	X									
00402	47					X	X	X	X	X	X	X	X									
00403	48					X	X	X	X	X	X	X	X									
* Please Provide Field PID Readings where possible					Totals:																	
00404	A2329/49					X	X	X	X	X	X	X	X									

Chain of Custody
 Relinquished by: Christine Date/Time: 5/3/09
 Received by: [Signature] Date/Time: 6/3/09 1005
 Relinquished by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____
 Relinquished by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____

Special Requirements (eg. OHS issues etc.)
 Sample Receipt Advice (Lab Use Only)
 All Samples Received in Good Condition
 All Documentation in Proper Order
 Samples Received with an Attempt to Chill
 Samples Received Within Holding Times
 Average sample temp on receipt: (°C) 18.5
 For enquires please quote Ref. No. E041980

RESULTS OF SOIL ANALYSIS (Page 1 of 1)

16 soil samples collected by EAL for Southern Cross University on 17th April 2009 - Lab Job No. A3026
 Soil samples supplied were composited by EAL into 4 composite samples for analysis
 Analysis requested by SCU- Geoff GoTtee.

ANALYTE	METHOD REFERENCE	Composite Sample 1	Composite Sample 2	Composite Sample 3	Composite Sample 4	Composite Acceptable Limit	Individual Acceptable Limit	Background Range
		1, 2, 3, 4	5, 6, 7, 8	9, 10, 11, 12	2, 5, 8, 10	Column 1	Column 1	
	Job No.	A3026/1	A3026/2	A3026/3	A3026/4	See note 1	See note 1	See note 2
MOISTURE %	b	20	17	9	24	..	..	..
SILVER (mg/Kg DW)	a	< 1	< 1	< 1	< 1	na	na	na
ARSENIC (mg/Kg DW)	a	2	3	7	1	<25	< 100	0.2-30
LEAD (mg/Kg DW)	a	11	14	16	14	<75	< 300	<2-200
CADMIUM (mg/Kg DW)	a	< 1	< 1	< 1	< 1	<5	< 20	0.04-2.0
CHROMIUM (mg/Kg DW)	a	25	23	11	20	..	..	..
COPPER (mg/Kg DW)	a	21	20	20	20	<250	< 1000	1-190
MANGANESE (mg/Kg DW)	a	1870	1708	940	1044	..	..	..
NICKEL (mg/Kg DW)	a	24	19	13	19	<150	< 600	2-400
SELENIUM (mg/Kg DW)	a	1	1	1	1	na	na	na
ZINC (mg/Kg DW)	a	93	93	74	91	<1750	< 7000	2-180
MERCURY (mg/Kg DW)	a	0.11	0.11	0.07	0.11	<3.75	< 15	0.001-0.1
IRON (% DW)	a	7.06	7.62	3.60	8.44	na	na	na
ALUMINIUM (% DW)	a	2.78	2.89	1.62	3.17	na	na	na
PESTICIDE ANALYSIS SCREEN								
4, 4 DDT (mg/Kg)	b	< 0.2	< 0.2	< 0.2	< 0.2	<50	< 200	<0.2
Methoxychlor (mg/kg)	b	< 0.2	< 0.2	< 0.2	< 0.2	<2.5	< 10	<0.2
Other Organochlorine Pesticides (mg/Kg)	b	< 0.05	< 0.05	< 0.05	< 0.05	<2.5	< 10	<0.05
Total Petroleum Hydrocarbons	b	..	..	..	..	..	..	..
C10-C14 Fraction (mg/Kg)	b	..	..	< 50	..	..	..	..
C15-C28 Fraction (mg/Kg)	b	..	..	< 100	..	..	..	..
C29-C36 Fraction (mg/Kg)	b	..	..	< 100	..	..	..	..
Sum of C10-C36 (mg/Kg)	b	..	..	..	..	..	..	..

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3120 ICPMS
- b. Analysis sub-contracted - results attached

NOTES

- 1. Column 1 ' Residential with gardens and accessible soil including childrens daycare centres, preschools, primary schools, town houses or villas' (NSW EPA 1998)
- 2. Environmental Soil Quality Guidelines, Page 40, ANZECC, 1992.

Additional NOTES

DW = Dry Weight

Organochlorine pesticide (OC) screen: (Aldrin, Gschlordane, Trans-chlordane, HCB, DDD, DDE, DDT, Alpha-BHC, Beta-BHC, Delta-BHC, Lindane, Dieldrin, Endrin, Heptachlor, Heptachlor epoxide, Alpha-endosulfan, Beta-endosulfan, Endosulfan sulfate, Methoxychlor)

na = no guidelines available

Environmental Analysis Laboratory –Contaminated Land Assessment



Laboratory Report No: E042506
Client Name: Environmental Analysis Laboratory
Contact Name: Environmental Analysis Laboratory
Client Reference: Soil and Water Analysis

Page: 1 of 7
 plus cover page
Date: 29/04/09

Final
Certificate
 of Analysis

This report supercedes reports issued on: N/A

Laboratory Identification		205469	205475	lcs	mb					
Sample Identification		A3026/C3	A3055/3	QC	QC					
Depth (m)		--	--	--	--					
Sampling Date recorded on COC		17/4/09	20/4/09	--	--					
Laboratory Extraction (Preparation) Date		27/4/09	27/4/09	27/4/09	27/4/09					
Laboratory Analysis Date		28/4/09	28/4/09	28/4/09	28/4/09					
Method : E006.2										
Petroleum Hydrocarbons (TPH)		EQL								
C10 - C14 Fraction	50	<50	<50	--	<50					
C15 - C28 Fraction	100	<100	<100	89%	<100					
C29 - C36 Fraction	100	<100	<100	--	<100					
Sum of TPH C10 - C36	--	--	--	--	--					

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

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

Environmental Analysis Laboratory – Contaminated Land Assessment



Laboratory Report No: E042506
Client Name: Environmental Analysis Laboratory
Contact Name: Environmental Analysis Laboratory
Client Reference: Soil and Water Analysis

Page: 2 of 7
 plus cover page
Date: 29/04/09

Final
Certificate
 of Analysis

This report supercedes reports issued on: N/A

Laboratory Identification		205465	205466	205467	205468	205469	205470	205473	205474	205475	205476
Sample Identification		A3009/C6	A3009/C7	A3026/C1	A3026/C2	A3026/C3	A3026/C4	A3055/1	A3055/2	A3055/3	A3055/4
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		16/4/09	16/4/09	17/4/09	17/4/09	17/4/09	17/4/09	20/4/09	20/4/09	20/4/09	20/4/09
Laboratory Extraction (Preparation) Date		27/4/09	27/4/09	27/4/09	27/4/09	27/4/09	27/4/09	27/4/09	27/4/09	27/4/09	27/4/09
Laboratory Analysis Date		28/4/09	28/4/09	28/4/09	28/4/09	28/4/09	28/4/09	28/4/09	28/4/09	28/4/09	28/4/09
Method : E013.2											
Organochlorine Pesticides (OC)	EQL										
a-BHC	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	0.05	<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	<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	<0.05
d-BHC	0.05	<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	<0.05
Aldrin	0.05	<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	<0.05
trans-chlordane	0.05	<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	<0.05
cis-chlordane	0.05	<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	<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	<0.05
Endrin	0.05	<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	<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	<0.05
Endosulfan sulphate	0.05	<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	<0.2
Methoxychlor	0.2	<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)	—	95%	102%	95%	102%	110%	110%	122%	106%	104%	104%

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

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

Environmental Analysis Laboratory – Contaminated Land Assessment



Laboratory Report No: E042506
Client Name: Environmental Analysis Laboratory
Contact Name: Environmental Analysis Laboratory
Client Reference: Soil and Water Analysis

Page: 3 of 7
 plus cover page
Date: 29/04/09

Final
Certificate
 of Analysis

This report supercedes reports issued on: N/A

Laboratory Identification	205465d	205465r	205466s	lcs	mb				
Sample Identification	QC	QC	QC	QC	QC				
Depth (m)	--	--	--	--	--				
Sampling Date recorded on COC	--	--	--	--	--				
Laboratory Extraction (Preparation) Date	27/4/09	--	27/4/09	27/4/09	27/4/09				
Laboratory Analysis Date	28/4/09	--	28/4/09	27/4/09	27/4/09				
Method : E013.2									
Organochlorine Pesticides (OC)	EQL								
a-BHC	0.05	<0.05	--	115%	90%	<0.05			
Hexachlorobenzene	0.05	<0.05	--	120%	90%	<0.05			
b-BHC	0.05	<0.05	--	120%	91%	<0.05			
g-BHC (Lindane)	0.05	<0.05	--	116%	87%	<0.05			
d-BHC	0.05	<0.05	--	124%	90%	<0.05			
Heptachlor	0.05	<0.05	--	125%	90%	<0.05			
Aldrin	0.05	<0.05	--	108%	80%	<0.05			
Heptachlor epoxide	0.05	<0.05	--	120%	83%	<0.05			
trans-chlordane	0.05	<0.05	--	115%	83%	<0.05			
Endosulfan I	0.05	<0.05	--	116%	85%	<0.05			
cis-chlordane	0.05	<0.05	--	115%	85%	<0.05			
Dieldrin	0.05	<0.05	--	126%	85%	<0.05			
4,4-DDE	0.05	<0.05	--	126%	91%	<0.05			
Endrin	0.05	<0.05	--	120%	89%	<0.05			
Endosulfan II	0.05	<0.05	--	115%	84%	<0.05			
4,4-DDD	0.05	<0.05	--	98%	89%	<0.05			
Endosulfan sulphate	0.05	<0.05	--	102%	86%	<0.05			
4,4-DDT	0.2	<0.2	--	102%	88%	<0.2			
Methoxychlor	0.2	<0.2	--	107%	96%	<0.2			
DBC (Sum @ 0.2mg/kg)	--	94%	1%	110%	82%	102%			

Results expressed in mg/kg dry weight unless otherwise specified

Comments:

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

Environmental Analysis Laboratory –Contaminated Land Assessment



Laboratory Report No: E042506
Client Name: Environmental Analysis Laboratory
Contact Name: Environmental Analysis Laboratory
Client Reference: Soil and Water Analysis

Page: 7 of 7
 plus cover page
Date: 29/04/09

Final
Certificate
 of Analysis

This report supercedes reports issued on: N/A

Laboratory Identification		205465	205466	205467	205468	205469	205470	205473	205474	205475	205476
Sample Identification		A3009/C6	A3009/C7	A3026/C1	A3026/C2	A3026/C3	A3026/C4	A3055/1	A3055/2	A3055/3	A3055/4
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		16/4/09	16/4/09	17/4/09	17/4/09	17/4/09	17/4/09	20/4/09	20/4/09	20/4/09	20/4/09
Laboratory Extraction (Preparation) Date		27/4/09	27/4/09	27/4/09	27/4/09	27/4/09	27/4/09	27/4/09	27/4/09	27/4/09	27/4/09
Laboratory Analysis Date		28/4/09	28/4/09	28/4/09	28/4/09	28/4/09	28/4/09	28/4/09	28/4/09	28/4/09	28/4/09
Method : E005.2											
Moisture	EQL	28	29	20	17	9	24	74	19	75	31
Moisture	--										

Results expressed in % w/w unless otherwise specified

Comments:

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

Laboratory Identification		205465d	205465r							
Sample Identification		QC	QC							
Depth (m)		--	--							
Sampling Date recorded on COC		--	--							
Laboratory Extraction (Preparation) Date		27/4/09	--							
Laboratory Analysis Date		28/4/09	--							
Method : E005.2										
Moisture	EQL	26	7%							
Moisture	--									

Results expressed in % w/w unless otherwise specified

Comments:

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

Environmental Analysis Laboratory – Contaminated Land Assessment

MELBOURNE BRISBANE SYDNEY GOLD COAST
 Ph: (03) 9538 2277 Fax: (03) 9538 2278 Ph: (07) 3902 4600 Fax: (07) 3902 4646 Ph: (02) 9476 6533 Fax: (02) 9476 8210 Ph: (07) 5533 1300
 1868 Dandenong Road Clayton VIC 3188 1/21 Smallwood Place Murarie QLD 4172 Unit 1/8 Leighton Place Asquith NSW 2077 1300 0 LABMARK
 E: enviro.melbourne@labmark.com.au E: enviro.brisbane@labmark.com.au E: enviro.sydney@labmark.com.au ENVIRONMENTAL LABORATORIES

Environmental Analysis Request – Chain Of Custody (COC)

Company: ENVIRONMENTAL ANALYSIS LABORATORY Project Name: _____ COC Number*: _____
 Address: S-C-U MILITARY ROAD Project Number: _____ #The COC number will act as a purchase order number if not supplied
FAST LISMORE 2480 Quote Reference: _____ Purchase Order No: _____
 Contact: GRAHAM LANCASTER Send Results to: _____ (email)
 Telephone: 02 66 20 36 78 Fax: 02 66 20 39 57 Results Required by*: _____
 Email: cal@scu.edu.au 24 hrs 48 hrs 5 Day Other
* Note: TAT of less than 5 days must be pre-arranged with the laboratory and surcharges may apply.

SAMPLE DESCRIPTION				ANALYSIS REQUIRED																
Lab ID	Sample ID	Date & Time Sampled	Soil / Water / Other	Comments*	COMPOSITE	TPH - CB-CB	TPH - C10-C16	MAHS	BTEX	PAHs	PCBs	DDCs	OPs	Total Phenolics	Specialized Phenols	Metals - Std 17	Metals - Specify **	Mercury	VEPA 418 & Screen	
205465	A3009/C6	16/10/09	S																	
205466	A3009/K7	16/10/09	S																	
205467	A3026/C1	17/10/09	S																	
205468	A3026/C2	17/10/09	S																	
205469	A3026/C3	17/10/09	S																	
205470	A3026/C4	17/10/09	S			X														
205471	A3045/1	20/10/09	W																	
205472	A3045/2	20/10/09	W																	
205473	A3055/1	20/10/09	S																	
205474	A3055/2	20/10/09	S																	
205475	A3055/3	20/10/09	S																	
205476	A3055/4	20/10/09	S			X														

Please Provide Field PID Readings where possible

Relinquished by: [Signature] Date/Time: 21/10/09 Special Requirements (eg. OHS issues etc.) _____ Sample Receipt Advice (Lab Use Only)
 Received by: MC Date/Time: 22/10/09 14:5 All Samples Received in Good Condition
 Relinquished by: _____ Date/Time: _____ All Documentation in Proper Order
 Received by: _____ Date/Time: _____ Samples Received with an Attempt to Chill
 Relinquished by: _____ Date/Time: _____ Samples Received Within Holding Times
 Received by: _____ Date/Time: _____ Average sample temp on receipt: (°C) 21.5
 For enquires please quote Ref. No. E042506

Document Number: LM-FOR-ADM-0218514 Date: June 2009

RESULTS OF SOIL ANALYSIS (Page 1 of 1)

5 soil samples collected by the Environmental Analysis Laboratory on the 19th March, 2009 - Lab Job No. A2632
Additional samples collected from original SP 74.

Analysis requested by Geoff Cottee. **Your Job.: Crawford Land**

ANALYTE	METHOD REFERENCE	Sample 1 SP 74 - A	Sample 2 SP 74 - B	Sample 3 SP 74 - C	Sample 4 SP 74 - D	Sample 5 SP 74 - E	Individual Acceptable Limit Column 1	Background Range
	<i>Job No.</i>	A2632/1	A2632/2	A2632/3	A2632/4	A2632/5	<i>See note 1</i>	<i>See note 2</i>
SILVER (mg/Kg DW)	<i>a</i>	0.15	0.16	0.12	0.12	0.11	<i>na</i>	<i>na</i>
ARSENIC (mg/Kg DW)	<i>a</i>	1.10	1.08	1.12	1.23	1.27	< 100	0.2-30
LEAD (mg/Kg DW)	<i>a</i>	44.1	10.1	8.98	9.12	5.94	< 300	<2-200
CADMIUM (mg/Kg DW)	<i>a</i>	0.258	0.244	0.142	0.134	0.099	< 20	0.04-2.0
CHROMIUM (mg/Kg DW)	<i>a</i>	15.1	15.8	14.6	17.1	17.3	..	..
COPPER (mg/Kg DW)	<i>a</i>	27.7	27.9	24.7	27.9	26.4	< 1000	1-190
MANGANESE (mg/Kg DW)	<i>a</i>	3950	6269	4364	2629	4527	..	..
NICKEL (mg/Kg DW)	<i>a</i>	29.2	32.1	32.2	25.1	28.4	< 600	2-400
SELENIUM (mg/Kg DW)	<i>a</i>	1.66	1.54	1.08	1.09	1.56	<i>na</i>	<i>na</i>
ZINC (mg/Kg DW)	<i>a</i>	271	215	170	172	148	< 7000	2-180
MERCURY (mg/Kg DW)	<i>a</i>	0.061	0.048	0.033	0.038	0.059	< 15	0.001-0.1
IRON (% DW)	<i>a</i>	13.2	13.3	12.1	13.5	16.2	<i>na</i>	<i>na</i>
ALUMINIUM (% DW)	<i>a</i>	4.03	3.89	3.62	3.43	4.76	<i>na</i>	<i>na</i>

METHODS REFERENCE

- a. ¹³Nitric/HCl digest - APHA 3120 IC PMS
b. ¹³Nitric/HCl digest - APHA 3120 IC POES
c. Analysis sub-contracted - results attached

NOTES

1. Column 1 ' Residential with gardens and accessible soil including childrens daycare centres, preschools, primary schools, town houses or villas' (NSW EPA 1998)
2. Environmental Soil Quality Guidelines, Page 40, ANZECC, 1992.

Additional NOTES

DW = Dry Weight

na = no guidelines available