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Midal Cables International Pty Limited

Phase 2 Contamination Site Assessment

Aluminium Rod and Conductor Manufacturing Facility, Tomago NSW

May 2011

Revision 0

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

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Abbreviation ListTo Do - Report for finalisation and pdf

ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
bgs	Below ground surface (depth)
BTEX	Benzene, Toluene, Ethyl Benzene, Xylenes
CLM Act	Contaminated Land Management Act 1997
CoC	Chain of Custody
DP	Deposited Plan
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EPA	NSW Environment Protection Authority
<	Less than (laboratory reporting limit or PQL)
ha	Hectare
HIL	Health Investigation Level (relating to defined land use scenario)
LOR	Limit of Reporting
mg/kg	Milligrams per kilogram (generally equivalent parts per million)
mg/L	Milligrams per Litre (generally equivalent parts per million)
µg/L	Micrograms per litre (generally equivalent to parts per billion)
NATA	National Association of Testing Authorities of Australia
NEHF	National Environmental Health Forum
NEPC	National Environment Protection Council
NEPM (1999)	National Environment Protection (Assessment of Site Contamination) Measure
NHMRC	National Health and Medical Research Council
OCP	Organochlorine Pesticide

OPP	Organophosphate Pesticide
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PID	Photoionisation Detector
ppm	Parts per million
PQL	Practical Quantitation Limit
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percent Difference
TC	Threshold Concentration (from NSW EPA 1994 *Guidelines for Assessing Service Station Sites*)
TPH	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit
VOC	Volatile Organic Compounds

Executive Summary

GHD was engaged by Midal International Pty Limited (Midal) to undertake a Phase 2 Contaminated Site Assessment (CSA) on a site located at 21 School Drive, Tomago, NSW (the site).

This Executive Summary presents a brief summary of the information described in this report and should be read in the context of the more detailed information presented in the body of this report, the scope of the investigations and the limitations discussed in Section 11.

The interpretation of the historical searches indicated that the site was likely to have been bush land/farming until the 1970's when it was cleared and then developed for metal fabrication in the 1980's. Development on the site has predominantly involved the construction of hard stand and storage rack areas and sheds. It is considered that the site has been used for industrial purposes (metal fabrication and storage) from the 1970's to the present.

The site walkover identified that the northern part of the site consisted of scattered shrubs, grasses and trees with a small amount of waste dumping. The central portion of the site was grassed with low points/depressions and scars/hardstand areas from previous racking and storage. This area was scattered with workshop waste/debris. In the southern central portion of the property (north of the existing shed) there were concrete hardstand areas with metal castings/weld fragments and blue discolouration of the surface rocks and gravels. Metal tracks were also evident in the area. Previous investigations have indicated the presence of a former bunded oil storage area in this location. In the southern portion of the site was a shed with adjoining structures/bays, former wash bays, storage areas and awnings. South of the shed was a large hardstand area with concrete anchor points, metal casting/weld fragments and also several resinous stains/patches. An access road is located along the southern boundary.

Several point sources of potential surface contamination were identified on site including areas of hardstand in the central western area, central area and the southern area of the site (blue discolouration of surface materials, metal casts and weld rejects, resinous materials) and the former oil storage area to the north of the shed. It was considered likely that contaminated surface soils could be present adjacent to or down gradient of these areas of the site.

The most likely sources of potential contamination were considered to be the following:

- Spills and leaks of oils/lubricants from on site equipment and/or storage areas.
- Surface debris and residues containing metals from previous site use and situation adjacent to the aluminium smelter.
- Importation of potentially contaminated fill materials over the site.
- Spraying pesticides over the site for weed control.

Soil samples from 17 locations were collected to assess areas of potential contamination across the site based on the site history, previous land use and site observations.

The results of the laboratory analyses indicated all concentrations of heavy metals were reported below the health based investigations level for commercial land use (HIL F). Ecological investigation levels (EILs) or health based investigation levels for residential land use (HIL A) were exceeded for several samples for arsenic, copper, manganese, vanadium and zinc.

All samples exceeding the EILs and HIL A were located within the surface soils of the former metal fabrication site (central and southern regions) and are likely to be associated with the surface fill materials and previous site use. While concentrations exceeding EILs may indicate some potential environmental impacts (eg phytotoxicity to sensitive plant species), GHD understands that the site is to be redeveloped for metal fabrication use comprising several buildings and hard stand areas. Landscaping will not be required as part of the future site redevelopment. The “decision-making process for assessing urban redevelopment sites” from DEC 2006 does not require consideration of EILs when assessing the suitability of a site for commercial / industrial land use.

TPH C_6-C_9, TPH C_{10}-C_{35}, BTEX, PAHs, OCP and PCB concentrations were reported below the nominated soil investigation levels for all samples analysed. No hydrocarbon impacts were identified in the vicinity of the former bunded oil storage area. Field screening analysis for potential acid sulfate soils indicated a low potential for occurrence at this site.

In review of the site history, proposed redevelopment plans and results from the soil investigation to date, it is considered that the site is suitable for redevelopment for industrial/commercial purposes without the requirement for further investigation or remediation.

1. Introduction

1.1 Background

GHD was engaged by Midal International Pty Limited (Midal) to undertake a Phase 2 Contaminated Site Assessment (CSA) on a site located at 21 School Drive, Tomago, NSW. The CSA is required as part of a Major Project Application to the Department of Planning (DoP) for the proposed cable manufacturing facility to be assessed under Part 3A of the *Environmental Planning and Assessment Act* 1979.

This investigation was commissioned by Midal on the basis of GHD's proposal, dated 29 July 2010 (GHD Doc Ref 22/09049/91226) as part of a larger scope of works including geotechnical, ecology, flooding, air and noise assessments, traffic, community consultation, hazard assessment, aboriginal archaeology, greenhouse gas emissions and climate change, preliminary civil engineering, visual and cumulative impacts for incorporation into an environmental assessment for the proposed project.

GHD understands that the proposed cable manufacturing facility is considered necessary to assist with the anticipated increase in national and international demand for aluminium wire. The preferred site is at a location adjacent to the existing Tomago Aluminium Smelter off School Drive, Tomago, NSW.

The investigation area (herein referred to as the site) is identified as Lot 1, 6 and 5 DP 270328 and part of Lot 301 DP 634536. The site has a total area of approximately 2.8ha and is generally rectangular shape in the central/southern portion with a triangular section adjacent to the Tomago Aluminium Plant in the northern portion. An aerial photograph of the site, showing the boundary, is provided in Figure 1, Appendix A.

1.2 Objectives

The objectives of the assessment were to:

- Conduct a Phase 2 contamination investigation to identify potential contamination issues at the site and provide recommendations as to the requirement for further investigations or management of any contamination issues identified.
- Assess the potential risk of offsite migration of contamination (if any) or to potential risk to human health or the environment.

1.3 Scope of Works

The scope of work for the Phase 2 site investigation included the following:

- A review of the Phase 1 CSA for the site (2215280/93864, February 2011) which included geology, hydrology and topography information, historical aerial photographs, Council Section 149 Certificates (Part 2 and 5), Development Applications (DAs) and Building Applications (BAs), historical title documents, NSW WorkCover notices, NSW DECC notices under the Contaminated Land Management Act (1997) and NSW Office of Water (Part of DECCW) database.

- Preparation of a Site Specific Safety Plan (SSSP).
- A specialist underground services search and Dial Before You Dig (DBYD) search prior to site works.
- Collection of soil samples from eleven (11) test pits and six (6) boreholes across the site to target potential Areas of Environmental Concern (AECs) identified in the Phase 1 and also provide systematic coverage of the site. The excavations/boreholes were extended to a maximum depth of 1.5 m, or a minimum of 300 mm into natural underlying soil (which ever occurs first).
- Collection of soil samples from shallow sampling intervals (eg. 0-0.1m, 0.2-0.3m, 0.4-0.5m then 0.5 m intervals (nominal depths, depending on soil profile) and every 0.5 metre thereafter to the end of the test pit with laboratory analysis of selected samples for heavy metals (As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, Va and Zn), total petroleum hydrocarbons (TPH), benzene, toluene, ethyl benzene and toluene (BTEX), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs) and acid sulfate soils (ASS).
- Preparation of a report with reference to the Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA, 1997), to include the following:
  - A summary of historical information for the site.
  - Details of any sampling exceeding site criteria and identified contamination issues.
  - Conclusions with regard to the suitability of the site for the proposed development (Industrial/Commercial) as a minimum and include recommendations for any remediation required for the site to meet specific land use.

1.4 Methodology

All investigations and assessment were carried out with reference to relevant guidelines made or approved by NSW DECCW including:

- *National Environment Protection Measure (Assessment of Site Contamination)* (NEPC, 1999).
- *Contaminated Sites: Guidelines for Assessing Service Station Sites* (EPA, 1994).
- *Contaminated Sites: Sampling Design Guidelines* (EPA, 1995).
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (EPA, 1997).
- *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd edition)*, (DEC, 2006).
- *Waste Classification Guidelines, Part 1: Classifying Waste.* (DECCW, 2008).

1.5 Data Quality Objectives

The purpose of establishing data quality objectives is to ensure the field investigations and analyses are undertaken in a way that enables the collection and reporting of reliable data on which to base the site assessment. The data quality objectives (DQOs) and the procedures designed to achieve these objectives are listed in Table 1-1.

Table 1-1 Data Quality Objective Decision Process

Process	Response
Step 1. Define the problem that necessitates the study.	The previous use of the site was for metal fabrication and storage. Site activities may have resulted in contamination of the site. At the time of the investigation, all metals fabrication infrastructure had been removed with the exception of a shed and some hardstand areas. GHD understands that Midal wish to develop the site for a rod and cable manufacturing facility. This investigation is required as part of the planning process (Part 3A of the *Environmental Planning and Assessment Act* 1979) to assess the suitability of the site for the proposed development.
Step 2. Identify the Goal of the Study. State how environmental data will be used in meeting objectives and solving the problem, identify study questions and define alternative outcomes.	The objective of this investigation is to assess whether contamination is present on the site as a result of previous land uses, and whether remediation of the contamination is required to make the site suitable, from a contamination perspective, for the proposed land use (commercial/industrial). Use of environmental data is detailed in Section 5.
Step 3. Identify Information Inputs. Identify data and information needed to answer study questions.	Data inputs and information required for the project include: ◗ Review of GHD Phase 1 report (Phase 1 Report - 2215280 February 2011 – included as PEA) ◗ Assessment of soils at 17 locations across the site including site observations, ASS field screening and analysis of representative samples by a NATA accredited laboratory. ◗ Assessment of the acceptability of the laboratory results (refer Sections 1.6 and 6). ◗ Comparison of analytical results to relevant site criteria (detailed in Section 5).
Step 4. Define the Boundaries of the Study. Specify the target population and characteristics of interest, define spatial and temporal limits, scale of inference.	The spatial boundaries of the study are shown in Figure 1 in Appendix A, with locations of the sites selected for testing shown in Figure 2 in Appendix A. Site conditions are taken as those at the time of investigations. Locations selected for sampling are considered representative of the corresponding subject area. Sample locations were selected primarily based on areas considered most likely to be impacted by potential contamination, with a limited number of locations selected across other representative areas of the site. The vertical extent of soil investigations was between 2.0 m and 13.45 m below ground surface. This approach will not demonstrate the absence of contamination in all areas of the site, but will be sufficient to provide a broad characterisation of the potential for contamination on the site. Further sampling may be required to delineate the extent or further substantiate the degree, occurrence or absence of such contamination, if encountered. No groundwater investigations were undertaken as part of this assessment.

Process	Response
Step 5. Develop the Analytic Approach. Define the parameters of interest, specify the type of inference, and develop the logic for drawing conclusions from findings.	Previous experience with similar sites together with the results of the site history review and site inspection have been used to identify the main contaminants of concern (see Section 2). Concentrations of contaminants at the subject locations will be compared with criteria in Section 5 to assess the potential impacts to soil and the need for remediation and/or management controls.
Step 6. Specify Performance or Acceptance Criteria. Develop acceptable performance criteria.	*Documentation and data completeness requirements:* ◗ Site conditions properly described. ◗ Sampling locations properly described and located. ◗ Completion of field records, calibration results, chain of custody documentation, laboratory test certificates from NATA registered laboratories. ◗ Samples are collected from all areas of potential environmental concern identified. ◗ Representative samples are tested for all identified potential contaminants of concern. *Data comparability requirements:* ◗ Techniques used for sampling, storage and transportation are appropriate. ◗ Use of NATA certified lab using NEPM procedures. *Data representativeness requirement:* Samples collected from each location are representative.
	Precision and Accuracy for Sampling and Analysis Requirements: ◗ Properly trained and supervised personnel used. ◗ Blind field duplicates collected and analysed at a minimum rate of 1 in 10. ◗ Relative percent differences (RPD) to be less than 30% for inorganic or 50% for organic analytes. ◗ Laboratory QC criteria achieved.
Step 7. Develop the Plan for Obtaining Data. Select the resource-effective sampling and analysis plan that meets the performance criteria.	Samples were collected as per Section 3.2. Sample locations were selected by Evette Griffin (GHD Senior Environmental Scientist). Sampling was undertaken by Joanna Sylvester (GHD Geologist) under the direction of Evette Griffin. A targeted sampling program has been developed based on the site inspection and site history. See Section 2. Quality Assurance (QA) procedures will be used as described in Section 4, and Quality Control (QC) samples collected to allow evaluation of DQIs as described in Section 6.

1.6 Data Quality Indicators

GHD has selected the following Data Quality Indicators (DQIs) to ensure the data is of a quality from which to draw conclusions:

- Data Representativeness – Is the data representative of site conditions.
- Document Completeness – Are there comprehensive records available from all field work undertaken.
- Data Comparability – Is the quality of the data such that samples analysed at different times can be compared (including data from previous investigations).
- Precision and Accuracy for Sampling and Analysis – Does the project laboratory achieve the relevant Quality Control Criteria, and are results from the secondary laboratory comparable.
- Assessment of precision of the results – GHD will undertake an independent review of all laboratory QA/QC data.
- Decision Rules – Data was compared against selected guidelines described in Section 3.

1.7 Limitations

The assessment was limited to the scope described in Section 1.3 and the limitations outlined in Section 11.

Groundwater investigations were not undertaken as part of this assessment. After reviewing the results of the soil investigations, assessment of groundwater was not considered necessary as the risk of contamination from soils on the site was considered to be low.

2. Review of Phase 1 CSA

2.1 Phase 1 Contamination Site Assessment. GHD February 2011 (22/15280/93864)

2.1.1 Site Description

The site is located on School Drive, Tomago, NSW and is defined as Lot 1, 6 and 5 DP 270328 and part of Lot 301 DP 634536.

The site of the proposed facilities is zoned 4a under Port Stephens Councils Local Environmental Plan 2000 and forms part of the wider Tomago Industrial area. The proposed development is permissible in this zone with consent.

The surrounding land uses include:

- North – Immediately north is vacant bushland consisting of low scrub and grasses.
- South – School Drive and other industrial premises. Further south is Tomago Road.
- East – Immediately to the east is an industrial site. Beyond that, is bushland.
- West – Immediately west is an industrial site and further west is the Tomago Aluminium plant.

Topographically, the site slopes gently to the south towards the Hunter River at approximately 2 degrees and is located approximately 10m Australian height datum (AHD). Drainage over the majority of the site is judged to be predominantly via surface run-off following the natural contours of the site in a southerly direction. Sub surface infiltration into the upper soils is anticipated over the majority of the site (un-sealed areas). The closest surface water to the site is the Hunter River located approximately 700m to the south of the site.

Reference to the 1:100,000 Soil Landscape Sheet of the Newcastle Region, indicates that the site is located within disturbed terrain (XX) and the Tea Gardens variant (a) (tna) soil landscapes. The Tea Gardens variant (a) soil landscape unit incorporates Pleistocene beach ridges with irregular sandy low rises and broad deflation basins and swales. Dominant soil materials include loamy sand and/or bleach sand topsoils overlying loam sand to sand subsoils.

Reference to the Newcastle Coal Measures 1:100,000 Geological Series Sheet indicates that the site is underlain by Quaternary dune, beach and alluvial unconsolidated sediments (Tomago Sand Beds).

The 1:25000 Acid Sulphate Soils (ASS) risk map for Beresfield as published by DLWC in 1997 identifies the site as a low probability of occurrence of acid sulphate soil materials within the soil profile (greater than 3m). The Acid Sulfate Soil Planning Map 2004 as published by Port Stephens Council identifies the site as Class 4. Works for which the planning instrument applies includes works beyond 2 metres below the natural ground surface or works by which the water table is likely to be lowered beyond 2 metres below natural surface.

Regional groundwater is expected to flow in a southern direction generally following the surface contours towards the Hunter River. Based on the groundwater information provided, the underlying aquifer is estimated to be approximately 2.0 m below the site.

2.1.2 Site History

The interpretation of the historical searches indicated that the site was likely to have been bush land/farming until the 1970's when it was cleared and then developed for metal fabrication in the 1980's. The adjacent Tomago Aluminium Plant was constructed between 1974 and 1983. Development on the site has predominantly involved the construction of hard stand and storage rack areas for metal fabrication. A large colour bond shed was constructed in the southern portion of the site sometime between 1992 and 2002. It is considered that the site has been used for industrial purposes (metal fabrication and storage) from the 1970's to the present.

The review of the dangerous goods search did not indicate any dangerous goods having been licensed with NSW WorkCover for the site. A previous investigation on the site identified a bunded oil storage area to the north of the existing shed. Council records (149 Certificates) for Lot 5 and Lot 6 DP 270328 at 21E and 35A School Drive, states that Port Stephens Council is aware of matters regarding potential site contamination that may affect the land. Council Building Applications, Development Applications and Complying Development Certificates did not identify any significant activities (not involved with metal fabrication) occurring on the site. The DECCW web site database did not reveal any existing former notices against the property.

2.1.3 Site Inspection

The site walkover identified that the northern part of the site consisted of scattered shrubs, grasses and trees with a small amount of waste dumping was observed along the chain wire fence line. The central portion of the site generally ranged from sparse to thick grasses with low points/depressions and several rectangular scars/hardstand areas from previous racking and storage areas. This area was scattered with workshop waste/debris including metal scrap, former poles in concrete, timber, fibreglass, a split bag of garnet sand and metal castings/weld fragments. In the southern central portion of the property (north of the existing shed) there were concrete hardstand areas with metal castings/weld fragments and blue discolouration of the surface rocks and gravels. Metal tracks were also evident in the area. Previous investigations have indicated the presence of a former bunded oil storage area in this location. A plastic standpipe was also observed directly behind the existing concrete floored colour bond shed. Several structures/bays, former wash bays, storage areas and awnings join the shed. South of the sheds is a large hardstand area with concrete anchor points from a former crane gantry. The surface has metal casting/weld fragments and also several resinous stains/patches. An access road is located along the southern boundary.

2.3 Potential for Contamination

It was considered likely that contaminated soil could be present on site in areas of previous sand blasting or welding and also adjacent to and down hydraulic gradient from areas where oil products have been used/stored and resulting from imported fill materials or the past use of pesticides for weed control.

Sensitive receptors to potential contamination on site may include:

- Site workers / subcontractors / employees.
- Site visitors.
- Flora and fauna on the site and surrounding land.

- Nearby residents.
- Groundwater beneath the site.

The following Table 2-1 summarises the potential areas of environmental concern based on the results of the desk-top review and site visit.

Table 2-1 Outcomes of Desk Top Review – Potential Areas of Environmental Concern

Description	Rationale / Details	Potential Contamination
Oils -used and stored on site.	Spills/leaks of oils from on site equipment, storage areas. North of the colour bond shed.	TPH, BTEX, PAHs, PCBs
Metal weld fragments, surface residues/deposition	Debris scattered over surface soils. Central and southern portion of the site. Adjacent to an aluminium smelter	Heavy Metals, fluoride
Fill materials from unknown sources.	Importation of potential contaminated fill materials to raise surface levels over the site.	Heavy Metals, TPH, BTEX, PAHs, OCPs, PCBs, Asbestos.
Weed and pest control.	Possible historical use over the site.	OCPs, arsenic. Organophosphate Pesticides (OPPs) were not considered due to their volatile nature and relatively short half life in soils.
Potential Acid Sulfate Soils (PASS)	Council ASS plan indicates Class 4 location.	Potential environmental damage from excavation of soils.

1. TPH – Total Petroleum Hydrocarbons.
2. BTEX – Benzene, Toluene, Ethylbenze and Xylenes.
3. PAH – Polynuclear Aromatic Hydrocarbons.
4. OCP – Organochlorine Pesticides.
5. PCB – Polychlorinated biphenyls.

Information with regard to fluoride contamination was obtained from Tomago Aluminium. It revealed that the proposed Midal Site and haul road are well within the Tomago Smelter Buffer Zone. The buffer zone is essentially a special environmental management zone and is defined in the Tomago Smelter Conditions of Consent and is derived from the prediction of ambient fluoride levels associated with the smelter operations. The boundaries of the buffer zone are between a 2km and 4km radius from the centre of the smelter. The buffer zone recognises that ambient levels of emissions may be above DECCW guideline values within the zone and delineates these and it highlights that there may be an existing environmental impact that arises from the smelter operations.

3. Sampling Analysis Plan and Methodology

3.1 Sampling and Analytical Program

The sampling and analytical program (Table 3-1) was based on the information provided by the client, the site characterisation and site history assessment and our experience on other similar sites.

The NSW EPA Sample Design Guidelines (*EPA, 1995*) recommends that for a 2.5 Ha site, a minimum of 35 locations need to be sampled, giving an equivalent sampling density of 14 sample locations per hectare. However, for the purpose of this assessment, a combination of a targeted and systematic sampling strategy is proposed with 16 locations. The rationale for this decision was based on a good understanding of the site history, former used for industrial purposes including metal fabrication and the proposed redevelopment for continued industrial purposes (production of wire/metal fabrication), This investigation is not intended to provide a complete assessment of the site, but to provide an indication of the presence of any significant contamination, which may pose constraints to the site development or require further investigation.

Sample locations were selected to assess the nominated potential AECs such as locations of former sand blasting, welding, metal storage and oil storage. Additional locations were selected to provide a general broad grid across the site (systematic sampling). The sampling locations are shown on Figure 2 in Appendix A.

Table 3-1 Sampling and Analytical Program - Soils

Basis of Investigation	Number of Sample Locations	Analytical Parameters	Number of Analyses (including QC[b])
Former Metal Storage Six locations excavated using a drill rig or excavator (TP5, BH3, TP7, BH4, BH6, TP11)	6	TPH/BTEX[c] PAHs[c] Heavy Metals [a] OCPs / PCBs [c] Asbestos [d]	2 2 10 2
Former Oil Storage Four locations excavated using a drill rig or excavator (TP8, BH5, TP12 (east of CPT8), TP9)	4	TPH/BTEX PAHs Heavy Metals [a] OCPs / PCBs [c]	6 4 6 2

Basis of Investigation	Number of Sample Locations	Analytical Parameters	Number of Analyses (including QC[b])
General Site Area Six locations excavated using a drill rig or excavator (TP2, TP4, TP6, BH1, BH2, TP10)	6	TPH/BTEX[c] PAHs[c] Heavy Metals [a] OCPs / PCBs [c] Asbestos [d]	2 2 10 2 -
General Site Area Six locations excavated using an excavator (TP1, TP2, TP4, TP6, TP8 and TP11)	6	PASS Screen	26 (4-5 per location)

1. Metals included As, Ba, Be, Cd, Cr, Co, Cu, Mn, Hg, Pb, Ni, V and Zn.
2. QA/QC included collection of 3 blind duplicates.
3. Analylsed as 3 – 4 part composite samples.
4. Asbestos will only be analysed for if visual indication of ACM on Site.
5. TPH – Total Petroleum Hydrocarbons.
6. BTEX – Benzene, Toluene, Ethylbenze and Xylenes.
7. PAH – Polynuclear Aromatic Hydrocarbons.
8. OCP – Organochlorine Pesticides.
9. PCB – Polychlorinated biphenyls.
10. PASS – Potential Acid Sulfate Screen.

Fluoride was excluded from the analytical suite as it has previously been identified as a contamination issue within the Tomago Smelter Buffer Zone.

3.2 Soil Sampling Methodology

All fieldwork was performed by trained and experienced GHD professional personnel, in accordance with the company's written Standard Operating Procedures (SOPs), which meet or exceed the requirements of the DECCW endorsed guidelines and Australian Standards. All sampling was conducted using carefully documented and supervised quality assurance procedures.

Soil sampling was undertaken by a Geologist with assistance and guidance from a Senior Environmental Scientist, both from GHD, on 24 February and 2 March 2011. The investigation was undertaken in conjunction with a Geotechnical Investigation for the site.

Soil sampling was undertaken with excavation of twelve test pits (TP1 to TP12), by mini excavator and drilling of 6 boreholes with either hollow stem auger, solid flight auger or rotary wash borer (dependent on geology and geotechnical testing required) across the site (BH1 to BH6). Test pit depths were all 2.0m below ground level (bgl) and borehole depths ranged between 10.29m and 13.45m bgl.

Soil samples were taken from surface materials and at various depths throughout the soil profile, generally at 0.5m intervals or changes in the soil profile, with between one and four samples collected from each location. Samples were collected directly from the excavator bucket or auger flights using dedicated disposable gloves to limit cross contamination between sampling points.

All excavations were reinstated level with the surface after completion of sampling, and nominally compacted using the excavator or hand tools.

Field PID headspace gas measurements were not taken during field works as volatile contaminants were not expected at this site.

Soils penetrated during the investigations were described in accordance with the Unified Soil Classification system, with features such as seepage, discolouration, staining, odours and other indications of contamination being noted. This information was recorded on the field borehole log sheets, completed for each of the sampling locations, as shown in Appendix B.

Collected soil samples were immediately transferred to laboratory supplied glass sample jars with Teflon lined lids. Soils for ASS screening tests were transferred to zip-lock plastic bags. All sample containers were clearly labelled with a sample number, sample location, sample depth, and sample date. The sample containers were then transferred to a chilled esky for sample preservation prior to and during shipment to the testing laboratory. A chain-of-custody form was completed and forwarded with the samples to the testing laboratory.

3.2.1 QA/QC

Duplicate samples were collected for Quality Control purposes during the soil sampling at a nominal rate of 1 in 10 samples.

3.3 Laboratory Analysis of Samples

GHD subcontracted laboratory analytical services to ALS Environmental, which is National Association of Testing Authorities (NATA) registered for the testing program. The laboratory-testing program comprised analysis of samples in accordance with the analytical schedule summarised in Table 3-1.

The details of the samples selected for analysis and the list of primary samples selected for compositing are presented in Table A to D in Appendix C, and copies of the laboratory certificates are presented in Appendix D.

4. Quality Assurance / Quality Control Plan

4.1 Field Quality Assurance / Quality Control (QA/QC)

4.1.1 Field Quality Assurance

All fieldwork was conducted in general accordance with the GHD Standard Field Operating Procedures (FOP). The FOP ensures that all environmental samples were collected by a set of uniform and systematic methods.

The FOP describes many field activities including:

- Implemented decontamination procedures.
- Sample identification procedures.
- Information requirements for soil bore logs.
- Chain of custody information requirements.
- Sample duplicate frequency.
- Field equipment calibration requirements.

4.1.2 Field Quality Control

Field quality control procedures used during the project comprised:

- Blind duplicates: These are prepared in the field by duplicating the original sample and placing two equivalent portions into two separate containers. The blind intra-laboratory duplicate sample is sent anonymously to the project laboratory with the blind inter-laboratory duplicate sample sent to a secondary laboratory. The duplicate samples were analysed for the identical set of parameters requested for the corresponding original sample. For the blind duplicate sample pairs, relative percentage difference (RPD) were calculated. Blind duplicates provide an indication of the analytical precision of the project laboratory, but may also be affected by factors such as sampling methodology, inherent heterogeneity of the sample medium and different laboratory analytical techniques.

Trip spikes were not used for field quality control as it was assumed that there was a low likelihood of volatile contaminants on this site. Rinsate samples were not collected as it was considered that sampling procedures (dedicated gloves) significantly reduced the likelihood of cross contamination between sampling locations.

4.2 Laboratory Quality Assurance / Quality Control

4.2.1 Laboratory Quality Assurance

The analytical laboratories undertook the analyses utilising their own internal procedures and test methods (for which they are NATA accredited) and in accordance with their own quality assurance system which forms part of their NATA accreditation.

4.2.2 Laboratory Quality Control

Laboratory quality control procedures used during the project and reported comprised:

Laboratory Duplicate Samples: Analysis of duplicate sub-samples from one sample submitted for analytical testing and analysis of the samples in the one batch. A laboratory duplicate provides data on the analytical precision (repeatability) of an analytical batch.

Spiked Samples: A sample is spiked by adding an aliquot of known concentration of the target analyte(s) to the sample matrix prior to sample extraction and analysis. A spike documents the effect of the sample matrix on the extraction and analytical techniques.

Laboratory Blank: Usually an organic or aqueous solution that is as free of analyte as possible and contains all the reagents in the same volume as used in the processing of the samples. The reagent blank must be carried through the complete sample preparation procedure and contains the same reagent concentrations in the final solution as in the sample solution used for analysis. The reagent blank is used to correct for possible contamination resulting from the preparation or processing of the sample.

Other internal laboratory quality control procedures, as required for NATA registration, are performed and are not reported by the laboratories. These procedures and results can be provided on request.

5. Basis for Contamination Assessment

5.1 Assessment Criteria

All investigations and assessment were undertaken with reference to relevant guidelines including:

- Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC/NHMRC, 1992).
- National Environment Protection Measure (Assessment of Site Contamination) (NEPC, 1999).
- Contaminated Sites: Guidelines for Assessing Service Station Sites (EPA, 1994).
- Contaminated Sites: Sampling Design Guidelines (EPA, 1995).
- Guidelines for Consultants Reporting on Contaminated Sites (EPA, 1997).
- Guidelines for the NSW Site Auditor Scheme (2nd Edition) (DEC 2006).
- Waste Classification Guidelines, Part 1: Classifying Waste. (DECCW, 2008).

5.2 Soil Investigation Guidelines

The National Environment Protection Measure (NEPM) includes a range of Soil Investigation Levels including Ecological Investigation Levels (EILs) largely similar to the Environmental Investigation Thresholds (EITs) listed in the Australian and New Zealand Guidelines for The Assessment and Management of Contaminated Sites (ANZECC/NHMRC 1992). Health Investigation Levels (HILs) listed in the NEPM are generally the same as the Health-based Soil Investigation Levels (HBSILs) listed in the Guidelines for the NSW Site Auditor Scheme (NSW DEC, 2006).

Essentially both EILs and HILs are default values designed to protect environmental and human receptors respectively. ANZECC/NHMRC recommends that generally where EITs are exceeded, an investigation should take place, but it is stressed that the values are intended as a guide only and site specific factors need to be taken into account when assessing data. It is stated that “in general terms the guideline values will protect the most sensitive receptor”, and of the receptors considered, the most sensitive and hence most stringent guidelines are for the protection of plant life.

The NEPM also uses the ANZECC/NHMRC (1992) definition of Environmental Investigation Level as the concentration above which further appropriate investigation and evaluation will be required. The EILs are based on consideration of phytotoxicity and soil survey data, and supported by the “ANZECC B” EITs (Environmental Investigation Thresholds). It is acknowledged that future ecologically based guidelines will be developed at a regional level and related to land use, and that specific circumstances may warrant the use of more pertinent regional values.

The basis on which the HILs have been set should be assessed for relevance to the situation under consideration. HILs are provided for a range of different exposure settings or land uses:

- "A" - Standard Residential with garden / accessible soil (includes children day-care centres, kindergartens, pre-schools and primary schools).
- "D" - Residential with minimal opportunities for soil access.
- "E" - Parks, recreational open space and playing fields (including secondary schools).
- "F" - Commercial/industrial (includes shops, offices, factories and industrial sites).

NSW DEC, 2006 Guidelines do not provide threshold levels for volatile petroleum hydrocarbon compounds. The NSW EPA Guidelines for Assessing Service Station Sites (NSW EPA, 1994) provide an indication of acceptable cleanup levels for petroleum hydrocarbons compounds at service station sites to be reused for sensitive land uses (Threshold Concentrations (TC)). The EPA have advised that these guidelines should also be used for less sensitive land uses. For semi-volatile petroleum hydrocarbons (C16 – C35 and >C35) investigation levels are provided in the NSW DEC, 2006, however, these are based on the NEPC, 1999 health-based criteria, which require the laboratory analysis to unequivocally differentiate between aromatic and aliphatic compounds. If this cannot be done, the C10 – C40 criteria in the service station guidelines should be applied.

On the advice of the NSW Department of Health, the NSW EPA previously advised NSW Site Auditors (Site Auditors Meeting 1 March 2000) that "no asbestos in the soil at the surface is permitted". Enhealth (2005) 'Guidelines for Asbestos in the Non-Occupational Environment', provides some guidance on assessing and managing asbestos in soil although it does not provide a threshold concentration or investigation level for asbestos. Subsequently in DEC 2006 the DECC advised that there are currently no national or NSW DECC-endorsed guidelines relating to human health or environmental investigation of material containing asbestos on sites. Until such guidelines become available, the NSW DECC have advised NSW Site Auditors to exercise their professional judgement when assessing whether a site is suitable for a specific use in the light of evidence that asbestos may be a contaminants of concern. For this investigation, we have adopted 'non detect' as the investigation criteria for asbestos.

The basis on which the HILs (or HBSILs) have been set should be assessed for relevance to the situation under consideration. To assess potential contamination issues for the site, GHD compared the analytical results to the Environmental Investigation levels (EILs) as an indication of potential environmental impacts, and to both the residential with accessible soil (HIL Setting "A") and commercial/industrial criteria (HIL Setting "F") as an indication of potential health risks to site users for both residential and industrial redevelopment.

A summary of the investigation levels used to assess soil contamination levels is provided in Table 5-1 below.

Table 5-1 Soil Assessment Criteria

Parameter	Environmental Criteria (EIL [a] or TC)	Health-Based Criteria (HIL A[i])	Health-Based Criteria (HIL F[j])
Arsenic	20	100	500
Barium	300	-	-
Beryllium	-	20	100
Cadmium	3	20	100
Chromium	50 [c]	100 [d]	500 [d]
Cobalt	-	100	500
Copper	100	1000	5000
Lead	600	300	1500
Manganese	500	1500	7500
Mercury	1	15	75
Nickel	60	600	3000
Vanadium	50	-	-
Zinc	200	7000	35000
TPH C_6-C_9	-	-	65[h]
TPH C_{10}-C_{36}	-	-	1000[h]
Benzene	1[e][f]	-	1[e][f]
Toluene	1.4[e][h]	-	130[g]
Ethyl Benzene	3.1[e][h]	-	50[g]
Xylene	14[e][h]	-	25[g]
PAHs (total)	-	20	100
Benzo(a)pyrene	-	1	5
PCBs (Total)	-	10	50
Aldrin + Dieldrin	-	10	50
Chlordane	-	50	250
DDT+DDD+DDE	-	200	1000

Parameter	Environmental Criteria (EIL [a] or TC)	Health-Based Criteria (HIL A[i])	Health-Based Criteria (HIL F[j])
Heptachlor	-	10	50
Asbestos	-	Detection	Detection

Note: All units in mg/kg.

a) NEPC (1999) NEPM Schedule B(1), Ecological Investigation Levels.
b) Australian and New Zealand Environment and Conservation Council (1992), Guidelines for the Assessment and Management of Contaminated Sites, Environmental Investigation Thresholds Level.
c) Australian and New Zealand Environment and Conservation Council (1992), Environmental Investigation Thresholds Level where valance state is not distinguished but expected to be Cr(III).
d) NEPC (1999) HIL A and HIL F, Based on Cr(VI).
e) From NSW EPA (1994) Guidelines for Assessing Service Station Sites, Threshold Concentration for Sensitive Land Use – Soils.
f) From NSW EPA (1994) Guidelines for Assessing Service Station Sites, Threshold Concentration for Sensitive Land Use. A lower benzene concentration may be needed to protect groundwater.
g) From NSW EPA (1994) Guidelines for Assessing Service Station Sites, Health based Threshold Concentration.
h) From NSW EPA (1994) Guidelines for Assessing Service Station Sites, Threshold Concentration for Sensitive Land Use - Soils (protection of terrestrial organisms in soil).
i) NEPC (1999) NEPM Schedule B(1), Health Investigation Levels, Exposure Setting: A – Residential with accessible soil.
j) NEPC (1999) NEPM Schedule B(1), Health Investigation Levels, Exposure Setting: F – Commercial/Industrial.

6. Quality Assurance / Quality Control Results

6.1 Field Duplicates

Three intra-laboratory duplicate soil samples were sent to the primary laboratory for analysis of similar suites of analytes.

- QA1 – TP7 0.0-0.1.
- QA2 – TP12 0.2-0.3.
- QA4 – TP2 0.0-0.1.

RPD were calculated for duplicated samples as part of the QA/QC program, and are presented in Tables A and B in Appendix C.

The RPDs for the duplicates analysed for heavy metals were generally within 30% with the exception of nickel (34% in duplicate pair QA1/TP7 0.0-0.1) and lead, manganese and zinc (33%, 82% and 162% respectively in duplicate pair QA4/TP2 0.0-0.1).

The RPDs for the other analytes were all less than 30%.

Variations in RPDs are attributed to the heterogenous nature of the surface soils and as such the variable nature of the soil should be considered when interpreting the results.

6.2 Laboratory QA / QC

The NATA certified laboratory results sheets, as presented in Appendix D, refer to a quality control program comprising the analysis of spikes, method blanks and duplicate samples. Generally the results reported indicate that the laboratory was achieving levels of performance within their recommended control limits during the period when the samples from this program were analysed.

Due to laboratory error and transport issues, all samples for ASS field screen analysis were extracted and analysed out of holding times (24 hours). However, as these samples were frozen for transport, it is understood that oxidation of the sample would be minimal and these breaches in holding times are not considered to affect the interpretation of the laboratory results.

ALS reported that that the duplicate RPDs for copper in one sample exceeded the LOR based limits, In addition, laboratory control spike recovery limits were greater than the upper control limits for Napthalene in one soil sample and matrix spike recoveries for zinc were not determined due to sample matrix interference and elevated background concentrations. These outliers in QC are not considered to affect the interpretation of the laboratory results.

Based on a review of the laboratory QA / QC data, it is considered that the analytical results are reasonably representative of conditions at the time of the investigation.

6.3 Overall Assessment of Data Quality Against DQIs

An overall assessment of data against the DQIs described in Section 1.6 is provided in Table 6-1.

Table 6-1 Evaluation of Data Against DQIs

DQI	Evaluation
Representativeness	Site conditions were relatively uniform, and the data collected is considered representative of the conditions encountered.
Completeness	All field work was undertaken by experienced staff and thoroughly documented. Data was complete to the depth investigated. The rate of duplicate sample analysis was in accordance with the SAQP.
Comparability	Sampling and analysis was undertaken using standard, documented methodology and it is considered the data would be comparable with data obtained at different times. Field conditions were consistent with laboratory results.
Precision	Based on evaluation of field and laboratory QC described above, the precision of data is considered acceptable. Some variability was apparent, attributed to soil heterogeneity. As analytical results were generally below the relevant criteria, with the exception of some heavy metals exceeding the HIL A, this variability is not considered to affect the assessment.
Accuracy	Review of laboratory QC indicates the accuracy of data is adequate for the purposes of the assessment, and there was no significant bias between the primary and check laboratories.
Decision Rules	The data was appropriate for comparison with the guidelines described in Section 6, and these guidelines were applied in the assessment.

On the basis of comparison against the DQIs, GHD considers the data is of adequate quality from which to draw conclusions for the purposes of this report.

7. Investigation Results

7.1 Soil Profile

Northern Portion of the Site (TP1, TP2, TP3 and TP4)

Natural sands (pale grey to orange brown to pale yellow) were encountered from the surface to depths of 2.0m bgl (maximum extent of test pits).

Central Portion of the Site (TP5, TP6, TP7, TP8, BH1, BH2, BH3 and BH4)

Fill - consisting of gravely sand were encountered to depths between 0.15 m and 0.7m bgl.

Sand - pale grey or orange brown, fine to medium grained) to depths of between 2.0m (extent of depth of test pit) and 4.5m.

Clay - dark grey or dark brown clay with sand was encountered in borehole locations at depths of between 3.8m and 5.2m.

Sand - pale grey, dark brown or orange/brown fine to medium grained sand (some with fine gravels, organic matter and “coffee rock”) to the extent of the deeper boreholes (between 10.29m and 13.45m bgl).

No fill was present in BH4.

Southern Portion of the Site (TP9, TP10, TP11, TP12, BH5 and BH6)

Fill - consisting of gravely sand with some clay were encountered to depths between 0.05 m and 0.35m bgl.

Sand - pale grey or orange brown, fine to medium grained) to depths of between 0.9m and 6.6m.

Clay - dark grey to black or dark brown clay with sand was encountered between 0.9m and 5.2m (some with weak to moderately cemented coffee rock).

Sand - pale grey, dark brown or orange/brown fine to medium grained sand (some with organic matter) to the extent of the deeper boreholes (10.42m bgl).

No asbestos was observed during the excavations. No hydrocarbon odours and / or staining were noted during the investigation.

Groundwater was encountered in TP7 at 1.5m, BH2 and BH6 at 2.0m, BH4 at 2.1m, BH5 at 2.2m and BH1 and BH3 at 2.3m. No sheens or odours were detected in the groundwater.

Bore and test pit logs are presented in Appendix B.

7.2 Soil Analytical Results

Soil sample locations are presented in Figure 2 Appendix A. Summaries of the laboratory results are presented in Tables A to D, in Appendix A. Detailed laboratory report sheets and COC (Chain of Custody) documents are provided in Appendix D.

In documenting these results, comparison has been made to the site assessment criteria, including Ecological Investigation Levels (EILs) and Health Investigation Levels (HILs) for both residential with accessible soils and commercial / industrial land use as discussed in Section 5.2.

7.2.1 Heavy Metals

Concentrations of heavy metals were below the HIL F for all samples analysed. Samples also generally reported concentrations below the relevant EILs and HIL A with the exception of the following:

- Arsenic in samples TP7 0.0-0.1(37 mg/kg), QA4 (30 mg/kg) and TP8 0.0-0.1 (72 mg/kg) exceeded the EIL of 20mg/kg.
- Copper in samples TP7 0.0-0.1(147 mg/kg), QA4 (187 mg/kg), BH6 0.0-0.1 (152 mg/kg), TP8 0.0-0.1 (237 mg/kg) and TP10 0.0-0.1 (127 mg/kg) exceeded the EIL of 100mg/kg.
- Manganese in 11 samples (BH3 0.0-0.1, TP7 0.0-0.1, QA4, BH6 0.0-0.1, TP11 0.0-0.1, TP8 0.0-0.1, TP9 0.0-0.1, BH1 0.0-0.1, BH2 0.0-0.1, BH2 0.2-0.3 and TP10 0.0-0.1) exceeded the EIL of 500 mg/kg and 3 samples, BH6 0.0-0.1 (1780 mg/kg), TP8 0.0-0.1 (3200 mg/kg) and TP10 0.0-0.1 (7150mg/kg) exceeded the HIL A of 1500 mg/kg.
- Vanadium in samples TP8 0.0-0.1 (170 mg/kg) and TP10 0.0-0.1 (137 mg/kg) exceeded the EIL of 50 mg/kg.
- Zinc in 14 samples (BH3 0.0-0.1, TP7 0.0-0.1, QA4, BH4 0.0-0.1, BH6 0.0-0.1, TP11 0.0-0.1, TP8 0.0-0.1, BH5 0.0-0.1, TP12 0.0-0.1, TP9 0.0-0.1, TP6 0.0-0.1, BH1 0.0-0.1, BH2 0.0-0.1, BH2 0.2-0.3 and BH10 0.0-0.1) exceeded the EIL of 200 mg/kg.

7.2.2 Asbestos

No fragments of materials potentially containing asbestos were observed in the soils. No soil analysis was undertaken.

7.2.3 Organics

Volatile Hydrocarbons (TPH C_6 – C_9 and BTEX)

All samples analysed for BTEX and TPH C_6 – C_9 recorded concentrations below the laboratory Limit of Reporting (LOR).

Total Petroleum Hydrocarbons (TPH C_{10} – C_{36})

All samples analysed for TPH C_{10} – C_{36} recorded concentrations below the LOR.

Poly Aromatic Hydrocarbons (PAHs)

All samples analysed for PAHs recorded concentrations below the laboratory LOR.

Organochlorine Pesticides (OCPs) and PCBs

Concentrations of OCPs and PCBs in all samples analysed were below the laboratory LOR.

Acid Sulfate Soils Screen

Acid sulphate soil (ASS) field pH (pHF) and field peroxide pH (pHFOX) indicator tests were carried out on 26 samples from 6 locations to provide an indication of the presence of acid sulfate soils. The potential for the presence of ASS was based on the following criteria from Ahern et al. (1998):

- The strength of the reaction with peroxide.
- A pHFOX value at least one unit below pHF.
- pHFOX < 3.

Two samples exhibited reaction strengths of 3 or 4 (vigorous to very vigorous) however initial pH was high (between 6 and 8.6) and the resultant pH change ranged from 2.1 to 0.2 pH units. Most of the higher reaction strengths and pH changes are for surface soils and would be likely attributable to organic material. No further analysis was requested. It is considered that the potential for acid sulfate soils to occur on this site is low.

8. Discussion

8.1 General Site History

The interpretation of the historical searches indicated that the site was likely to have been bush land/farming until the 1970's when it was cleared and then developed for metal fabrication in the 1980's. Development on the site has predominantly involved the construction of hard stand and storage rack areas and sheds. It is considered that the site has been used for industrial purposes (metal fabrication and storage) from the 1970's to the present.

The review of the dangerous goods search did not reveal any dangerous goods having been licensed to the site. A previous investigation on the site identified a bunded oil storage area to the north of the existing shed. Council 149 Certificates for Lot 5 and Lot 6 DP 270328 at 21E and 35A School Drive, states that PSC is aware of matters regarding potential site contamination that may affect the land. The DECCW web site database did not reveal any existing former notices against the property.

The site walkover identified that the northern part of the site consisted of scattered shrubs, grasses and trees with a small amount of waste dumping. The central portion of the site was grassed with low points/depressions and scars/hardstand areas from previous racking and storage. This area was scattered with workshop waste/debris. In the southern central portion of the property (north of the existing shed) there were concrete hardstand areas with metal castings/weld fragments and blue discolouration of the surface rocks and gravels. Metal tracks were also evident in the area. Previous investigations have indicated the presence of a former bunded oil storage area in this location. In the southern portion of the site was a shed with adjoining structures/bays, former wash bays, storage areas and awnings. South of the shed was a large hardstand area with concrete anchor points, metal casting/weld fragments and also several resinous stains/patches. An access road is located along the southern boundary.

Several point sources of potential surface contamination were identified on the site including areas of hardstand in the central western areas, central areas and the southern areas of the site (blue discolouration of surface materials, metal casts and weld rejects, resinous materials) and the former oil storage area to the north of the shed. It was considered likely that contaminated surface soils could be present adjacent to or down gradient of these areas of the site.

The most likely sources of potential contamination were considered to be the following:

- Spills and leaks of oils / lubricants from on site equipment and / or storage areas.
- Surface debris and residues containing metals from previous site use and situation adjacent to the aluminium smelter.
- Importation of potentially contaminated fill materials over the site.
- Spraying pesticides over the site for weed control.

8.2 Summary of Results

8.2.1 Soil

Soil samples from 17 locations were collected to assess areas of potential contamination across the site based on the site history.

Fill comprising gravely sands was encountered in the majority of locations in the central and southern portion of the site. No fill materials were present in the northern portion of the site. Fill materials was generally overlying natural sands. Groundwater was encountered at depths between 1.5m and 2.3m bgl.

The results of the laboratory analyses indicated all concentrations of heavy metals below the HIL F.

Surface soil samples (0-0.1) from several locations reported concentrations of some metals exceeding the EILs or HIL A including:

- Arsenic (TP7 and TP8).
- Copper (TP7, BH6, TP8 and TP10.
- Manganese (BH3, TP7, BH6, TP11, TP8, TP9, BH1, BH2, BH2 and TP10).
- Vanadium (TP8 and TP10).
- Zinc (BH3, TP7, BH4, BH6, TP11, TP8, BH5, TP12, TP9, TP6, BH1, BH2, BH2 and BH10).

All samples exceeding the EILs and HIL A were located within the surface soils of the former metal fabrication site (central and southern regions) and are likely to be associated with the surface fill materials and previous site use. While concentrations exceeding EILs may indicate some potential environmental impacts (eg phytotoxicity to sensitive plant species) the site is to be redeveloped for metal fabrication use comprising several buildings and hard stand areas. Landscaping will not be required. The “decision-making process for assessing urban redevelopment sites” from DEC 2006 does not require consideration of EILs when assessing the suitability of a site for commercial / industrial land use.

TPH C_6-C_9, TPH C_{10}-C_{35}, BTEX, PAHs, OCP and PCB concentrations were reported below the nominated soil investigation levels for all samples analysed. No hydrocarbons impacts were identified in the vicinity of the former bunded oil storage area. Field screening analysis for potential acid sulfate soils indicated a low potential for occurrence at this site.

In review of the site history, proposed redevelopment plans and results from the soil investigation to date, it is considered that the site is suitable for redevelopment for industrial/commercial purposes without the requirement for further investigation or remediation.

9. Conclusions and Recommendations

GHD was engaged by Midal International Pty Limited (Midal) to undertake a Phase 2 Contaminated Site Assessment (CSA) on a site located at 21 School Drive, Tomago, NSW. The CSA is required as part of a Major Project Application to the Department of Planning (DoP) for the proposed cable manufacturing facility to be assessed under Part 3A of the *Environmental Planning and Assessment Act* 1979.

Soil investigations identified several locations within the central and southern regions of the site (former metal fabrication and storage, oil storage) with heavy metal concentrations (arsenic, copper, manganese, vanadium and zinc) in excess of the EILs and HIL A (residential land use). Although concentrations exceeding EILs may indicate some potential environmental impacts, these impacts are not considered to impede the suitability of the site for commercial/industrial redevelopment.

Based on the site history review and investigations undertaken involving subsurface sampling and laboratory analysis on selected soil samples, it is considered that the site is suitable for redevelopment for commercial/industrial land use without the requirement for further investigation or remediation.

10. References

DEC 2006, Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 2006.

DECCW 2009, Waste Classification Guidelines, Part 1: Classifying Waste.

DLWC 1:25000 Acid Sulphate Soils (ASS) risk map - Beresfield 1997.

enHealth, Guidelines for Asbestos in the Non-Occupational Environment, 2005.

EPA, Contaminated Sites: Guidelines for Assessing Service Station Sites, 1994.

EPA, Contaminated Sites: Sampling Design Guidelines, 1995.

EPA, Guidelines for Consultants Reporting on Contaminated Sites, 1997.

NEPC 1999, National Environment Protection (Assessment of Site Contamination) Measure (NEPM), 1999.

Phase II Environmental Site Assessment. AEC – Tomago Fabrication Facility – Tomago, NSW. (for ABB Pty Limited). ERM. November 1999. Reference: 59099rp1.

Port Stephens Council - Acid Sulfate Soil Planning Map 2004.

S.P.Hawley, R.A.Glenn, and C.J. Baker, (1994). *Newcastle Coalfield Regional Geology, Edition 1*. Published by the Department of Mineral Resources.

11. Limitations

This report has been prepared by GHD in response to a specific brief issued by Midal (the client) under the engagement for this project. No warranties, expressed or implied, are offered to any third party and no liability will be accepted for the use of this report by any third party.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent and experienced person with experience in environmental investigations, before being used for any other purpose. GHD Pty Ltd accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by GHD Pty Ltd, and should not be relied upon by other parties, who should make their own enquires.

In preparation of this report GHD has relied upon certain information and documentation supplied by the client. GHD has accepted this information in good faith.

Where site investigations have been conducted, these have been limited sampling exercises targeted at obtaining specific, issue-related information. The information obtained is not warranted in respect to site conditions that might be encountered across the site other than at the sampling locations. The extent of sampling of soils and subsequent analysis has been necessarily limited and it may not identify contamination that occurs in unexpected locations or from unexpected sources. Further, soil conditions are often variable, resulting in non-homogenous contaminant distributions across a site. Contaminant concentrations have been identified at chosen sample locations; however, conditions between sample locations can only be inferred on the basis of the estimated geological conditions and the nature and extent of identified contamination. Boundaries between zones of variable contamination are often indistinct, and have been interpreted based on available information and the application of professional judgement. The accuracy with which the soils conditions have been characterised depends on the frequency and methods of sampling and the uniformity of sub-surface conditions and is therefore limited by the scope of works undertaken.

The contents and conclusion of this report may be inappropriate for any third party in the context of that third party's particular purposes and circumstances. Any party other than those above should obtain its own independent information or advice and no responsibility is accepted and no duty of care is assumed by GHD to any third party who may use or rely on the whole or any part of the content of this document.

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Appendix A

Figures

LEGEND

TP01 11 TEST PITS TO 2.0m

BH01 6 BOREHOLES TO 10.0m

CPT01 10 CPT's TO 10.0m

TP01 TP02 TP03 TP04 TP05 TP06 TP07 TP08 TP09 TP10 TP11 TP12

BH01 BH02 BH03 BH04 BH05 BH06

CPT01 CPT02 CPT03 CPT04 CPT05 CPT05 CPT07 CPT08 CPT09 CPT10

ADMINISTRATION OFFICE
GROUND FLOOR AREA

Site Locality Plan

0 20 40 60m

SCALE 1:2000 AT ORIGINAL SIZE

MIDAL CABLES INTERNATIONAL PTY LTD
TOMAGO CABLE PLANT

BOREHOLE, TEST PIT AND CPT LOCATIONS

Job Number 22-15280
Revision B
Date SEPT 11

Figure 01

Levels 2 & 3 GHD Tower, 24 Honeysuckle Drive Newcastle NSW 2300 Australia T 61 2 4979 9999 F 61 2 4979 9988 E ntlmail@ghd.com W www.ghd.com

Plot Date: 6 September 2011 - 4:00 PM Plotted by: Rebecca J Cocks/Newcastle/GHD/AU Cad File No: G:\22\15280\CADD\Drawings\22-15280-FIG01.dwg

Appendix B

Borehole Logs

BOREHOLE LOG SHEET

GEO_BOREHOLE 2215280_05_GEOTECH_LOGS.GPJ GHD_GEO_TEMPLATE.GDT 7/4/11

Client :	Midal Cables International Pty Ltd	**HOLE No. BH01**	
Project :	Midal Cable Plant		
Location :	Tomago NSW	**SHEET 1 OF 2**	
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°
Rig Type :	MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny
Date Started :	2/3/11	**Date Completed :** 2/3/11	**Logged by :** JMS

Processed : JMS
Checked :
Date :

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
				BH1 0.0-0.1	0.15		SG	FILL, Gravelly SAND, orange brown (fill)	D	-	
				BH1 0.2-0.3	0.30		SP	FILL, SAND trace gravel, pale grey, fine grained sand, coarse grained gravel (fill)	D	-	
				BH1 0.5-0.6			SP	SAND, orange brown, fine to medium grained (alluvium)	D-SM	L	
1				BH1 1.0-1.1 SPT 3/3/4 N=7							
2			▼ GWL 2.3m						W	VL	
				SPT 2/1/2 N=3							
3	Hollow Stem Auger	Hollow Stem Auger									
4				SPT 1/0/1 N=1	4.50		ML	SILT with sand, dark grey, low plasticity (MC>>PL) (alluvium)	M	VS	Silt layer location inferred based on cave in at 5.5 m SPT
5					5.20		SP	SAND, orange brown, fine to medium grained (alluvium)	M	VL	
6				SPT 1/0/2 N=2							
7										D	
				SPT 9/17/23 N=40							
8					8.00						

See standard sheets for details of abbreviations & basis of descriptions

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Job No.
2215280-05

BOREHOLE LOG SHEET

GEO_BOREHOLE 2215280_05_GEOTECH_LOGS.GPJ GHD_GEO_TEMPLATE.GDT 7/4/11

Client :	Midal Cables International Pty Ltd	**HOLE No. BH01**	
Project :	Midal Cable Plant		
Location :	Tomago NSW		**SHEET 2 OF 2**
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°
Rig Type :	MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny
Date Started :	2/3/11	**Date Completed :** 2/3/11	**Logged by :** JMS

Processed : JMS
Checked :
Date :

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
9	Hollow Stem Auger	Hollow Stem Auger		SPT 8/17/25 N=42			SP	SAND, as previous		D	
								dark orange brown		VD	
10				SPT+ 10/25 for 150mm N>50	10.30			End of Hole at 10.30 metres Limit of Investigation Reached Groundwater Encountered at 2.30 meters			
11											
12											
13											
14											
15											
16											

See standard sheets for details of abbreviations & basis of descriptions

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CONSULTING GEOTECHNICAL ENGINEERS AND GEOLOGISTS

Job No.
2215280-05

BOREHOLE LOG SHEET

GEO_BOREHOLE 2215280_05_GEOTECH_LOGS.GPJ GHD_GEO_TEMPLATE.GDT 7/4/11

Client :	Midal Cables International Pty Ltd	**HOLE No. BH02**	
Project :	Midal Cable Plant		
Location :	Tomago NSW		**SHEET 1 OF 2**
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°
Rig Type :	MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny
Date Started :	2/3/11	**Date Completed :** 2/3/11	**Logged by :** JMS

Processed : JMS
Checked :
Date :

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
				BH2 0.0-0.1			SG	FILL, Gravelly SAND, orange brown, fine to medium grained sand, fine grained gravel (fill)	D	-	
				BH2 0.2-0.3							
				QA7							
				BH2 0.5-0.6	0.70		SP	SAND, pale orange brown, fine to medium grained (alluvium)	M	MD	
1				BH2 1.0-1.1 SPT 4/7/6 N=13							
2			GWL 2.0m						W	VL	
				SPT 0/0/1 N=1							SPT advanced 300mm under hammer weight
3											
4	Hollow Stem Auger	Hollow Stem Augers		SPT 3/0/1 N=1	4.20		ML	Sandy SILT/Silty SAND, dark grey, low plasticity (MC>>PL), fine grained sand (alluvium)	W	VS	Silt layer location inferred based on cave in at 5.5 m SPT
5					5.00		SP	SAND, orange brown, fine to medium grained (alluvium)	M	D	
				SPT 11/13/25 N=38							
6											
7								grades to dark orange brown		MD	
				SPT 5/11/15 N=26							
8					8.00						

See standard sheets for details of abbreviations & basis of descriptions

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BOREHOLE LOG SHEET

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Client :	Midal Cables International Pty Ltd	**HOLE No. BH02**	
Project :	Midal Cable Plant		
Location :	Tomago NSW		**SHEET 2 OF 2**
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°
Rig Type :	MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny
Date Started :	2/3/11	**Date Completed :** 2/3/11	**Logged by :** JMS

Processed : JMS
Checked :
Date :

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
9	Hollow Stem Auger	Hollow Stem Augers		SPT 8/17/26 N=43			SP	SAND, as previous	M	D	
10				SPT 5/12/23 N=36							
11											
12				SPT 1/0/6 N=6						MD?	Probable cave-in or loosening resulted in low blow counts. Likely MD-D.
13				SPT 1/3/15 N=18	13.45						Probable cave-in or loosening resulted in low blow counts. Likely MD-D.
								End of Hole at 13.45 metres Limit of Investigation Reached Groundwater Encountered at 2.0 metres			
14											
15											
16											

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BOREHOLE LOG SHEET

GEO_BOREHOLE 2215280_05_GEOTECH_LOGS.GPJ GHD_GEO_TEMPLATE.GDT 7/4/11

Client :	Midal Cables International Pty Ltd	**HOLE No. BH03**	
Project :	Midal Cable Plant		
Location :	Tomago NSW		**SHEET 1 OF 2**
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°
Rig Type :	MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny
Date Started :	1/3/11	**Date Completed :** 1/3/11	**Logged by :** JMS

Processed : JMS | **Checked :** | **Date :**

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
				BH3 0.0-0.1	0.15		SG	FILL, Gravelly SAND, pale grey, fine grained sand, medium gravel (fill)	D	-	
				QA6			SP	SAND, pale grey, fine grained (alluvium)	D-SM	L	
				BH3 0.2-0.3							
				BH3 0.5-0.6							
1				BH3 1.0-1.1 SPT 4/4/4 N=8				grey brown, trace fine quartz gravel	M		
2			GWL 2.3m								
				SPT 1/0/0 N=0					W	VL	
3											
4	Hollow Stem Auger	Hollow Stem Augers		SPT 2/0/1 N=1				gravelly SAND, fine gravel			
					4.10		ML	SILT, dark brown, low plasticity (MC>>PL) (alluvium)	W	VS	
5					5.00		SP	SAND with gravel, pale grey, fine to medium grained sand, fine subrounded gravel (alluvium)	M	MD	
				SPT+ 12/25 for 110mm N>50				SAND, dark brown		VD	
6											
7				SPT+ 22/ 25 for 90mm N>50							
8					8.00						

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BOREHOLE LOG SHEET

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Client :	Midal Cables International Pty Ltd	**HOLE No. BH03**	
Project :	Midal Cable Plant		
Location :	Tomago NSW	**SHEET 2 OF 2**	
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°	**Processed :** JMS
Rig Type :	MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny	**Checked :**
Date Started :	1/3/11	**Date Completed :** 1/3/11	**Logged by :** JMS	**Date :**

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
9	Hollow Stem Auger	Hollow Stem Augers		SPT+ 20/25 for 80mm N>50			SP	SAND, as previous	M	VD	
10				SPT 8/16/23 N=39				orange brown		D	
11											
12				SPT 6/10/21 N=31						MD-D	
13					13.00			End of Hole at 13.00 metres Limit of Investigation Reached Groundwater Encountered at 2.30 metres			
14											
15											
16											

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BOREHOLE LOG SHEET

GEO_BOREHOLE 2215280_05_GEOTECH_LOGS.GPJ GHD_GEO_TEMPLATE.GDT 7/4/11

Client :	Midal Cables International Pty Ltd	**HOLE No. BH04**	
Project :	Midal Cable Plant		
Location :	Tomago NSW		**SHEET 1 OF 2**
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°
Rig Type :	MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny
Date Started :	28/2/11	**Date Completed :** 28/2/11	**Logged by :** JMS

Processed : JMS
Checked :
Date :

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
0	Solid Flight Auger	HQ casing	GWL 2.10M	BH4 0.0-0.1			SP	SAND, brown, fine grained (alluvium)	SM-D	L	
				BH4 0.2-0.3	0.40						
				BH4 0.5-0.6			SP	SAND, orange brown, fine to medium grained (alluvium)	SM	L	
1				BH4 1.0-1.1 SPT 3/2/4 N=6					M		
2									W	VL	
				SPT 1/0/0 N=0							
3					3.80		ML	SILT, dark brown, low plasticity (MC>>PL) with organic matter (alluvium)	W	VS	
4	Rotary Wash Boring			SPT 1/2/1 N=3	4.35		SP	SAND with to trace silt, pale grey to mid grey, fine grained (alluvium)	W	VL	
5					5.30		SP	SAND, dark brown, fine to medium grained, organic matter, weakly cemented (indurated) 'coffee rock' (alluvium)	M	VD	
6				SPT+ 16.30+ for 100mm HB N>50							
7				SPT+ 25 for 140mm HB N>50	7.80		SP	SAND, dark orange brown, fine grained, minor organics	M	D	
8					8.00						

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Client :	Midal Cables International Pty Ltd	**HOLE No. BH04**	
Project :	Midal Cable Plant		
Location :	Tomago NSW		**SHEET 2 OF 2**
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°
Rig Type :	MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny
Date Started :	28/2/11	**Date Completed :** 28/2/11	**Logged by :** JMS

Processed : JMS
Checked :
Date :

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
9	Rotary Wash Boring			SPT+ 16/25/25 for 80mm N>50	8.65		SP	(alluvium) SAND, as previous	M	D	
10				SPT+ 10/25 for 140mm N>50	10.29			SAND, dark brown, fine grained, with organi matter, weakly cemented (indurated) 'coffee rock' (alluvium)	M	VD	
11								End of Hole at 10.29 meters Limit of Investigation Reached Groundwater Encountered at 2.10 metres			
12											
13											
14											
15											
16											

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Client :	Midal Cables International Pty Ltd	**HOLE No. BH05**	
Project :	Midal Cable Plant		
Location :	Tomago NSW		**SHEET 1 OF 2**
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°
Rig Type :	MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny
Date Started :	1/3/11	**Date Completed :** 1/3/11	**Logged by :** JMS

Processed : JMS
Checked :
Date :

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
0	Hollow Stem Auger	Hollow Stem Auger	GWL 2.2m	BH5 0.0-0.1	0.15		SG	FILL, Gravelly SAND, orange brown, fine grained sand, coarse gravel (fill)	D	-	
				BH5 0.2-0.3			SP	SAND, pale grey, fine grained (alluvium)	SM	L	
				BH5 0.5-0.6							
1				BH5 1.0-1.1 SPT 2/3/2 N=5					M		
2									W	VL	
				SPT 2/0/2 N=2							
3											
4				SPT 1/0/0 N=0							
5											
				SPT 1/1/0 N=1	5.70		ML	SILT with sand, dark grey brown, low plastcity (MC>>PL), fine grained sand, with organic matter (alluvium)	W	VS	
6					6.60		SP	SAND, orange brown, fine to medium grained (alluvium)	M	MD	
7				SPT 4/13/16 N=29							
8					8.00						

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BOREHOLE LOG SHEET

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Client :	Midal Cables International Pty Ltd	**HOLE No. BH05**	
Project :	Midal Cable Plant		
Location :	Tomago NSW	**SHEET 2 OF 2**	
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°
Rig Type :	MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny
Date Started :	1/3/11	**Date Completed :** 1/3/11	**Logged by :** JMS

Processed : JMS
Checked :
Date :

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
9	Hollow Stem Auger	Hollow Stem Auger		SPT 2/13/21 N=34			SP	SAND, as previous	M	D	
10				SPT+ 7/16/25 for 130mm N>50	10.42					VD	
								End of Hole at 10.42 metres Limit of Investigation Reched Groundwater Encountered at 2.20 metres			
11											
12											
13											
14											
15											
16											

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BOREHOLE LOG SHEET

GEO_BOREHOLE 2215280_05_GEOTECH_LOGS.GPJ GHD_GEO_TEMPLATE.GDT 7/4/11

Client : Midal Cables International Pty Ltd		**HOLE No. BH06**	
Project : Midal Cable Plant			
Location : Tomago NSW			**SHEET 1 OF 2**
Position : Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°	**Processed :** JMS
Rig Type : MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny	**Checked :**
Date Started : 28/2/11	**Date Completed :** 1/3/11	**Logged by :** JMS	**Date :**

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
0	Solid Flight Auger	HQ casing	GWL 2.0m	BH6 0.0-0.1	0.15		SG	FILL, Gravelly SAND, orange brown, fine to coarse grained sand, fine gravel (fill)	D-SM		
				QA5	0.35		SP				
				BH6 0.2-0.3			SP	FILL, SAND, with gravel, orange brown, fine to coarse grained sand, fine gravel (fill)	D-SM	L	
				BH6 0.5-0.6				SAND, pale orange brown, fine to medium grained (alluvium)	SM		
1				BH6 1.0-1.1 SPT 2/1/2 N=3							
2									W	VL	
3				SPT 1/1/1 N=2	3.70		ML	SILT, black brown, low plasticity (MC>>PL), with organic matter (alluvium)	W	VS	
4	Rotary Wash Boring			SPT 1/0/1 N=1	4.40		SP	SAND, pale grey, fine to medium grained (alluvium)	W	VL	
5					5.20		SP	SAND, orange brown, fine to medium grained (alluvium)	M	MD	
6				SPT 6/5/5 N=10							
7				SPT+ 12/19/25 for 140mm N>34				dark orange brown, with organic matter		VD	
8					8.00						

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BOREHOLE LOG SHEET

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Client : Midal Cables International Pty Ltd
Project : Midal Cable Plant
Location : Tomago NSW

HOLE No. BH06

SHEET 2 OF 2

Position : Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°		**Processed :** JMS
Rig Type : MD20 **Mounting:** Truck	**Contractor :** FICO Group Drilling	**Driller :** Danny		**Checked :**
Date Started : 28/2/11	**Date Completed :** 1/3/11	**Logged by :** JMS		**Date :**

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
9	Hollow Stem Auger	Hollow Stem Augers		SPT+ 15/25 for 140 mm N>50			SP	SAND, as previous	M	VD	Cave-in. Redrilled 1/3/2011 with Hollow Stem Augers
10				SPT+ 10/16/25 for 130mm N>41	10.42			End of Hole at 10.42 metres Limit of Investigation Reached Groundwater Encountered at 2.0 metres			
11											
12											
13											
14											
15											
16											

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TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP01

SHEET 1 **OF** 1

Position: Refer to test location plan	**Surface RL:**	**Processed:** JMS
Method of Exploration: Mini Excavator	**Hole Size:** 200 x 450	**Checked:**
Date: 23/02/11	**Logged by:** JMS	**Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments Observations
					SP	SAND, pale grey, fine grained (alluvium)	SM-D	L	
		TP1@0.5 ASS	0.55		SP	SAND, orange brown, fine grained with orange staining (alluvium)	SM	L	
1		TP1@1.0 ASS				grades to pale yellow			
		TP1@1.5 ASS				grades to very pale yellow to white			
2		TP1@2.0 ASS	2.00			End of Hole at 2.0 m Limit of Investigation Reached Groundwater Not Encountered			
3									

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TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP02

SHEET 1 **OF** 1

Position: Refer to test location plan	**Surface RL:**	**Processed:** JMS
Method of Exploration: Mini Excavator	**Hole Size:** 200 x 450	**Checked:**
Date: 23/02/11	**Logged by:** JMS	**Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments Observations
		TP2 0.0-0.1			SP	SAND, pale grey, fine grained (alluvium)	SM-D	VL	
		TP2 0.2-0.3 QA4	0.30		SP	SAND, orange brown, fine to medium grained (alluvium)	SM	L	
		TP2 0.5-0.6 TP2@0.5 ASS						MD	
1		TP2 1.0-1.1 TP2@1.0 ASS				grades to pale orange		D	
		TP2@1.5 ASS				grades to very pale orange yellow			
						grades to very pale yellow to white		MD	
2		TP2@2.0 ASS	2.00			End of Hole at 2.0 m Limit of Investigation Reached Groundwater Not Encountered			
3									

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TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP03

SHEET 1 **OF** 1

Position: Refer to test location plan | **Surface RL:** | **Processed:** JMS

Method of Exploration: Mini Excavator | **Hole Size:** 200 x 450 | **Checked:**

Date: 23/02/11 | **Logged by:** JMS | **Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments Observations
					SP	SAND, pale grey, fine grained (alluvium)	SM-D	L	
			0.20		SP	SAND, pale orange brown, fine to medium grained (alluvium)	SM	L	
		TP3@0.5						MD	
1		TP3@1.0					M	D	
		TP3@1.5						MD	
2		TP3@2.0	2.00			End of Hole at 2.0 m Limit of Investigation Reached Groundwater Not Encountered			
3									

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Job No. 2215280-05

TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP04

SHEET 1 **OF** 1

Position: Refer to test location plan	**Surface RL:**	**Processed:** JMS
Method of Exploration: Mini Excavator	**Hole Size:** 200 x 450	**Checked:**
Date: 23/02/11	**Logged by:** JMS	**Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments Observations
		TP4 0.0-0.1			SP	SAND, pale grey, fine grained (alluvium)	SM	L	
			0.20						
		TP4 0.2-0.3 QA3			SP	SAND, pale orange brown, fine to medium grained (alluvium)	SM	L	
		TP4 0.5-0.6 TP4@0.5 ASS							
1		TP4 1.0-1.1 TP4 Bulk@1.0 ASS							
		TP4@1.5 ASS							
		TP4@2.0 ASS	2.00						
2						End of Hole at 2.0 m Limit of Investigation Reached Groundwater Not Encountered			
3									

See standard sheets for details of abbreviations & basis of descriptions

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CONSULTING GEOTECHNICAL ENGINEERS AND GEOLOGISTS

Job No. **2215280-05**

TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP05

SHEET 1 **OF** 1

Position: Refer to test location plan | **Surface RL:** | **Processed:** JMS

Method of Exploration: Mini Excavator | **Hole Size:** 200 x 450 | **Checked:**

Date: 23/02/11 | **Logged by:** JMS | **Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments Observations
		TP5 0.0-0.1			SP	FILL, Gravelly SAND, pale grey, fined graine sand, concrete rubble (to 300 mm) (fill)	D	-	
			0.20						
		TP5 0.2-0.3			SP	SAND trace clay, pale gray, fine to medium grained (alluvium)	SM	D	
		TP5 0.5-0.6 TP5@0.5						VD	
			0.90						
					SP	grades to pale orange brown mottled pale grey	M	VD	
1		TP5 1.0-1.1 TP5@1.0							
		TP5@1.5							
		TP5@2.0	2.00						
2						End of Hole at 2.0 m Limit of Investigation Reached Groundwater Not Encountered			
3									

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TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP06

SHEET 1 **OF** 1

Position: Refer to test location plan	**Surface RL:**	**Processed:** JMS
Method of Exploration: Mini Excavator	**Hole Size:** 200 x 450	**Checked:**
Date: 23/02/11	**Logged by:** JMS	**Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments Observations
		TP6 0.0-0.1 ASS			SP	FILL, SAND with gravel and clay, orange brown, fine to medium grained sand (fill)	SM	-	
			0.15		SP	SAND, pale grey, fine grained (alluvium)	SM	VD	
		TP6 0.2-0.3							
			0.40		SP	SAND, pale orange mottled pale grey, fine to medium grained (alluvium)	SM-M	VD	
		TP6 0.5-0.6 TP6@0.5 ASS							
1		TP6 1.0-1.1 TP6@1.0 ASS							1.00m, hole collapsing
		TP6@1.5 ASS					W	D	
		TP6@2.0 ASS	2.00						
2						End of Hole at 2.0 m Limit of Investigation Reached Groundwater Encountered at 1.5 m			
3									

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Job No. **2215280-05**

TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP07

SHEET 1 **OF** 1

Position: Refer to test location plan | **Surface RL:** | **Processed:** JMS

Method of Exploration: Mini Excavator | **Hole Size:** 200 x 450 | **Checked:**

Date: 23/02/11 | **Logged by:** JMS | **Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments Observations
		TP7 0.0-0.1 QA1			SP	FILL, SAND trace to with gravel, orange brown (fill)	SM	MD	
			0.20						
		TP7 0.2-0.3			SP	SAND, pale grey, fine grained (alluvium)	SM	D	
		TP7 0.5-0.6 TP7@0.5							
1		TP7 1.0-1.1 TP7@1.0					M		
		TP7@1.5					W		
		TP7@2.0	2.00						
2						End of Hole at 2.0 m Limit of Investigation Reached Groundwater Encountered at 1.5 m			
3									

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TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP08

SHEET 1 **OF** 1

Position: Refer to test location plan	**Surface RL:**		**Processed:** JMS
Method of Exploration: Mini Excavator	**Hole Size:** 200 x 450		**Checked:**
Date: 23/02/11	**Logged by:** JMS		**Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments Observations
		TP8 0.0-0.1 ASS			SP-GP	FILL, Gravelly SAND, orange brown, fine to medium grained sand (fill)	SM	-	
			0.20						
		TP8 0.2-0.3			SP	FILL, SAND with gravel, grey brown, fine grained (fill)	SM	-	
			0.30		SP	SAND, pale orange brown, fine to medium grained (alluvium)	SM	VD	
		TP8 0.5-0.6 TP8@0.5 ASS							
1		TP8 1.0-1.1 TP8@1.0 ASS					M		
		TP8@1.5 ASS						D	
		TP8@2.0 ASS	2.00						
2						End of Hole at 2.0 m Limit of Investigation Reached Groundwater Not Encountered			
3									

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TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP09

SHEET 1 **OF** 1

Position: Refer to test location plan	**Surface RL:**	**Processed:** JMS
Method of Exploration: Mini Excavator	**Hole Size:** 200 x 450	**Checked:**
Date: 23/02/11	**Logged by:** JMS	**Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description (SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength)	Moisture Condition	Consistency / Density Index	Comments Observations
		TP9 0.0-0.1			SP	FILL, Gravelly SAND with clay, orange brown, fine to medium grained sand (fill)	SM	-	
			0.15						Previous car parking area
			0.20		SP	FILL, SAND, pale grey, fin grained (fill)	SM	-	
		TP9 0.2-0.3 TP@0.2			CI	FILL, Gravelly sandy CLAY, medium plasticity (MC<PL) (fill)	SM	-	
			0.30		SP	SAND, orange brown, fine to medium grained (alluvium)	SM	VD	
		TP9 0.5-0.6 TP9@0.5							
1		TP9 1.0-1.1 TP9@1.0						D	
		TP9@1.5							
		TP9@2.0	2.00						
2						End of Hole at 2.0 m Limit of Investigation Reached Groundwater Not Encountered			
3									

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TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP10

SHEET 1 **OF** 1

Position: Refer to test location plan | **Surface RL:** | **Processed:** JMS

Method of Exploration: Mini Excavator | **Hole Size:** 200 x 450 | **Checked:**

Date: 23/02/11 | **Logged by:** JMS | **Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description (SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength)	Moisture Condition	Consistency / Density Index	Comments Observations
		TP10 0.0-0.1 TP10@0.0			SP	FILL, gravelly SAND with clay, orange brown (fill)	SM-D	-	
			0.15		SP	SAND, pale grey, fine grained (alluvium)	SM	D-VD	
		TP10 0.2-0.3							
		TP10 0.5-0.6 TP10 Bulk@0.5							
			0.90		SC/CI	Clayey SAND/Sandy CLAY, dark brown, low plasticity (MC<PL), weakly to moderately cemented ("coffee rock" compacted and cemented or indurated layer with humus and iron oxides - alluvium)	SM	D-VSt	
1		TP10 1.0-1.1 TP10@1.0				1.2m, moderately cemented			
		TP10@1.5						VD/H	1.5m, difficulty excavating
		TP10@2.0	2.00						
2						End of Hole at 2.0 m Limit of Investigation Reached Groundwater Not Encountered			
3									

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TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP11

SHEET 1 **OF** 1

Position: Refer to test location plan	**Surface RL:**		**Processed:** JMS
Method of Exploration: Mini Excavator	**Hole Size:** 200 x 450		**Checked:**
Date: 23/02/11	**Logged by:** JMS		**Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description (SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength)	Moisture Condition	Consistency / Density Index	Comments Observations
		TP11 0.0-0.1	0.05		SC	FILL, Clayey SAND with gravel, orange brown (fill)	SM-D	-	
					SP	SAND, pale grey, fined grained (alluvium)	SM	D	previous carpark area
		TP11 0.2-0.3							
		TP11 0.5-0.6 TP11@0.5 ASS							
			0.90		SC	Clayey SAND, dark brown, weakly cemented, fine grained ("coffee rock" compacted and cemented or indurated layer with humus and iron oxides - alluvium)	SM	D	
1		TP11 1.0-1.1 TP11@1.0 ASS							
		TP11@1.5 ASS				black, moderately cemented	M	VD	increased resistance to excavation
			1.80		SP	SAND, pale grey, fine grained (alluvium)	M	MD	
		TP11@2.0 ASS	2.00						
2						End of Hole at 2.0 m Limit of Investigation Reached Groundwater Not Encountered			
3									

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TEST PIT LOG SHEET

Client: Midal Cables International Pty Ltd

Project: Midal Cable Plant

Location: Tomago NSW

HOLE No. TP12

SHEET 1 **OF** 1

Position: Refer to test location plan | **Surface RL:** | **Processed:** JMS

Method of Exploration: Mini Excavator | **Hole Size:** 200 x 450 | **Checked:**

Date: 23/02/11 | **Logged by:** JMS | **Date:**

Scale (m)	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Material Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments Observations
		TP12 0.0-0.1			SP	FILL, Gravelly SAND trace clay, orange brown, iron stained (fill)	D	MD	
			0.20		SP	SAND, orange brown, fine to medium grained (alluvium)	SM	L	
		TP12 0.2-0.3 QA2							
		TP12 0.5-0.6							
1		TP12 1.0-1.1							
			1.10			End of Hole at 1.1 m Limit of Investigation Reached Groundwater Not Encountered			
2									
3									

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Job No. 2215280-05

Appendix C

Summary Tables

Table A: **Soil Analytical Results - Heavy Metals**
Client: **Midal Cables International Pty Limited**
Project: **Phase 2 CSA**
Job No.: **2215280-04**

NEPM 1999 EIL
NEPM 1999 HIL A - Residential with Accessible Soils
NEPM 1999 HIL F - Industrial/Commercial

Field ID	Sample Date	Moisture	Metals												
			Arsenic	Barium	Beryllium	Cadmium	Chromium (III+VI)	Cobalt	Copper	Lead	Manganese	Mercury	Nickel	Vanadium	Zinc
Units		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		1	5	10	1	1	2	2	5	5	5	0.1	2	5	5
NEPM 1999 EIL			**20**	**300**		**3**	**400**		**100**	**600**	**500**	**1**	**60**	**50**	**200**
NEPM 1999 HIL A			100		20	20	120000	100	1000	300	1500	15	600		7000
NEPM 1999 HIL F			500		100	100	600000	500	5000	1500	7500	75	3000		35000
Metal Storage Areas															
TP5 0.0-0.1	24/02/2011	16	<5	<10	<1	<1	2	<2	<5	<5	<5	<0.1	<2	<5	<5
BH3_0.0-0.1	2/03/2011	18.9	11	90	<1	<1	26	6	45	88	**912**	<0.1	19	36	**2020**
BH3_0.2-0.3	2/03/2011	4.9	<5	<10	<1	<1	<2	<2	<5	<5	31	<0.1	<2	<5	90
TP7 0.0-0.1	24/02/2011	15.2	**37**	190	<1	<1	47	11	**147**	154	**1040**	<0.1	34	32	**2970**
QA1	24/02/2011	23.8	**30**	220	<1	<1	39	14	**187**	200	**1180**	<0.1	24	34	**3880**
RPD% (1)			21	15	-	-	19	24	24	26	13	-	**34**	6	27
TP7 0.2-0.3	24/02/2011	12.4	<5	<10	<1	<1	<2	<2	<5	<5	6	<0.1	<2	<5	48
BH4_0.0-0.1	2/03/2011	3.7	6	80	<1	<1	16	5	95	99	415	<0.1	10	15	**2460**
BH4_0.5-0.6	2/03/2011	21.1	<5	<10	<1	<1	<2	<2	<5	<5	6	<0.1	<2	<5	41
BH6_0.0-0.1	2/03/2011	2.5	9	80	<1	2	70	9	**152**	85	**1780**	<0.1	53	33	**1950**
TP11 0.0-0.1	24/02/2011	4	17	80	<1	<1	25	12	27	27	**1390**	<0.1	24	41	**660**
Potential Oil Storage Area															
TP8 0.0-0.1	24/02/2011	3.5	**72**	280	<1	<1	104	17	**237**	246	**3200**	<0.1	20	**170**	**4810**
BH5_0.0-0.1	2/03/2011	2.7	<5	50	<1	<1	17	5	29	35	498	<0.1	16	28	**786**
TP12 0.0-0.1	24/02/2011	5.4	<5	100	<1	<1	8	4	19	21	239	<0.1	8	15	**350**
TP12 0.2-0.3	24/02/2011	22.9	<5	<10	<1	<1	2	<2	<5	<5	<5	<0.1	<2	<5	<5
QA2	24/02/2011	8.3	<5	<10	<1	<1	2	<2	<5	<5	<5	<0.1	<2	<5	6
RPD% (1)			-	-	-	-	0	-	-	-	-	-	**-**	-	18
TP9 0.0-0.1	24/02/2011	17.6	<5	40	<1	<1	17	5	18	22	**885**	<0.1	8	32	**377**
General Site Area															
TP2 0.0-0.1	24/02/2011	3.8	<5	<10	<1	<1	<2	<2	<5	7	12	<0.1	<2	<5	47
QA4	24/02/2011	2.6	<5	<10	<1	<1	<2	<2	<5	<5	<5	<0.1	<2	<5	<5
RPD% (1)			**-**	-	-	-	-	-	**-**	**33**	**82**	-	-	-	**162**
TP2 0.2-0.3	24/02/2011	2.3	<5	<10	<1	<1	<2	<2	<5	<5	<5	<0.1	<2	<5	<5
TP4 0.2-0.3	24/02/2011	3.7	<5	<10	<1	<1	<2	<2	<5	<5	<5	<0.1	<2	<5	<5
TP6 0.0-0.1	24/02/2011	31.4	5	40	<1	<1	13	6	30	36	402	<0.1	30	21	**463**
BH1_0.0-0.1	2/03/2011	9.6	8	130	<1	<1	48	9	96	108	**1470**	<0.1	36	42	**2770**
BH2_0.0-0.1	2/03/2011	7.4	12	40	<1	<1	33	8	31	20	**709**	<0.1	32	25	**301**
BH2_0.2-0.3	2/03/2011	5.9	12	40	<1	<1	9	10	25	9	**560**	<0.1	19	21	90
TP10 0.0-0.1	24/02/2011	9.2	8	90	<1	<1	131	8	**127**	113	**7150**	<0.1	47	**137**	**1890**
TP10 0.2-0.3	24/02/2011	7.7	<5	<10	<1	<1	2	<2	<5	<5	15	<0.1	<2	<5	7

(1) Where one sample of a dulpicate pair has a concentration less than the PQL, a value equal to the PQL has been used for the RPD% calculation.

Table B: **Soil Analytical Results - BTEX/TPH/PAHs**
Client: **Midal Cables International Pty Limited**
Project: **Phase 2 CSA**
Job No.: **2215280-04**

NEPM 1999 EIL ot TC
NEPM 1999 HIL A - Residential with Accessible Soils or TC
NEPM 1999 HIL F - Industrial/Commercial or TC

		BTEX					TPH					PAH																	
Field ID	**Sample Date**	**Benzene**	**Ethylbenzene**	**Toluene**	**Xylene (m & p)**	**Xylene (o)**	**TPH C6 - C9**	**TPH C10 - C14**	**TPH C15 - C28**	**TPH C29-C36**	**TPH+C10 - C36 (Sum of total)**	**Acenaphthene**	**Acenaphthylene**	**Anthracene**	**Benz(a)anthracene**	**Benzo(a) pyrene**	**Benzo(b)fluoranthene**	**Benzo(g,h,i)perylene**	**Benzo(k)fluoranthene**	**Chrysene**	**Dibenz(a,h)anthracene**	**Fluoranthene**	**Fluorene**	**Indeno(1,2,3-c,d)pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**TOTAL PAHs**
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		0.2	0.5	0.5	0.5	0.5	10	50	100	100	50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 1999 EIL or TC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEPM 1999 HIL A or TC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	20
NEPM 1999 HIL F or TC		1	50	130	25		65	-	-	-	1000	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	100
Metal Storage Areas																												
COMPOSITE_1 (TP5/TP3/TP7)	24/02/2011	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
COMPOSITE_2 (BH4/BH6/TP11	24/02/2011	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potential Oil Storage Area																												
TP8 0.0-0.1	24/02/2011	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH5_0.0-0.1	2/03/2011	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP12 0.0-0.1	24/02/2011	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TP12 0.2-0.3	24/02/2011	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QA2	24/02/2011	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP9 0.0-0.1	24/02/2011	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
General Site Area																												
COMPOSITE_5 (TP2/BH1/TP4)	24/02/2011	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
COMPOSITE_6 (BH2/TP6)	24/02/2011	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Table C: **Soil Analytical Results - OCPs/PCBs**
Client: **Midal Cables International Pty Limited**
Project: **Phase 2 CSA**
Job No.: **2215280-04**

NEPM 1999 EIL ot TC
NEPM 1999 HIL A - Residential with Accessible Soils or TC
NEPM 1999 HIL F - Industrial/Commercial or TC

Field ID	Sample Date	Organochlorine Pesticides																					PCBs
		4,4-DDE	a-BHC	Aldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	PCBs (Sum of total)
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.1
NEPM 1999 EIL		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	
NEPM 1999 HIL A		-	-	10	-	50		-	200		10	-	-	-	-	-	-	-	10	-	-	-	10
NEPM 1999 HIL F		-	-	50	-	250		-	1000		50	-	-	-	-	-	-	-	50	-	-	-	50
Metal Storage Areas																							
COMPOSITE_1	24/02/2011	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1
COMPOSITE_2	24/02/2011	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1
Potential Oil Storage Area																							
COMPOSITE_3	24/02/2011	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1
COMPOSITE_4	24/02/2011	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1
General Site Area																							
COMPOSITE_5	24/02/2011	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1
COMPOSITE_6	24/02/2011	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1

Table D: Soil Analytical Results - ASS Field Screen
Client: Midal Cables International Pty Limited
Project: Phase 2 CSA
Job No.: 2215280-04

Field ID	Sample Date	Acid Sulfate Soils			
		Reaction Rate (1)	pH (Field)	pH (Ox)	pH change
Units		-	pH_Units	pH Unit	
EQL		1	0.1	0.1	
Trigger		**3-4**			**>1.5**
TP1 0.5-0.6	24/02/2011	1	5.2	3.7	**1.5**
TP1 0.9-2.0	24/02/2011	1	5.3	4.8	0.5
TP1 1.0-1.1	24/02/2011	1	5.4	4.6	0.8
TP1 1.5-1.6	24/02/2011	1	5.3	4.6	0.7
					0
TP2 0.5-0.6	24/02/2011	1	5.4	4.3	1.1
TP2 0.9-2.0	24/02/2011	1	5.3	4.8	0.5
TP2 1.0-1.1	24/02/2011	1	4.8	4.1	0.7
TP2 1.5-1.6	24/02/2011	1	5.2	4.7	0.5
					0
TP4 0.5-0.6	24/02/2011	1	6	4.7	1.3
TP4 0.9-2.0	24/02/2011	1	5.5	4.7	0.8
TP4 1.0-1.1	24/02/2011	1	5.9	4.8	1.1
TP4 1.5-1.6	24/02/2011	1	5.4	4.4	1
					0
TP6 0.0-0.1	24/02/2011	**3**	6	3.9	**2.1**
TP6 0.5-0.6	20/02/2011	1	6.2	5.1	1.1
TP6 0.9-2.0	24/02/2011	1	6	5.2	0.8
TP6 1.0-1.1	24/02/2011	1	6.6	5.4	1.2
TP6 1.5-1.6	24/02/2011	1	6.4	5.2	1.2
					0
TP8 0.0-0.1	24/02/2011	**4**	8.6	8.4	0.2
TP8 0.5-0.6	24/02/2011	1	5.6	4.3	1.3
TP8 0.9-2.0	24/02/2011	1	5.7	5	0.7
TP8 1.0-1.1	24/02/2011	1	5.7	4.8	0.9
TP8 1.5-1.6	24/02/2011	1	5.9	4.7	1.2
					0
TP11 0.5-0.6	24/02/2011	1	4.4	4.1	0.3
TP11 0.9-2.0	24/02/2011	1	5.5	4.8	0.7
TP11 1.0-1.1	24/02/2011	**2**	4.8	3.3	**1.5**
TP11 1.5-1.6	24/02/2011	1	5.7	4.8	0.9

(1) pH FOX Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Vigorous; 4 - Very Vigorous

Appendix D

Laboratory Analytical Certificates

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1103992**	Page	: 1 of 21
Client	: **GHD SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS EVETTE GRIFFIN	Contact	: Angela Pavlovic
Address	: PO BOX 5403 NEWCASTLE WEST NSW, AUSTRALIA 2302	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: evette.griffin@ghd.com.au	E-mail	: angela.pavlovic@alsenviro.com
Telephone	: ----	Telephone	: +61 2 8784 8523
Facsimile	: ----	Facsimile	: +61 2 8784 8500
Project	: 2215280 04 PHASE2-TOMAGO	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 24-FEB-2011
Sampler	: JS	Issue Date	: 15-MAR-2011
Site	: ----		
		No. of samples received	: 92
Quote number	: EN/005/10	No. of samples analysed	: 56

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Senior Organic Chemist	Sydney Organics
Hoa Nguyen	Inorganic Chemist	Sydney Inorganics
Myles.Clark	Acid Sulfate Soils Supervisor	Brisbane Acid Sulphate Soils
Wisam.Marassa	Metals Coordinator	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG005T: Poor precision was obtained for Copper on sample ES113992#67 due to sample heterogeneity. Results have been confirmed by re-extraction and reanalysis.**
- **pH FOX Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Vigorous; 4 - Very Vigorous**

Analytical Results

Sub-Matrix: **COMPOSITE**

Compound	CAS Number	LOR	Unit	Client sample ID: COMPOSITE_1	COMPOSITE_2	COMPOSITE_3	COMPOSITE_4	COMPOSITE_5
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-087	ES1103992-088	ES1103992-089	ES1103992-090	ES1103992-091
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**22.7**	**4.1**	**3.8**	**10.6**	**5.3**
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	<0.5

Analytical Results

Sub-Matrix: **COMPOSITE**

Compound	CAS Number	LOR	Unit	Client sample ID: COMPOSITE_1	COMPOSITE_2	COMPOSITE_3	COMPOSITE_4	COMPOSITE_5
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-087	ES1103992-088	ES1103992-089	ES1103992-090	ES1103992-091
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	----	<10
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	----	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	----	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	<50
EP080: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	<0.5
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	**129**	**126**	**114**	**121**	**129**
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	**126**	**66.9**	**78.7**	**70.4**	**72.6**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	**83.2**	**118**	**119**	**102**	**111**
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	**92.8**	**102**	----	----	**95.8**
2-Chlorophenol-D4	93951-73-6	0.1	%	**97.8**	**110**	----	----	**101**
2.4.6-Tribromophenol	118-79-6	0.1	%	**87.0**	**93.7**	----	----	**90.3**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**95.2**	**101**	----	----	**102**
Anthracene-d10	1719-06-8	0.1	%	**104**	**96.6**	----	----	**102**
4-Terphenyl-d14	1718-51-0	0.1	%	**108**	**113**	----	----	**103**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**92.4**	**110**	----	----	**123**
Toluene-D8	2037-26-5	0.1	%	**91.6**	**118**	----	----	**114**
4-Bromofluorobenzene	460-00-4	0.1	%	**94.8**	**113**	----	----	**112**

Analytical Results

Sub-Matrix: COMPOSITE				Client sample ID	COMPOSITE_6	----	----	----	----
				Client sampling date / time	24-FEB-2011 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1103992-092	----	----	----	----
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1.0	%		7.9	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.10	mg/kg		<0.10	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: COMPOSITE				Client sample ID	COMPOSITE_6	----	----	----	----
				Client sampling date / time	24-FEB-2011 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1103992-092	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEX									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		123	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.1	%		75.9	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.1	%		111	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		96.2	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		101	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		90.9	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		100	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		99.1	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		99.1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		123	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		110	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		113	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP1 0.5-0.6	TP1 1.0-1.1	TP1 1.5-1.6	TP1 0.9-2.0	TP2 0.0-0.1
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-001	ES1103992-002	ES1103992-003	ES1103992-004	ES1103992-005
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.2**	**5.4**	**5.3**	**5.3**	----
pH (Fox)	----	0.1	pH Unit	**3.7**	**4.6**	**4.6**	**4.8**	----
Reaction Rate	----	1	-	**1**	**1**	**1**	**1**	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	----	----	----	----	**3.8**
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	----	----	<5
Barium	7440-39-3	10	mg/kg	----	----	----	----	<10
Beryllium	7440-41-7	1	mg/kg	----	----	----	----	<1
Cadmium	7440-43-9	1	mg/kg	----	----	----	----	<1
Chromium	7440-47-3	2	mg/kg	----	----	----	----	<2
Cobalt	7440-48-4	2	mg/kg	----	----	----	----	<2
Copper	7440-50-8	5	mg/kg	----	----	----	----	<5
Lead	7439-92-1	5	mg/kg	----	----	----	----	**7**
Manganese	7439-96-5	5	mg/kg	----	----	----	----	**12**
Nickel	7440-02-0	2	mg/kg	----	----	----	----	<2
Vanadium	7440-62-2	5	mg/kg	----	----	----	----	<5
Zinc	7440-66-6	5	mg/kg	----	----	----	----	**47**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	<0.1

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP2 0.2-0.3	TP2 0.5-0.6	TP2 1.0-1.1	TP2 1.5-1.6	TP2 0.9-2.0
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-006	ES1103992-007	ES1103992-008	ES1103992-009	ES1103992-010
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	----	**5.4**	**4.8**	**5.2**	**5.3**
pH (Fox)	----	0.1	pH Unit	----	**4.3**	**4.1**	**4.7**	**4.8**
Reaction Rate	----	1	-	----	**1**	**1**	**1**	**1**
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**2.3**	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Barium	7440-39-3	10	mg/kg	<10	----	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	<2	----	----	----	----
Cobalt	7440-48-4	2	mg/kg	<2	----	----	----	----
Copper	7440-50-8	5	mg/kg	<5	----	----	----	----
Lead	7439-92-1	5	mg/kg	<5	----	----	----	----
Manganese	7439-96-5	5	mg/kg	<5	----	----	----	----
Nickel	7440-02-0	2	mg/kg	<2	----	----	----	----
Vanadium	7440-62-2	5	mg/kg	<5	----	----	----	----
Zinc	7440-66-6	5	mg/kg	<5	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP4 0.2-0.3	TP4 0.5-0.6	TP4 1.0-1.1	TP4 1.5-1.6	TP4 0.9-2.0
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-012	ES1103992-013	ES1103992-014	ES1103992-015	ES1103992-016
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	----	**6.0**	**5.9**	**5.4**	**5.5**
pH (Fox)	----	0.1	pH Unit	----	**4.7**	**4.8**	**4.4**	**4.7**
Reaction Rate	----	1	-	----	**1**	**1**	**1**	**1**
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**3.7**	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Barium	7440-39-3	10	mg/kg	<10	----	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	<2	----	----	----	----
Cobalt	7440-48-4	2	mg/kg	<2	----	----	----	----
Copper	7440-50-8	5	mg/kg	<5	----	----	----	----
Lead	7439-92-1	5	mg/kg	<5	----	----	----	----
Manganese	7439-96-5	5	mg/kg	<5	----	----	----	----
Nickel	7440-02-0	2	mg/kg	<2	----	----	----	----
Vanadium	7440-62-2	5	mg/kg	<5	----	----	----	----
Zinc	7440-66-6	5	mg/kg	<5	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP5 0.0-0.1	TP6 0.0-0.1	TP6 0.5-0.6	TP6 1.0-1.1	TP6 1.5-1.6
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	20-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-017	ES1103992-021	ES1103992-023	ES1103992-024	ES1103992-025
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	----	**6.0**	**6.2**	**6.6**	**6.4**
pH (Fox)	----	0.1	pH Unit	----	**3.9**	**5.1**	**5.4**	**5.2**
Reaction Rate	----	1	-	----	**3**	**1**	**1**	**1**
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**16.0**	**31.4**	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	**5**	----	----	----
Barium	7440-39-3	10	mg/kg	<10	**40**	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	<1	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	**2**	**13**	----	----	----
Cobalt	7440-48-4	2	mg/kg	<2	**6**	----	----	----
Copper	7440-50-8	5	mg/kg	<5	**30**	----	----	----
Lead	7439-92-1	5	mg/kg	<5	**36**	----	----	----
Manganese	7439-96-5	5	mg/kg	<5	**402**	----	----	----
Nickel	7440-02-0	2	mg/kg	<2	**30**	----	----	----
Vanadium	7440-62-2	5	mg/kg	<5	**21**	----	----	----
Zinc	7440-66-6	5	mg/kg	<5	**463**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP6 0.9-2.0	TP7 0.0-0.1	TP7 0.2-0.3	TP8 0.0-0.1	TP8 0.5-0.6
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-026	ES1103992-027	ES1103992-028	ES1103992-031	ES1103992-033
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	6.0	----	----	8.6	5.6
pH (Fox)	----	0.1	pH Unit	5.2	----	----	8.4	4.3
Reaction Rate	----	1	-	1	----	----	4	1
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	----	15.2	12.4	3.5	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	37	<5	72	----
Barium	7440-39-3	10	mg/kg	----	190	<10	280	----
Beryllium	7440-41-7	1	mg/kg	----	<1	<1	<1	----
Cadmium	7440-43-9	1	mg/kg	----	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	----	47	<2	104	----
Cobalt	7440-48-4	2	mg/kg	----	11	<2	17	----
Copper	7440-50-8	5	mg/kg	----	147	<5	237	----
Lead	7439-92-1	5	mg/kg	----	154	<5	246	----
Manganese	7439-96-5	5	mg/kg	----	1040	6	3200	----
Nickel	7440-02-0	2	mg/kg	----	34	<2	20	----
Vanadium	7440-62-2	5	mg/kg	----	32	<5	170	----
Zinc	7440-66-6	5	mg/kg	----	2970	48	4810	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	<0.1	<0.1	<0.1	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	----	----	----	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	<0.5	----
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	----	----	----	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	<0.5	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP6 0.9-2.0	TP7 0.0-0.1	TP7 0.2-0.3	TP8 0.0-0.1	TP8 0.5-0.6
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-026	ES1103992-027	ES1103992-028	ES1103992-031	ES1103992-033
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	<10	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	<50	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	<100	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	<50	----
EP080: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	<0.5	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	----	----	----	**96.0**	----
2-Chlorophenol-D4	93951-73-6	0.1	%	----	----	----	**99.6**	----
2.4.6-Tribromophenol	118-79-6	0.1	%	----	----	----	**83.7**	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	----	----	----	**100**	----
Anthracene-d10	1719-06-8	0.1	%	----	----	----	**104**	----
4-Terphenyl-d14	1718-51-0	0.1	%	----	----	----	**102**	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	----	**113**	----
Toluene-D8	2037-26-5	0.1	%	----	----	----	**124**	----
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	----	**120**	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP8 1.0-1.1	TP8 1.5-1.6	TP8 0.9-2.0	TP9 0.0-0.1	TP10 0.0-0.1
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-034	ES1103992-035	ES1103992-036	ES1103992-037	ES1103992-041
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.7**	**5.9**	**5.7**	----	----
pH (Fox)	----	0.1	pH Unit	**4.8**	**4.7**	**5.0**	----	----
Reaction Rate	----	1	-	**1**	**1**	**1**	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	----	----	----	**17.6**	**9.2**
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	----	<5	**8**
Barium	7440-39-3	10	mg/kg	----	----	----	**40**	**90**
Beryllium	7440-41-7	1	mg/kg	----	----	----	<1	<1
Cadmium	7440-43-9	1	mg/kg	----	----	----	<1	<1
Chromium	7440-47-3	2	mg/kg	----	----	----	**17**	**131**
Cobalt	7440-48-4	2	mg/kg	----	----	----	**5**	**8**
Copper	7440-50-8	5	mg/kg	----	----	----	**18**	**127**
Lead	7439-92-1	5	mg/kg	----	----	----	**22**	**113**
Manganese	7439-96-5	5	mg/kg	----	----	----	**885**	**7150**
Nickel	7440-02-0	2	mg/kg	----	----	----	**8**	**47**
Vanadium	7440-62-2	5	mg/kg	----	----	----	**32**	**137**
Zinc	7440-66-6	5	mg/kg	----	----	----	**377**	**1890**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	----	----	----	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	<0.5	----
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	----	----	----	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	<0.5	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP8 1.0-1.1	TP8 1.5-1.6	TP8 0.9-2.0	TP9 0.0-0.1	TP10 0.0-0.1
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-034	ES1103992-035	ES1103992-036	ES1103992-037	ES1103992-041
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	<10	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	<50	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	<100	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	<50	----
EP080: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	<0.5	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	----	----	----	**99.1**	----
2-Chlorophenol-D4	93951-73-6	0.1	%	----	----	----	**99.3**	----
2.4.6-Tribromophenol	118-79-6	0.1	%	----	----	----	**87.1**	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	----	----	----	**101**	----
Anthracene-d10	1719-06-8	0.1	%	----	----	----	**104**	----
4-Terphenyl-d14	1718-51-0	0.1	%	----	----	----	**103**	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	----	**102**	----
Toluene-D8	2037-26-5	0.1	%	----	----	----	**110**	----
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	----	**105**	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP10 0.2-0.3	TP11 0.0-0.1	TP11 0.5-0.6	TP11 1.0-1.1	TP11 1.5-1.6
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-042	ES1103992-045	ES1103992-047	ES1103992-048	ES1103992-049
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	----	----	**4.4**	**4.8**	**5.7**
pH (Fox)	----	0.1	pH Unit	----	----	**4.1**	**3.3**	**4.8**
Reaction Rate	----	1	-	----	----	**1**	**2**	**1**
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**7.7**	**4.0**	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	**17**	----	----	----
Barium	7440-39-3	10	mg/kg	<10	**80**	----	----	----
Beryllium	7440-41-7	1	mg/kg	<1	<1	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	**2**	**25**	----	----	----
Cobalt	7440-48-4	2	mg/kg	<2	**12**	----	----	----
Copper	7440-50-8	5	mg/kg	<5	**27**	----	----	----
Lead	7439-92-1	5	mg/kg	<5	**27**	----	----	----
Manganese	7439-96-5	5	mg/kg	**15**	**1390**	----	----	----
Nickel	7440-02-0	2	mg/kg	<2	**24**	----	----	----
Vanadium	7440-62-2	5	mg/kg	<5	**41**	----	----	----
Zinc	7440-66-6	5	mg/kg	**7**	**660**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP11 0.9-2.0	TP12 0.0-0.1	TP12 0.2-0.3	QA1	QA2
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-050	ES1103992-051	ES1103992-052	ES1103992-055	ES1103992-056
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.5**	----	----	----	----
pH (Fox)	----	0.1	pH Unit	**4.8**	----	----	----	----
Reaction Rate	----	1	-	**1**	----	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	----	**5.4**	**22.9**	**23.8**	**8.3**
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	<5	<5	**30**	<5
Barium	7440-39-3	10	mg/kg	----	**100**	<10	**220**	<10
Beryllium	7440-41-7	1	mg/kg	----	<1	<1	<1	<1
Cadmium	7440-43-9	1	mg/kg	----	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	----	**8**	**2**	**39**	**2**
Cobalt	7440-48-4	2	mg/kg	----	**4**	<2	**14**	<2
Copper	7440-50-8	5	mg/kg	----	**19**	<5	**187**	<5
Lead	7439-92-1	5	mg/kg	----	**21**	<5	**200**	<5
Manganese	7439-96-5	5	mg/kg	----	**239**	<5	**1180**	<5
Nickel	7440-02-0	2	mg/kg	----	**8**	<2	**24**	<2
Vanadium	7440-62-2	5	mg/kg	----	**15**	<5	**34**	<5
Zinc	7440-66-6	5	mg/kg	----	**350**	<5	**3880**	**6**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	----	----	----
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	----	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: TP11 0.9-2.0	TP12 0.0-0.1	TP12 0.2-0.3	QA1	QA2
				Client sampling date / time: 24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00	24-FEB-2011 15:00
				ES1103992-050	ES1103992-051	ES1103992-052	ES1103992-055	ES1103992-056
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg	----	<50	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg	----	<100	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg	----	<100	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	<50	----	<50
EP080: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	----	**98.4**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	----	**101**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%	----	**87.2**	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	----	**103**	----	----	----
Anthracene-d10	1719-06-8	0.1	%	----	**105**	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	----	**103**	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	----	**108**	**97.9**	----	**101**
Toluene-D8	2037-26-5	0.1	%	----	**118**	**99.2**	----	**106**
4-Bromofluorobenzene	460-00-4	0.1	%	----	**116**	**97.4**	----	**104**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	QA4	BH1_0.0-0.1	BH2_0.0-0.1	BH2_0.2-0.3	BH3_0.0-0.1
Client sample ID				QA4	BH1_0.0-0.1	BH2_0.0-0.1	BH2_0.2-0.3	BH3_0.0-0.1
Client sampling date / time				24-FEB-2011 15:00	02-MAR-2011 15:00	02-MAR-2011 15:00	02-MAR-2011 15:00	02-MAR-2011 15:00
				ES1103992-058	ES1103992-059	ES1103992-063	ES1103992-064	ES1103992-067
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**2.6**	**9.6**	**7.4**	**5.9**	**18.9**
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	**8**	**12**	**12**	**11**
Barium	7440-39-3	10	mg/kg	<10	**130**	**40**	**40**	**90**
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	<2	**48**	**33**	**9**	**26**
Cobalt	7440-48-4	2	mg/kg	<2	**9**	**8**	**10**	**6**
Copper	7440-50-8	5	mg/kg	<5	**96**	**31**	**25**	**45**
Lead	7439-92-1	5	mg/kg	<5	**108**	**20**	**9**	**88**
Manganese	7439-96-5	5	mg/kg	<5	**1470**	**709**	**560**	**912**
Nickel	7440-02-0	2	mg/kg	<2	**36**	**32**	**19**	**19**
Vanadium	7440-62-2	5	mg/kg	<5	**42**	**25**	**21**	**36**
Zinc	7440-66-6	5	mg/kg	<5	**2770**	**301**	**90**	**2020**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: BH3_0.2-0.3	BH4_0.0-0.1	BH4_0.5-0.6	BH5_0.0-0.1	BH6_0.0-0.1
				Client sampling date / time: 02-MAR-2011 15:00	02-MAR-2011 15:00	02-MAR-2011 15:00	02-MAR-2011 15:00	02-MAR-2011 15:00
				ES1103992-068	ES1103992-071	ES1103992-073	ES1103992-075	ES1103992-079
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	4.9	3.7	21.1	2.7	2.5
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	6	<5	<5	9
Barium	7440-39-3	10	mg/kg	<10	80	<10	50	80
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	2
Chromium	7440-47-3	2	mg/kg	<2	16	<2	17	70
Cobalt	7440-48-4	2	mg/kg	<2	5	<2	5	9
Copper	7440-50-8	5	mg/kg	<5	95	<5	29	152
Lead	7439-92-1	5	mg/kg	<5	99	<5	35	85
Manganese	7439-96-5	5	mg/kg	31	415	6	498	1780
Nickel	7440-02-0	2	mg/kg	<2	10	<2	16	53
Vanadium	7440-62-2	5	mg/kg	<5	15	<5	28	33
Zinc	7440-66-6	5	mg/kg	90	2460	41	786	1950
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	----	----	----	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	<0.5	----
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	----	----	----	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	0.9	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	<10	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	<50	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	<100	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	<100	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: BH3_0.2-0.3	BH4_0.0-0.1	BH4_0.5-0.6	BH5_0.0-0.1	BH6_0.0-0.1
				Client sampling date / time: 02-MAR-2011 15:00	02-MAR-2011 15:00	02-MAR-2011 15:00	02-MAR-2011 15:00	02-MAR-2011 15:00
				ES1103992-068	ES1103992-071	ES1103992-073	ES1103992-075	ES1103992-079
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	<50	----
EP080: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	<0.5	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	----	----	----	**101**	----
2-Chlorophenol-D4	93951-73-6	0.1	%	----	----	----	**105**	----
2.4.6-Tribromophenol	118-79-6	0.1	%	----	----	----	**88.8**	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	----	----	----	**104**	----
Anthracene-d10	1719-06-8	0.1	%	----	----	----	**108**	----
4-Terphenyl-d14	1718-51-0	0.1	%	----	----	----	**103**	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	----	**108**	----
Toluene-D8	2037-26-5	0.1	%	----	----	----	**111**	----
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	----	**104**	----

Surrogate Control Limits

Sub-Matrix: **COMPOSITE**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	30.8	155.7
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	19.5	167.0
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	22.7	163.5
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	56.3	133.3
2-Chlorophenol-D4	93951-73-6	53.8	133.8
2.4.6-Tribromophenol	118-79-6	23.1	134.9
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	58.9	132.7
Anthracene-d10	1719-06-8	55.0	137.6
4-Terphenyl-d14	1718-51-0	54.0	147.8
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	56.3	133.3
2-Chlorophenol-D4	93951-73-6	53.8	133.8
2.4.6-Tribromophenol	118-79-6	23.1	134.9
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	58.9	132.7
Anthracene-d10	1719-06-8	55.0	137.6
4-Terphenyl-d14	1718-51-0	54.0	147.8
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **ES1103992**	Page	: 1 of 11
Client	: **GHD SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS EVETTE GRIFFIN	Contact	: Angela Pavlovic
Address	: PO BOX 5403 NEWCASTLE WEST NSW, AUSTRALIA 2302	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: evette.griffin@ghd.com.au	E-mail	: angela.pavlovic@alsenviro.com
Telephone	: ----	Telephone	: +61 2 8784 8523
Facsimile	: ----	Facsimile	: +61 2 8784 8500
Project	: 2215280 04 PHASE2-TOMAGO	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 24-FEB-2011
Sampler	: JS	Issue Date	: 15-MAR-2011
Order number	: ----		
		No. of samples received	: 92
Quote number	: EN/005/10	No. of samples analysed	: 56

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Senior Organic Chemist	Sydney Organics
Hoa Nguyen	Inorganic Chemist	Sydney Inorganics
Myles.Clark	Acid Sulfate Soils Supervisor	Brisbane Acid Sulphate Soils
Wisam.Marassa	Metals Coordinator	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA037: Ass Field Screening Analysis (QC Lot: 1705365)									
ES1103992-001	TP1 0.5-0.6	EA037: pH (F)	----	0.1	pH Unit	5.2	5.2	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	3.7	3.6	2.7	0% - 20%
ES1103992-015	TP4 1.5-1.6	EA037: pH (F)	----	0.1	pH Unit	5.4	5.3	1.9	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	4.4	4.6	4.4	0% - 20%
EA037: Ass Field Screening Analysis (QC Lot: 1705366)									
ES1103992-035	TP8 1.5-1.6	EA037: pH (F)	----	0.1	pH Unit	5.9	5.8	1.7	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	4.7	4.9	4.2	0% - 20%
EA037: Ass Field Screening Analysis (QC Lot: 1707538)									
ES1103992-049	TP11 1.5-1.6	EA037: pH (F)	----	0.1	pH Unit	5.7	5.7	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	4.8	4.9	2.1	0% - 20%
EA055: Moisture Content (QC Lot: 1699611)									
ES1103992-005	TP2 0.0-0.1	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	3.8	3.2	16.0	No Limit
ES1103992-041	TP10 0.0-0.1	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	9.2	8.4	9.2	No Limit
EA055: Moisture Content (QC Lot: 1699612)									
ES1103992-067	BH3_0.0-0.1	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	18.9	17.9	5.3	0% - 50%
ES1103992-090	COMPOSITE_4	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	10.6	11.2	4.7	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 1699806)									
ES1103992-005	TP2 0.0-0.1	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	<10	<10	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	7	6	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	12	10	19.7	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	47	46	3.2	No Limit
ES1103992-042	TP10 0.2-0.3	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	<10	<10	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	2	2	0.0	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 1699806) - continued									
ES1103992-042	TP10 0.2-0.3	EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	15	<5	98.2	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	7	<5	28.1	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1699808)									
ES1103992-067	BH3_0.0-0.1	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	90	90	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	26	34	25.6	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	6	6	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	19	18	7.6	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	11	21	57.9	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	45	81	# 56.3	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	88	94	7.3	0% - 50%
		EG005T: Manganese	7439-96-5	5	mg/kg	912	981	7.2	0% - 20%
		EG005T: Vanadium	7440-62-2	5	mg/kg	36	45	22.4	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	2020	2110	4.0	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1699807)									
ES1103992-005	TP2 0.0-0.1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1103992-042	TP10 0.2-0.3	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1699809)									
ES1103992-067	BH3_0.0-0.1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 1699577)									
ES1103992-087	COMPOSITE_1	EP066: Total Polychlorinated biphenyls	----	0.10	mg/kg	<0.10	<0.10	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1699576)									
ES1103992-087	COMPOSITE_1	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1699576) - continued									
ES1103992-087	COMPOSITE_1	EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1699585)									
ES1103992-037	TP9 0.0-0.1	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1699250)									
ES1103992-031	TP8 0.0-0.1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1699584)									
ES1103992-037	TP9 0.0-0.1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1699600)									
ES1103992-087	COMPOSITE_1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEX (QC Lot: 1699250)									
ES1103992-031	TP8 0.0-0.1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEX (QC Lot: 1699250) - continued									
ES1103992-031	TP8 0.0-0.1	EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080: BTEX (QC Lot: 1699600)									
ES1103992-087	COMPOSITE_1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1699806)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	13.11 mg/kg	119	70	130
EG005T: Barium	7440-39-3	10	mg/kg	<10	137.41 mg/kg	110	70	130
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.51 mg/kg	103	70	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2.76 mg/kg	97.1	83.3	111
EG005T: Chromium	7440-47-3	2	mg/kg	<2	60.93 mg/kg	104	89.2	117
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	24.49 mg/kg	99.7	70	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	54.68 mg/kg	104	90.1	114
EG005T: Lead	7439-92-1	5	mg/kg	<5	54.76 mg/kg	95.0	85.2	111
EG005T: Manganese	7439-96-5	5	mg/kg	<5	135.60 mg/kg	100	70	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.23 mg/kg	104	88.3	116
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	34.03 mg/kg	111	70	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	103.88 mg/kg	96.0	88.9	112
EG005T: Total Metals by ICP-AES (QCLot: 1699808)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	13.11 mg/kg	126	70	130
EG005T: Barium	7440-39-3	10	mg/kg	<10	137.41 mg/kg	115	70	130
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.51 mg/kg	111	70	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2.76 mg/kg	105	83.3	111
EG005T: Chromium	7440-47-3	2	mg/kg	<2	60.93 mg/kg	113	89.2	117
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	24.49 mg/kg	110	70	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	54.68 mg/kg	108	90.1	114
EG005T: Lead	7439-92-1	5	mg/kg	<5	54.76 mg/kg	105	85.2	111
EG005T: Manganese	7439-96-5	5	mg/kg	<5	135.60 mg/kg	107	70	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.23 mg/kg	114	88.3	116
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	34.03 mg/kg	119	70	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	103.88 mg/kg	108	88.9	112
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1699807)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	1.4 mg/kg	73.1	67	118
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1699809)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	1.4 mg/kg	82.4	67	118
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1699577)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.10	1 mg/kg	86.0	57.4	117
EP068A: Organochlorine Pesticides (OC) (QCLot: 1699576)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.6	60.8	116
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	87.7	59.4	115

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 1699576) - continued								
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	88.8	59.8	117
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	88.2	59.8	118
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	87.4	65.8	114
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	87.7	65.6	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.8	67	113
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	86.2	65.6	113
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	85.9	60.7	113
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.2	65.8	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	87.9	57.3	120
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	88.2	67.4	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	86.3	67.5	114
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.0	63	121
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	95.0	66.1	117
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.5	65.3	116
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	82.5	57.3	115
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	87.0	63.6	119
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	101	58.4	127
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	86.6	63.6	117
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	110	50.4	132
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1699585)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	4 mg/kg	# 119	81.9	113
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	4 mg/kg	81.4	79.6	113
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	4 mg/kg	109	81.5	112
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	4 mg/kg	111	79.9	112
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	4 mg/kg	86.7	79.4	114
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	4 mg/kg	91.9	81.1	112
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	4 mg/kg	112	78.8	113
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	4 mg/kg	109	78.9	113
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	4 mg/kg	104	77.2	112
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	4 mg/kg	86.3	79.8	114
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	4 mg/kg	109	71.8	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	4 mg/kg	86.8	74.2	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	4 mg/kg	108	76.4	113
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	4 mg/kg	100	71	113
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	4 mg/kg	102	71.7	113
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	4 mg/kg	106	72.4	114
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1699250)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	88.6	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1699584)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1699584) - continued								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	113	75.2	116
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	200 mg/kg	106	75.3	113
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	113	72.6	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1699600)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	92.7	68.4	128
EP080: BTEX (QCLot: 1699250)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	87.8	63	121
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	92.6	69	122
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	84.4	61	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	87.2	62	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	86.5	63	117
EP080: BTEX (QCLot: 1699600)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	97.9	63	121
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	102	69	122
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	99.7	61	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	112	62	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	93.7	63	117

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1699806)							
ES1103992-005	TP2 0.0-0.1	EG005T: Arsenic	7440-38-2	50 mg/kg	102	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	100	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	103	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	112	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	101	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	103	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	103	70	130
EG005T: Total Metals by ICP-AES (QCLot: 1699808)							
ES1103992-067	BH3_0.0-0.1	EG005T: Arsenic	7440-38-2	50 mg/kg	92.0	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	97.8	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	116	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	109	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	98.1	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	94.5	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	# Not Determined	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1699807)							
ES1103992-005	TP2 0.0-0.1	EG035T: Mercury	7439-97-6	5 mg/kg	79.2	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1699809)							
ES1103992-067	BH3_0.0-0.1	EG035T: Mercury	7439-97-6	5 mg/kg	91.4	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1699577)							
ES1103992-087	COMPOSITE_1	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	104	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1699576)							
ES1103992-087	COMPOSITE_1	EP068: gamma-BHC	58-89-9	0.5 mg/kg	102	75.65	110.44
		EP068: Heptachlor	76-44-8	0.5 mg/kg	100	72.2	106.71
		EP068: Aldrin	309-00-2	0.5 mg/kg	102	77.54	107.0
		EP068: Dieldrin	60-57-1	0.5 mg/kg	97.9	76.37	109.7
		EP068: Endrin	72-20-8	2 mg/kg	97.3	68.51	119.47
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	89.4	67.12	118.10
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1699585)							
ES1103992-037	TP9 0.0-0.1	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	95.9	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	107	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1699250)							
ES1103992-031	TP8 0.0-0.1	EP080: C6 - C9 Fraction	----	32.5 mg/kg	81.0	70	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1699584)							
ES1103992-037	TP9 0.0-0.1	EP071: C10 - C14 Fraction	----	640 mg/kg	108	70	130
		EP071: C15 - C28 Fraction	----	3140 mg/kg	84.1	70	130
		EP071: C29 - C36 Fraction	----	2860 mg/kg	77.5	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1699600)							
ES1103992-087	COMPOSITE_1	EP080: C6 - C9 Fraction	----	32.5 mg/kg	89.0	70	130
EP080: BTEX (QCLot: 1699250)							
ES1103992-031	TP8 0.0-0.1	EP080: Benzene	71-43-2	2.5 mg/kg	74.8	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	77.8	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	75.3	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	79.6	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	77.8	70	130
EP080: BTEX (QCLot: 1699600)							
ES1103992-087	COMPOSITE_1	EP080: Benzene	71-43-2	2.5 mg/kg	93.3	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	86.6	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	100	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	106	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	87.6	70	130

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1103992**	Page	: 1 of 10
Client	: GHD SERVICES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MS EVETTE GRIFFIN	Contact	: Angela Pavlovic
Address	: PO BOX 5403 NEWCASTLE WEST NSW, AUSTRALIA 2302	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: evette.griffin@ghd.com.au	E-mail	: angela.pavlovic@alsenviro.com
Telephone	: ----	Telephone	: +61 2 8784 8523
Facsimile	: ----	Facsimile	: +61 2 8784 8500
Project	: 2215280 04 PHASE2-TOMAGO	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 24-FEB-2011
Sampler	: JS	Issue Date	: 15-MAR-2011
Order number	: ----		
		No. of samples received	: 92
Quote number	: EN/005/10	No. of samples analysed	: 56

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA037: Ass Field Screening Analysis							
Snap Lock Bag TP6 0.5-0.6	**20-FEB-2011**	**14-MAR-2011**	21-FEB-2011	×	**14-MAR-2011**	21-FEB-2011	×
Snap Lock Bag TP1 0.5-0.6, TP1 1.0-1.1, TP1 1.5-1.6, TP1 0.9-2.0, TP2 0.5-0.6, TP2 1.0-1.1, TP2 1.5-1.6, TP2 0.9-2.0, TP4 0.5-0.6, TP4 1.0-1.1, TP4 1.5-1.6, TP4 0.9-2.0, TP6 0.0-0.1, TP6 1.0-1.1, TP6 1.5-1.6, TP6 0.9-2.0, TP8 0.0-0.1, TP8 0.5-0.6, TP8 1.0-1.1, TP8 1.5-1.6, TP8 0.9-2.0, TP11 0.5-0.6, TP11 1.0-1.1, TP11 0.9-2.0	**24-FEB-2011**	**14-MAR-2011**	25-FEB-2011	×	**14-MAR-2011**	25-FEB-2011	×
Snap Lock Bag TP11 1.5-1.6	**24-FEB-2011**	**15-MAR-2011**	25-FEB-2011	×	**15-MAR-2011**	25-FEB-2011	×

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved							
BH1_0.0-0.1, BH2_0.0-0.1, BH2_0.2-0.3, BH3_0.0-0.1, BH3_0.2-0.3, BH4_0.0-0.1, BH4_0.5-0.6, BH5_0.0-0.1, BH6_0.0-0.1	**02-MAR-2011**	**----**	----	----	**09-MAR-2011**	16-MAR-2011	✓
Soil Glass Jar - Unpreserved							
TP2 0.0-0.1, TP2 0.2-0.3, TP4 0.2-0.3, TP5 0.0-0.1, TP6 0.0-0.1, TP7 0.0-0.1, TP7 0.2-0.3, TP8 0.0-0.1, TP9 0.0-0.1, TP10 0.0-0.1, TP10 0.2-0.3, TP11 0.0-0.1, TP12 0.0-0.1, TP12 0.2-0.3, QA1, QA2, QA4, COMPOSITE_1, COMPOSITE_2, COMPOSITE_3, COMPOSITE_4, COMPOSITE_5, COMPOSITE_6	**24-FEB-2011**	**----**	----	----	**09-MAR-2011**	10-MAR-2011	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved							
BH1_0.0-0.1, BH2_0.0-0.1, BH2_0.2-0.3, BH3_0.0-0.1, BH3_0.2-0.3, BH4_0.0-0.1, BH4_0.5-0.6, BH5_0.0-0.1, BH6_0.0-0.1	**02-MAR-2011**	**09-MAR-2011**	29-AUG-2011	✓	**10-MAR-2011**	29-AUG-2011	✓
Soil Glass Jar - Unpreserved							
TP2 0.0-0.1, TP2 0.2-0.3, TP4 0.2-0.3, TP5 0.0-0.1, TP6 0.0-0.1, TP7 0.0-0.1, TP7 0.2-0.3, TP8 0.0-0.1, TP9 0.0-0.1, TP10 0.0-0.1, TP10 0.2-0.3, TP11 0.0-0.1, TP12 0.0-0.1, TP12 0.2-0.3, QA1, QA2, QA4	**24-FEB-2011**	**09-MAR-2011**	23-AUG-2011	✓	**10-MAR-2011**	23-AUG-2011	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved							
BH1_0.0-0.1, BH2_0.0-0.1, BH2_0.2-0.3, BH3_0.0-0.1, BH3_0.2-0.3, BH4_0.0-0.1, BH4_0.5-0.6, BH5_0.0-0.1, BH6_0.0-0.1	**02-MAR-2011**	**09-MAR-2011**	30-MAR-2011	✓	**10-MAR-2011**	30-MAR-2011	✓
Soil Glass Jar - Unpreserved							
TP2 0.0-0.1, TP2 0.2-0.3, TP4 0.2-0.3, TP5 0.0-0.1, TP6 0.0-0.1, TP7 0.0-0.1, TP7 0.2-0.3, TP8 0.0-0.1, TP9 0.0-0.1, TP10 0.0-0.1, TP10 0.2-0.3, TP11 0.0-0.1, TP12 0.0-0.1, TP12 0.2-0.3, QA1, QA2, QA4	**24-FEB-2011**	**09-MAR-2011**	24-MAR-2011	✓	**10-MAR-2011**	24-MAR-2011	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved							
COMPOSITE_1, COMPOSITE_2, COMPOSITE_3, COMPOSITE_4, COMPOSITE_5, COMPOSITE_6	**24-FEB-2011**	**09-MAR-2011**	10-MAR-2011	✓	**10-MAR-2011**	18-APR-2011	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved							
COMPOSITE_1, COMPOSITE_2, COMPOSITE_3, COMPOSITE_4, COMPOSITE_5, COMPOSITE_6	**24-FEB-2011**	**09-MAR-2011**	10-MAR-2011	✓	**10-MAR-2011**	18-APR-2011	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved							
BH5_0.0-0.1	**02-MAR-2011**	**09-MAR-2011**	16-MAR-2011	✓	**10-MAR-2011**	18-APR-2011	✓
Soil Glass Jar - Unpreserved							
TP8 0.0-0.1, TP9 0.0-0.1, TP12 0.0-0.1, COMPOSITE_1, COMPOSITE_2, COMPOSITE_5, COMPOSITE_6	**24-FEB-2011**	**09-MAR-2011**	10-MAR-2011	✓	**10-MAR-2011**	18-APR-2011	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved BH5_0.0-0.1	**02-MAR-2011**	**09-MAR-2011**	16-MAR-2011	✓	**09-MAR-2011**	18-APR-2011	✓
Soil Glass Jar - Unpreserved BH5_0.0-0.1	**02-MAR-2011**	**09-MAR-2011**	16-MAR-2011	✓	**10-MAR-2011**	16-MAR-2011	✓
Soil Glass Jar - Unpreserved TP8 0.0-0.1, TP9 0.0-0.1, TP12 0.0-0.1, TP12 0.2-0.3, QA2, COMPOSITE_1, COMPOSITE_2, COMPOSITE_5, COMPOSITE_6	**24-FEB-2011**	**09-MAR-2011**	10-MAR-2011	✓	**09-MAR-2011**	18-APR-2011	✓
Soil Glass Jar - Unpreserved TP8 0.0-0.1, TP9 0.0-0.1, TP12 0.0-0.1, TP12 0.2-0.3, QA2, COMPOSITE_1, COMPOSITE_2, COMPOSITE_5, COMPOSITE_6	**24-FEB-2011**	**09-MAR-2011**	10-MAR-2011	✓	**10-MAR-2011**	10-MAR-2011	✓
EP080: BTEX							
Soil Glass Jar - Unpreserved BH5_0.0-0.1	**02-MAR-2011**	**09-MAR-2011**	16-MAR-2011	✓	**10-MAR-2011**	16-MAR-2011	✓
Soil Glass Jar - Unpreserved TP8 0.0-0.1, TP9 0.0-0.1, TP12 0.0-0.1, TP12 0.2-0.3, QA2, COMPOSITE_1, COMPOSITE_2, COMPOSITE_5, COMPOSITE_6	**24-FEB-2011**	**09-MAR-2011**	10-MAR-2011	✓	**10-MAR-2011**	10-MAR-2011	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	4	26	**15.4**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	4	32	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	6	**16.7**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	6	**16.7**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	3	26	**11.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	3	26	**11.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	10	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	10	**20.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	6	**16.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	6	**16.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	10	**10.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	10	**20.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	6	**16.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	6	**16.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	26	**7.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	10	**10.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	10	**20.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.5**	**5.0**	✓	ALS QCS3 requirement
Pesticides by GCMS	EP068	1	6	**16.7**	**5.0**	✓	ALS QCS3 requirement
Polychlorinated Biphenyls (PCB)	EP066	1	6	**16.7**	**5.0**	✓	ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	26	**7.7**	**5.0**	✓	ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	26	**7.7**	**5.0**	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	10	**10.0**	**5.0**	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	10	**20.0**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
ASS Field Screening Analysis	* EA037	SOIL	Acid Sulfate Soils Laboratory Methods Guidelines, version 2.1 June 2004. As received samples are tested for pH field and pH fox and assessed for a reaction rating.
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (1999) Schedule B(3) (Method 504,505)
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (1999) Schedule B(3) (Method 506.1)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 502 and 507)
TPH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Sample Compositing	* EN020	SOIL	Equal weights of each original soil are taken, then mixed and homogenised. The combined mixture is labelled as a new sample.
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids (Option A - Concentrating)	ORG17A	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Preparation Methods	Method	Matrix	Method Descriptions
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005T: Total Metals by ICP-AES	ES1103992-067	BH3_0.0-0.1	**Copper**	7440-50-8	56.3 %	0-50%	**RPD exceeds LOR based limits**
Laboratory Control Spike (LCS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	1997695-007	----	**Naphthalene**	91-20-3	119 %	81.9-113%	**Recovery greater than upper control limit**
Matrix Spike (MS) Recoveries							
EG005T: Total Metals by ICP-AES	ES1103992-067	BH3_0.0-0.1	**Zinc**	7440-66-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

- **For all matrices, no Method Blank value outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EA037: Ass Field Screening Analysis						
Snap Lock Bag TP6 0.5-0.6	14-MAR-2011	21-FEB-2011	**21**	14-MAR-2011	21-FEB-2011	**21**
Snap Lock Bag TP1 0.5-0.6, TP1 1.0-1.1, TP1 1.5-1.6, TP1 0.9-2.0, TP2 0.5-0.6, TP2 1.0-1.1, TP2 1.5-1.6, TP2 0.9-2.0, TP4 0.5-0.6, TP4 1.0-1.1, TP4 1.5-1.6, TP4 0.9-2.0, TP6 0.0-0.1, TP6 1.0-1.1, TP6 1.5-1.6, TP6 0.9-2.0, TP8 0.0-0.1, TP8 0.5-0.6, TP8 1.0-1.1, TP8 1.5-1.6, TP8 0.9-2.0, TP11 0.5-0.6, TP11 1.0-1.1, TP11 0.9-2.0	14-MAR-2011	25-FEB-2011	**17**	14-MAR-2011	25-FEB-2011	**17**

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA037: Ass Field Screening Analysis - Analysis Holding Time Compliance						
Snap Lock Bag TP11 1.5-1.6	15-MAR-2011	25-FEB-2011	**18**	15-MAR-2011	25-FEB-2011	**18**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

1403 11

CHAIN OF CUSTODY

ALS Laboratory: please tick →

CLIENT:	Midal	TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle): Custody Seal Intact? Yes No N/A
OFFICE:	GHD Newcastle	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT:	Phase 2 - Tomago PROJECT NO 2215280/04	ALS QUOTE NO.: GHD Quote EN-005-10	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7
ORDER NUMBER:	PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	OF: 1 2 3 4 5 6 7
PROJECT MANAGER:	Ron Pollock/Evette Griffin	CONTACT PH: 0459804372	Random Sample Temperature on Receipt: °C
SAMPLER:	Joanna Sylvester	SAMPLER MOBILE: NA	Other comment:
COC Emailed to ALS? (YES / NO)		EDD FORMAT (or default):	
Email Reports to (will default to PM if no other addresses are listed): evette.griffin@ghd.com			
Email Invoice to (will default to PM if no other addresses are listed): melissa.simpson@ghd.com			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Joanna Sylvester (23/02/11) Newcastle			
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	Heavy Metals (NEPM 13) - S3	TPH/BTEX - S4	PAHs	TPH/BTEX/PAHs - S7	OCP/PCB - S11	PASS Screen	HOLD		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	TP1 0.5-0.6	24/02/2011	soil		1						x			Soil samples for PASS should have already been analysed. Composites are required from 2 individual sample batches - one of test pit samples (TP samples - ES1103992) and one of borehole samples (received yesterday 3/3/11 - not batched as yet).
2	TP1 1.0-1.1	24/02/2011	soil		1						x			
3	TP1 1.5-1.6	24/02/2011	soil		1						x			
4	TP1 0.9-2.0	24/02/2011	soil		1						x			
5	TP2 0.0-0.1	24/02/2011	soil		1	x								
6	TP2 0.2-0.3	24/02/2011	soil		1	x								
7	TP2 0.5-0.6	24/02/2011	soil		2						x	x		
8	TP2 1.0-1.1	24/02/2011	soil		2						x	x		
9	TP2 1.5-1.6	24/02/2011	soil		1						x			
10	TP2 0.9-2.0	24/02/2011	soil		1						x			
11	TP4 0.0-0.1	24/02/2011	soil		1							x		
12	TP4 0.2-0.3	24/02/2011	soil		1	x								
13	TP4 0.5-0.6	24/02/2011	soil		2						x	x		

ES 1103992

Environmental Division
Sydney
Work Order
ES1103992

Telephone : +61-2-8784 8555

14	TP4 1.0-1.1	24/02/2011	soil		2						x	x		
15	TP4 1.5-1.6	24/02/2011	soil		1						x			
16	TP4 0.9-2.0	24/02/2011	soil		1						x			
17	TP5 0.0-0.1	24/02/2011	soil		1	x								
18	TP5 0.2-0.3	24/02/2011	soil		1							x		
19	TP5 0.5-0.6	24/02/2011	soil		1							x		
20	TP5 1.0-1.1	24/02/2011	soil		1							x		
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph. 02 8784 8555 E:samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph 02 4968 9433 E.samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph.03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E.adelaide@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Midal	TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):		FOR LABORATORY USE ONLY: (Circle)	
OFFICE:	GHD Newcastle	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		Custody Seal Intact?	Yes No N/A
PROJECT:	Phase 2 - Tomago PROJECT NO. 2215280/04	ALS QUOTE NO.: GHD Quote EN-005-10	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt?	Yes No N/A
ORDER NUMBER:	PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER:	Ron Pollock/Evette Griffin CONTACT PH: 0459804372		OF: 1 2 3 4 5 6 7	Other comment:	

SAMPLER: Joanna Sylvester	SAMPLER MOBILE: NA	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
COC Emailed to ALS? (YES / NO)	EDD FORMAT (or default):	*Joanna Sylvester (23/02/11) Newcastle*			
Email Reports to (will default to PM if no other addresses are listed): evette.griffin@ghd.com		DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): melissa.simpson@ghd.com					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	Heavy Metals (NEPM 13) - S3	TPH/BTEX - S4	PAHs	TPH/BTEX/PAHs - S7	OCP/PCB - S11	PASS Screen	HOLD		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
21	TP6 0.0-0.1	24/02/2011	Soil		2	x					x			Soil samples for PASS should have already been analysed. Composites are required from 2 individual sample batches - one of test pit samples (TP samples - ES1103992) and one of borehole samples (received yesterday 3/3/11 - not batched as yet).
22	TP6 0.2-0.3	24/02/2011	Soil		1							x		
23	TP6 0.5-0.6	24/02/2011	Soil		2						x	x		
24	TP6 1.0-1.1	24/02/2011	Soil		2						x	x		
25	TP6 1.5-1.6	24/02/2011	Soil		1						x			
26	TP6 0.9-2.0	24/02/2011	Soil		1						x			
27	TP7 0.0-0.1	24/02/2011	Soil		1	x								
28	TP7 0.2-0.3	24/02/2011	Soil		1	x								
29	TP7 0.5-0.6	24/02/2011	Soil		1							x		
30	TP7 1.0-1.1	24/02/2011	Soil		1							x		
31	TP8 0.0-0.1	24/02/2011	Soil		2	x			x		x			

32	TP8 0.2-0.3	24/02/2011	Soil		1							x		
33	TP8 0.5-0.6	24/02/2011	Soil		2						x	x		
34	TP8 1.0-1.1	24/02/2011	Soil		2						x	x		
35	TP8 1.5-1.6	24/02/2011	Soil		1						x			
36	TP8 0.9-2.0	24/02/2011	Soil		1						x			
37	TP9 0.0-0.1	24/02/2011	Soil		1	x			x					
38	TP9 0.2-0.3	24/02/2011	Soil		1							x		
39	TP9 0.5-0.6	24/02/2011	Soil		1							x		
40	TP9 1.0-1.1	24/02/2011	Soil		1							x		
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

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☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4958 9400 E:samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Midal	TURNAROUND REQUIREMENTS :	☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE:	GHD Newcastle	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT:	Phase 2 - Tomago PROJECT NO. 2215280/04	ALS QUOTE NO.: GHD Quote EN-005-10	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER:	PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER:	Ron Pollock/Evette Griffin CONTACT PH: 0459804372		OF: 1 2 3 4 5 6 7	Other comments:	

SAMPLER: Joanna Sylvester	SAMPLER MOBILE: NA	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
COC Emailed to ALS? (YES / NO)	EDD FORMAT (or default):	*Joanna Sylvester (23/02/11) Newcastle*			
Email Reports to (will default to PM if no other addresses are listed): evette.griffin@ghd.com		DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): melissa.simpson@ghd.com					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	Heavy Metals (NEPM 13) - S3	TPH/BTEX - S4	PAHs	TPH/BTEX/PAHs - S7	OCP/PCB - S11	PASS Screen	HOLD		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
41	TP10 0.0-0.1	24/02/2011	Soil		1	x								Soil samples for PASS should have already been analysed. Composites are required from 2 individual sample batches - one of test pit samples (TP samples - ES1103992) and one of borehole samples (received yesterday 3/3/11 - not batched as yet).
42	TP10 0.2-0.3	24/02/2011	Soil		1	x								
43	TP10 0.5-0.6	24/02/2011	Soil		1							x		
44	TP10 1.0-1.1	24/02/2011	Soil		1							x		
45	TP11 0.0-0.1	24/02/2011	Soil		1	x								
46	TP11 0.2-0.3	24/02/2011	Soil		1							x		
47	TP11 0.5-0.6	24/02/2011	Soil		2						x	x		
48	TP11 1.0-1.1	24/02/2011	Soil		2						x	x		
49	TP11 1.5-1.6	24/02/2011	Soil		1						x			
50	TP11 0.9-2.0	24/02/2011	Soil		1						x			
51	TP12 0.0-0.1	24/02/2011	Soil		1	x			x					
52	TP12 0.2-0.3	24/02/2011	Soil		1	x	x							

53	TP12 0.5-0.6	24/02/2011	Soil		1							x		
54	TP12 1.0-1.1	24/02/2011	Soil		1							x		
55	QA1	24/02/2011	Soil		1	x								
56	QA2	24/02/2011	Soil		1	x	x							
57	QA3	24/02/2011	Soil		1							x		
58	QA4	24/02/2011	Soil		1	x								
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph: 07 4796 0600 E: samples.townsville@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-4 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E: samples.adelaide@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2155 E: launceston@alsenviro.com

CLIENT:	Midal	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE:	GHD Newcastle		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT:	Phase 2 - Tomago PROJECT NO 2215280/04	ALS QUOTE NO.: GHD Quote EN-005-10	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER:	PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER:	Ron Pollock/Evette Griffin CONTACT PH: 0459804372		OF: 1 2 3 4 5 6 7	Other comments:	
SAMPLER:	Joanna Sylvestar SAMPLER MOBILE: NA	RELINQUISHED BY: *Joanna Sylvester (2/03/11) Newcastle*	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
COC Emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): evette.griffin@ghd.com					
Email Invoice to (will default to PM if no other addresses are listed): melissa.simpson@ghd.com					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	Heavy Metals (NEPM 13) - S3	TPH/BTEX - S4	PAHs	TPH/BTEX/PAHs - S7	OCP/PCB - S11	PASS Screen	HOLD		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
59	BH1 0.0-0.1	2/03/2011	soil		1	x								Composi
60	BH1 0.2-0.3	2/03/2011	soil		1							x		
61	BH1 0.5-0.6	2/03/2011	soil		1							x		Composites are required from 2 individual sample batches - one of test pit samples (TP samples - ES1103992) and one of borehole samples (received yesterday 3/3/11 - not batched as yet).
62	BH1 1.0-1.1	2/03/2011	soil		1							x		
63	BH2 0.0-0.1	2/03/2011	soil		1	x								
64	BH2 0.2-0.3	2/03/2011	soil		1	x								
65	BH2 0.5-0.6	2/03/2011	soil		1							x		
66	BH2 1.0-1.1	2/03/2011	soil		1							x		
67	BH3 0.0-0.1	2/03/2011	soil		1	x								
68	BH3 0.2-0.3	2/03/2011	soil		1	x								
69	BH3 0.5-0.6	2/03/2011	soil		1							x		
70	BH3 1.0-1.1	2/03/2011	soil		1							x		
71	BH4 0.0-0.1	2/03/2011	soil		1	x								
72	BH4 0.2-0.3	2/03/2011	soil		1							x		
73	BH4 0.5-0.6	2/03/2011	soil		1	x								
74	BH4 1.0-1.1	2/03/2011	soil		1							x		
75	BH5 0.0-0.1	2/03/2011	soil		1	x			x					
76	BH5 0.2-0.3	2/03/2011	soil		1							x		
77	BH5 0.5-0.6	2/03/2011	soil		1							x		
78	BH5 1.0-1.1	2/03/2011	soil		1							x		
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Road Smithfield NSW 2164
Ph 02 8784 8555 | Fax 02 8784 8500 | samples.sydney@alsenviro.com

☐ Newcastle: 5 Rosegum Rd Warabrook NSW 2304
Ph 02 4014 2500 | Fax 02 4014 2501 | samples.newcastle@alsenviro.com

☐ Brisbane: 32 Shand St Stafford QLD 4053
Ph 07 3243 7222 | Fax 07 3243 7218 | samples.brisbane@alsenviro.com

☐ Townsville: 14-15 Desma Ct (PO Box 1037) Bohle QLD 4818
Ph 07 4796 0600 | Fax 07 4796 0699 | samples.townsville@alsenviro.com

☐ Melbourne: 24 Woodlands Dr Braeside VIC 3195
Ph 03 8549 9600 | Fax 03 8549 9601 | samples.melbourne@alsenviro.com

☐ Adelaide: 21 Burma Rd Pooraka SA 5095
Ph 08 8359 0890 | Fax 08 8359 0500 | samples.adelaide@alsenviro.com

☐ Perth: 10 Hod Way, Malaga WA 6090
Ph 08 9209 7655 | Fax 08 9209 7651 | samples.perth@alsenviro.com

☐ Launceston: 27 Williamson St Launceston TAS 7250
Ph 03 6323 2800 | Fax 03 6323 2898 | samples.launceston@alsenviro.com

CLIENT:	Midal	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE:	GHD Newcastle		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT:	Phase 2 - Tomago	PROJECT NO. 2215280/04	ALS QUOTE NO.: GHD Quote EN-085-10	Free ice / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER:		PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER:	Ron Pollock/Evette Griffin	CONTACT PH: 0459804372	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Other comment:	
SAMPLER:	Joanna Sylvester	SAMPLER MOBILE: NA	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY: / RECEIVED BY:
COC Emailed to ALS? (YES / NO)		EDD FORMAT (or default):	*Joanna Sylvester (2/03/11) Newcastle*		
Email Reports to (will default to PM if no other addresses are listed): evette.griffin@ghd.com			DATE/TIME:	DATE/TIME:	DATE/TIME: / DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): melissa.simpson@ghd.com					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required)								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	Heavy Metals (NEPM 13) - S3	TPH/BTEX - S4	PAHs	TPH/BTEX/PAHs - S7	OCP/PCB - S11	PASS Screen	HOLD		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
79	BH5 0.0-0.1	2/03/2011	Soil		1	x								Composites are required from 2 individual sample batches - one of test pit samples (TP samples - ES1103992) and one of borehole samples (received yesterday 3/3/11 - not batched as yet).
80	BH5 0.2-0.3	2/03/2011	Soil		1							x		
81	BH5 0.5-0.6	2/03/2011	Soil		1							x		
82	BH5 1.0-1.1	2/03/2011	Soil		1							x		
83	TP6 1.5-1.6	2/03/2011	Soil	← Not Received	1							x		
84	QA5	2/03/2011	Soil		1							x		
85	QA6	2/03/2011	Soil		1							x		
86	QA7	2/03/2011	Soil		1							x		
87	Composite 1	27/2/11 and 2/3/11	Soil						x	x			1	TP5 0.0-0.1, TP3 0.0-0.1, TP7 0.0-0.1
88	Composite 2	27/2/11 and 2/3/11	Soil						x	x			2	BH4 0.0-0.1, BH5 0.0-0.1, TP11 0.0-0.1
89	Composite 3	27/2/11 and 2/3/11	Soil							x			3	TP5 0.0-0.1, TBH5 0.0-0.1
90	Composite 4	27/2/11 and 2/3/11	Soil							x			4	TP9 0.0-0.1, TP12 0.0-0.1
91	Composite 5	27/2/11 and 2/3/11	Soil						x	x			5	TP2 0.0-0.1, TP4 0.0-0.1, BH1 0.0-0.1
92	Composite 6	27/2/11 and 2/3/11	Soil						x	x			6	BH2 0.0-0.1, BH5 0.0-0.1
				TOTAL										

67

→ 17 + (21) + 27

→ 71 + 79 + 45

→ 31 + [illegible] 75

→ 37 + 51

→ 5 + 11 + 59

→ 63 + [illegible] 21

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

1Q0811

CHAIN OF CUSTODY

ALS Laboratory: please tick →

[ ] Sydney 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
[ ] Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
[ ] Brisbane 32 Shand St Stafford QLD 4053 Ph:07 3243 7222 E: samples.brisbane@alsenviro.com
[ ] Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: [illegible]
[ ] Melbourne 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
[ ] Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsenviro.com
[ ] Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
[ ] Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Midal	TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle) Custody Seal Intact? Yes / No / N/A; Free ice / frozen ice bricks present upon receipt? Yes / No / N/A; Random Sample Temperature on Receipt: °C; Other comments:
OFFICE:	GHD Newcastle	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	
PROJECT:	Phase 2 - Tomago PROJECT NO 2215280/04	ALS QUOTE NO.: GHD Quote EN-005-10	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER:	PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	
PROJECT MANAGER:	Ron Pollock/Evette Griffin CONTACT PH: 0459804372		
SAMPLER:	Joanna Sylvester SAMPLER MOBILE: NA	RELINQUISHED BY: Joanna Sylvester (23/02/11) Newcastle	RECEIVED BY: SOYDNEY NS
COC Emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME:	DATE/TIME: 28/2/11 1530
Email Reports to (will default to PM if no other addresses are listed): evette.griffin@ghd.com		RELINQUISHED BY:	RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed): melissa.simpson@ghd.com		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Heavy Metals (NEPM 13) - S3	TPH/BTEX - S4	PAHs	TPH/BTEX/PAHs - S7	OCP/PCB - S11	PASS Screen	HOLD		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	TP1 0.5-0.6	24/02/2011	soil		1						x			
2	TP1 1.0-1.1	24/02/2011	soil		1						x			
3	TP1 1.5-1.6	24/02/2011	soil		1						x			
4	TP1 0.9-2.0	24/02/2011	soil		1						x			
✓ (5)	TP2 0.0-0.1	24/02/2011	soil		1							x		All soil samples not for PASS require holding as other samples from the same site are expected Thursday next week and they need to be analysed/composited at the same time. Details on updated COC to be forwarded next week.
✓ (6)	TP2 0.2-0.3	24/02/2011	soil		1							x		
✓ (7)	TP2 0.5-0.6	24/02/2011	soil		2						x	x		
✓ (8)	TP2 1.0-1.1	24/02/2011	soil		2						x	x		
9	TP2 1.5-1.6	24/02/2011	soil		1						x			
10	TP2 0.9-2.0	24/02/2011	soil		1						x			
(11)	TP4 0.0-0.1	24/02/2011	soil		1							x		
(12)	TP4 0.2-0.3	24/02/2011	soil		1							x		
✓ (13)	TP4 0.5-0.6	24/02/2011	soil		2						x	x		
✓ (14)	TP4 1.0-1.1	24/02/2011	soil		2						x	x		
15	TP4 1.5-1.6	24/02/2011	soil		1						x			
16	TP4 0.9-2.0	24/02/2011	soil		1						x			
✓ (17)	TP5 0.0-0.1	24/02/2011	soil		1							x		
✓ (18)	TP5 0.2-0.3	24/02/2011	soil		1							x		
✓ (19)	TP5 0.5-0.6	24/02/2011	soil		1							x		
✓ (20)	TP5 1.0-1.1	24/02/2011	soil		1							x		
				TOTAL										

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V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

EA 37
- As per Wael.

Subcon / Forward Lab / Split WO
Lab / Analysis: Brisbane / ASS
Organised By / Date:
Relinquished By / Date:
Connote / Courier:
WO No:
Attach By PO / Internal Sheet:

Environmental Division
Sydney
Work Order
ES1103992

Telephone : +61-2-8784 8555

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277-289 Woodpark Rd, Smithfield NSW 2164 Ph: 02 8784 8555 | Fax: 02 8784 8500 | Email: sydney@alsenviro.com

☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph: 07 3243 7222 | Fax: 07 3243 7218 | Email: brisbane@alsenviro.com

☐ Melbourne: 24-31 Kingsgrove Rd, Laverton North VIC 3026 Ph: 03 8549 9600 | Fax: 03 8549 9601 | Email: melbourne@alsenviro.com

☐ Perth: 91 Hall Way, Malaga WA 6090 Ph: 08 9209 7655 | Fax: 08 9209 7644 | Email: perth@alsenviro.com

☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph: 02 4014 2500 | Fax: 02 4014 2501 | Email: newcastle@alsenviro.com

☐ Townsville: 14-15 Desma Ct, Pallarenda QLD 4810 Ph: 07 4796 0600 | Fax: 07 4796 0699 | Email: townsville@alsenviro.com

☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 1852 | Fax: 03 6332 3500 | Email: launceston@alsenviro.com

CLIENT:	Midal	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:	GHD Newcastle		
PROJECT:	Phase 2 - Tomago PROJECT NO.: 2215280/04	ALS QUOTE NO.: GHD Quote EN-005-10	
ORDER NUMBER:	PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	
PROJECT MANAGER:	Ron Pollock/Evette Griffin CONTACT PH: 0459804372		
SAMPLER:	Joanna Sylvester SAMPLER MOBILE: NA		
COC Emailed to ALS? (YES / NO)	EDD FORMAT (or default):		
Email Reports to (will default to PM if no other addresses are listed): evette.griffin@ghd.com			
Email Invoice to (will default to PM if no other addresses are listed): melissa.simpson@ghd.com			

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY: (Circle)
Custody Seal Intact: Yes / No / N/A
Free ice (frozen ice bricks present upon receipt): Yes / No / N/A
Random Sample Temperature on Receipt: 4°C
Other Comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Joanna Sylvester (23/02/11) Newcastle			SG/AH
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME: 23/2/11 1530

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Heavy Metals (NEPM 13) - 83	TRH/BTEX - 84	PAHs	TRH/BTEX/PAHs - 87	OC/PEC/B - 811	PASS Screen	HOLD		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
21	TP6 0.0-0.1	24/02/2011	Soil		2						x	x		All soil samples not for PASS require holding as other samples from the same site are expected Thursday next week and they need to be analysed/composited at the same time. Details on updated COC to be forwarded next week.
22	TP6 0.2-0.3	24/02/2011	Soil		1							x		
23	TP6 0.5-0.6	24/02/2011	Soil		2						x	x		
24	TP6 1.0-1.1	24/02/2011	Soil		2						x	x		
25	TP6 1.5-1.6	24/02/2011	Soil		1						x			
26	TP6 0.9-2.0	24/02/2011	Soil		1						x			
27	TP7 0.0-0.1	24/02/2011	Soil		1							x		
28	TP7 0.2-0.3	24/02/2011	Soil		1							x		
29	TP7 0.5-0.6	24/02/2011	Soil		1							x		
30	TP7 1.0-1.1	24/02/2011	Soil		1							x		
31	TP8 0.0-0.1	24/02/2011	Soil		2						x	x		
32	TP8 0.2-0.3	24/02/2011	Soil		1							x		
33	TP8 0.5-0.6	24/02/2011	Soil		2						x	x		
34	TP8 1.0-1.1	24/02/2011	Soil		2						x	x		
35	TP8 1.5-1.6	24/02/2011	Soil		1						x			
36	TP8 0.9-2.0	24/02/2011	Soil		1						x			
37	TP9 0.0-0.1	24/02/2011	Soil		1							x		
38	TP9 0.2-0.3	24/02/2011	Soil		1							x		
39	TP9 0.5-0.6	24/02/2011	Soil		1							x		
40	TP9 1.0-1.1	24/02/2011	Soil		1							x		
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney ☐ Newcastle ☐ Brisbane ☐ Townsville ☐ Melbourne ☐ Adelaide ☐ Perth ☐ Launceston

CLIENT: Midal		TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE: GHD Newcastle			
PROJECT: Phase 2 - Tomago	PROJECT NO.: 2215280/04	ALS QUOTE NO.: GHD Quote EN-005-10	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER:	PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	
PROJECT MANAGER: Ron Pollock/Evette Griffin	CONTACT PH: 0459804372		
SAMPLER: Joanna Sylvester	SAMPLER MOBILE: NA		
COC Emailed to ALS? (YES / NO)	EDD FORMAT (or default):		
Email Reports to (will default to PM if no other addresses are listed): evette.griffin@ghd.com			
Email Invoice to (will default to PM if no other addresses are listed): melissa.simpson@ghd.com			

FOR LABORATORY USE ONLY (Circle)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Joanna Sylvester (23/02/11) Newcastle			Sonja Tas
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME: 28/2/11 15:30

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Heavy Metals (NEPM 13) - S3	TPH/BTEX - S4	PAHs	TPH/BTEX/PAHs - S7	OCP/PCB - S11	PASS Screen	HOLD		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
41	TP10 0.0-0.1	24/02/2011	Soil		1							x		All soil samples not for PASS require holding as other samples from the same site are expected Thursday next week and they need to be analysed/composited at the same time. Details on updated COC to be forwarded next week.
42	TP10 0.2-0.3	24/02/2011	Soil		1							x		
43	TP10 0.5-0.6	24/02/2011	Soil		1							x		
44	TP10 1.0-1.1	24/02/2011	Soil		1							x		
45	TP11 0.0-0.1	24/02/2011	Soil		1							x		
46	TP11 0.2-0.3	24/02/2011	Soil		1							x		
47	TP11 0.5-0.6	24/02/2011	Soil		2						x	x		
48	TP11 1.0-1.1	24/02/2011	Soil		2						x	x		
49	TP11 1.5-1.6	24/02/2011	Soil		1						x			
50	TP11 0.9-2.0	24/02/2011	Soil		1						x			
51	TP12 0.0-0.1	24/02/2011	Soil		1							x		
52	TP12 0.2-0.3	24/02/2011	Soil		1							x		
53	TP12 0.5-0.6	24/02/2011	Soil		1							x		
54	TP12 1.0-1.1	24/02/2011	Soil		1							x		
55	QA1	24/02/2011	Soil		1							x		
56	QA2	24/02/2011	Soil		1							x		
57	QA3	24/02/2011	Soil		1							x		
58	QA4	24/02/2011	Soil		1							x		
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

- 1, 2, 3, 4, 9, 10, 11, 12, 15, 16, 25, 26, 35, 36, 49, 50

Angela Pavlovic

From: Angela Pavlovic
Sent: Wednesday, 9 March 2011 9:02 AM
To: Phoung Tran
Cc: 'Evette.Griffin@ghd.com'
Subject: FW: COC and instructions for GHD job number 2215280 - we are SORTED!

Hi Phoung,

Please see below:

- **Composite 6 should be BH2 0.0-0.1 and TP6 0.0-0.** #63 #21
  - #83 missing (TP6 1.5-1.6) **This is my typo - should be BH6 1.5-1.6**
- **Composite 1 should be made of TP5, BH3 and TP7 (all 0.0-0.1)** -17 +#67+27
- **Composite 3 should be made of TP8 and BH5 (both 0.0-0.1).** #31+75

Please let me know if there are any further problems.

Thanks Evette; all are logged in for analysis, we will fix these questionable ones this morning, and your SRN should come through complete today.

Best wishes,
Angela.

From: Evette.Griffin@ghd.com [mailto:Evette.Griffin@ghd.com]
Sent: Wednesday, 9 March 2011 6:49 AM
To: Angela Pavlovic
Subject: Re: COC and instructions for GHD job number 2215280 - we are SORTED!

Hi Angela

Thanks you for all your efforts on sorting this out. Maybe we can get them extracted today within all the holding times (TPH/BTEX and PAHs.....). Is that do-able? We really need these samples to be representative of the site.

Cheers
Evette

Anyways, here's my thoughts on your emails.....

Composite 2 is correct and Composite 6 should be BH2 0.0-0.1 and TP6 0.0-0.1 (my typo - sorry)

We are missing soil jars for the following samples:

- 1 (TP1 0.5-0.6)
- 2 (TP1 1.0-1.1)
- 3 (TP1 1.5-1.6)
- 4 (TP1 0.9-2.0) **- all hopefully gone for ASS analysis. No further analysis required.**
- 9 (TP2 1.5-1.6)
- 10 (TP2 0.9-2.0)
- 15 (TP4 1.5-1.6)
- 16 (TP4 0.9-2.0)

Fadi Soro

From: Evette.Griffin@ghd.com
Sent: Thursday, 24 February 2011 2:30 PM
To: Samples Sydney
Subject: COCs and Instructions - GHD job no. 2215280

Hi

Your lab should receive some GHD Newcastle samples from couriered from ALS Newcastle today. Please find attached the COC with instructions.

Client: GHD
Project Client: Midal
Job No. 2215280
Sampler: Joanna Sylvester
Description - mix of soil jars and plastic bags (PASS screen)

Please hold all soil samples not for PASS as there are additional samples from this site expected to arrive Thursday next week. This batch and the batch next week require some compositing and analysis.

If you have any questions at all, please contact me on 0459 804 372.

Cheers
Evette

Regards

Evette Griffin
Senior Environmental Scientist

GHD
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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	E. Griffin	J. Hallchurch		I. Gregson		16/05/2011