

Caltex Australia Petroleum Pty Ltd

**Investigation and Remediation Strategy - Former Esk Service
Station and Depot (Caltex Site ID 11800), 255-259 Ipswich
Street, Esk, Queensland**

5 November 2015



Document information

Client: Caltex Australia Petroleum Pty Ltd
Title: Investigation and Remediation Strategy - Former Esk Service Station and Depot (Caltex Site ID 11800), 255-259 Ipswich Street, Esk, Queensland
Document No: 2201681A-CLM-REP-001 RevB
Date: 5 November 2015

Rev	Date	Details
A	30/10/2015	Draft
B	05/11/2015	Final

Prepared by:	sch4p4(6) Per	Date: 05/11/2015	Signature: sch4p4(6) Personal information
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Distribution

Caltex Australia Petroleum Pty Ltd, WSP | Parsons Brinckerhoff file

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Abbreviations

AHD	Australian height datum
ALS	Australian Laboratory Services
ANZECC	Australian and New Zealand Environment and Conservation Council
AST	Aboveground storage tank
BGL	Below ground level
BTEX	Benzene, toluene, ethyl benzene, xylene
BTEXN	Benzene, toluene, ethyl benzene, xylene, naphthalene
BUA	Beneficial use assessment
C ₆ –C ₁₀	Light hydrocarbon chain groups (for example, petrol)
C ₁₀ –C ₁₆	Medium hydrocarbon chain groups (for example, kerosene)
C ₁₆ –C ₃₄	Heavy hydrocarbon chain groups (for example, diesel)
C ₃₄ –C ₄₀	Heavy hydrocarbon chain groups (for example, lube oil)
Caltex	Caltex Australia Petroleum Pty Ltd
CoC	Chain of custody
CSM	Conceptual site model
EMR	Environmental Management Register
ESA	Environmental Site Assessment
DNRM	Department of Natural Resources and Mines
DO	Dissolved oxygen
EC	Electrical conductivity
EHP	Department of Environment and Heritage Protection
FID	Flame ionization detector
GDA	Geocentric Datum of Australia
GIL	Groundwater investigation level
GME	Groundwater monitoring event
HESP	Health environment and safety plan

HSL	Health screening level
km	Kilometre
LIF	Laser induced fluorescence
LNAPL	Light non-aqueous phase liquid
LOR	Limit of reporting
mAHD	Metres Australian Height Datum
mBTC	Metres below top of casing
mBGL	Metres below ground level
MIP	Membrane interface probe
MNA	Monitored natural attenuation
MPVE	Mobile multi-phase vacuum extraction
mV	Millivolt
NATA	National Association of Testing Authorities
NDD	Non-destructive digging
NEPC	National Environment Protection Council
NEPM	National Environmental Protection Measure
NHMRC	National Health and Medical Research Council
NRMMC	National Resources Management Ministerial Council
PAH	Polycyclic aromatic hydrocarbon
PID	Photo-ionisation detector
PULP	Premium unleaded petrol
QA/QC	Quality assurance/quality control
Redox	Reduction-oxidation potential
RPD	Relative percentage difference
SRC	Somerset Regional Council
SWL	Standing water level
TDS	Total dissolved solids
TCLP	Toxicity characteristic leachate procedure
TMR	Department of Transport and Main Roads

TRH	Total recoverable hydrocarbons
µS/cm	MicroSiemens per centimetre a measure of conductivity and salinity
ULP	Unleaded petrol
UST	Underground storage tank
VOC	Volatile organic compound
WPCG	Workplace Clearance Group
WSP Parsons Brinckerhoff	WSP Parsons Brinckerhoff Australia Pty Ltd

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Executive summary

Background

WSP | Parsons Brinckerhoff Australia Pty Ltd (WSP | Parsons Brinckerhoff) was commissioned by Caltex Australia Petroleum Pty Ltd (Caltex) to develop a remediation strategy for the former Esk Service Station and Depot (Caltex ID 11800) located at 255-259 Ipswich Street, Esk, Queensland (the site) where petroleum impact in soil and groundwater has been identified.

Site history

Historical environmental site assessments undertaken on the site, prior to 2000 reported light non-aqueous phase liquid (LNAPL) in one monitoring well (MW02). Prior to 7 November 1997, remediation using a skimmer pump recovered approximately 8,500 L of LNAPL. Investigations after 2000 did not report LNAPL in any monitoring wells.

In 2008, a site-wide environmental assessment of 25 soil bores, ten hand auger locations, was undertaken. Sixteen (MW1-MW16) monitoring wells on-site and seven delineation monitoring wells offsite (MW17-MW23). It is not known if an Environmental Site Assessment (ESA) report exists for this work as no report was provided; however, gauging results, soil and groundwater analysis tables, figures, and bore logs were provided.

The reported soil results indicated concentrations of benzene and petroleum hydrocarbon C₆-C₉ fraction exceeding the nominated assessment criteria within the north-west corner of the site and at off-site monitoring well MW20. The elevated soil concentrations were reported for soil samples collected from between 7.0 and 11.5 m below ground level (BGL).

The reported groundwater results for a number of on-site and off-site monitoring wells exceeded the benzene National Health and Medical Research Council (NHMRC) drinking water guidelines and Australian and New Zealand Environment and Conservation Council (ANZECC) investigation levels for slightly-moderately disturbed ecosystems. In general, the reported concentrations exceeding the nominated assessment criteria related to groundwater samples collected from monitoring wells located within the north-west portion of the site and from off-site monitoring wells on the adjacent northern property (i.e. MW19, MW20 and MW21).

Scope of work

WSP | Parsons Brinckerhoff was engaged to undertake a stage scope of works comprising a groundwater monitoring event (GME) and further investigation to fill data gaps to enable the development of a conceptual site model (CSM) and appropriate remediation strategy.

Findings

The findings for the investigative works conducted during this investigation can be summarised with respect to on-site findings and off-site findings as provided below.

On-site investigative works - findings

Based on the on-site investigative works conducted the on-site findings are as follows:

Soil

- Drilling undertaken in 2015 identified residual hydrocarbon impacts within the smear zone of the soil profile of on-site monitoring wells MW33 and within the soil profile encountered from 1.8-3.5m depth of MW34. The residual hydrocarbon impacts (i.e. benzene and TRH (C₆-C₁₀)) exceeded the human health risk from the vapour exposure pathway for residential land use. The locations of MW33 and MW34 relate to the former locations of the service station and depot. The extent of the hydrocarbon impact has been delineated to the east of MW36. However, the extent of residual soil impact to the south of MW34 has not been delineated.

Groundwater

- The groundwater elevations on-site ranges from 103.154m AHD (MW34) to 102.444m AHD (MW36) which generally relates to approximately 7.40m to 6.59 m BGL on-site. Groundwater is flowing from the south/south-west to north/north-east direction across the site.
- Groundwater hydrocarbon impacts have been identified to exceed adopted assessment criteria within on-site monitoring wells which have screens that transect the groundwater table. The identified benzene concentrations within the groundwater exceed the human health risk from the vapour exposure pathway for residential land use. The extent of the groundwater hydrocarbon impact has not been delineated to the east of MW36 which marginally exceeds the adopted assessment criteria and to the south of MW34.

Off-site investigative works - findings

Based on the off-site investigative works conducted the off-site findings are as follows:

Soil

- Residual hydrocarbon impacts have been identified within the smear zone of the soil profile of off-site monitoring wells MW31 and MW32. The residual hydrocarbon impacts (i.e. benzene and TRH (C₆-C₁₀)) exceed the human health risk from the vapour exposure pathway for residential land use. The extent of the residual hydrocarbon impact has not been delineated to the north-east of MW31 and MW32.

Groundwater

- The groundwater elevations on-site ranges from 103.21m AHD (MW23) to 102.674m AHD (MW32) which generally relates to approximately 8.383m to 7.245 m BGL. Groundwater is flowing to in a north/north-east direction towards Sandy Creek.
- Groundwater hydrocarbon impacts have been identified within off-site monitoring wells to the north-east of the site. The identified benzene concentrations within the groundwater exceed the human health risk from the vapour exposure pathway for residential land use. The extent of the groundwater hydrocarbon impact has not been delineated to the north-east of MW30, MW31 and MW32.

Proposed remedial strategy

Based on findings of the investigative works conducted during this investigation, a proposed remedial strategy was developed. The objectives of the proposed remedial strategy for the site are as follows:

- Proposed remedial strategy to protect human health and environmental risks
- Optimise return on site divestment.

Remedial strategy considerations included: soil impact; groundwater impact; soil vapour; subdivision and divestment; and stakeholder engagement (off-site impact). Remedial strategy was developed considering the following identified impacts:

- Residual volatile hydrocarbon soil impact from 1.8m to 3.5m BGL within the area formerly used as a service station.
- Hydrocarbon impacted groundwater and residual soil impacts within the smear zone (on and off site) relating to former releases from point sources.

With respect to the remedial strategy considerations and development, the site was divided into three on-site areas based on anticipated divestment timeframes and an off-site area requiring further investigation and remedial works. These areas are defined below.

- Short term – no remediation required
- Medium term – requires further investigation to ensure no unacceptable risk to human health and the location of the boundary to enable the portion of land to be removed from the Department of Environment and Heritage Protection (EHP) Environmental Management Register (EMR).
- Long term - requires further investigation to ensure no unacceptable risk to human health for the use of the portion of land whether it be for residential or commercial use. The remedial approach would comprise monitored natural attenuation (MNA) and periodic mobile multi-phase vacuum extraction (MPVE) events.
- Off-site impacts - requires further investigation to ensure no unacceptable risk to human health for residential use. The remedial approach would comprise MNA and periodic MPVE events.

In association with the above stakeholder engagement should be undertaken prior to the commencement works. Market research will also be undertaken to determine the most appropriate configuration.

Although the above remedial strategy has been provided, the adopted remedial strategy would need review by an EHP approved auditor.

1. Introduction

1.1 Background

WSP | Parsons Brinckerhoff Australia Pty Ltd (WSP | Parsons Brinckerhoff) was commissioned by Caltex Australia Petroleum Pty Ltd (Caltex) to develop a remediation strategy for the former Esk Service Station and Depot (Caltex ID 11800) located at 255-259 Ipswich Street, Esk, Queensland (the site) where petroleum impact in soil and groundwater has been identified. The location of the site is shown on Figure 1 (Appendix A).

1.2 Objective

The overall objective of the proposed investigative works was to develop a holistic remediation strategy for the site with consideration for the future divestment of the site.

1.3 Scope of works

WSP | Parsons Brinckerhoff was engaged to undertake a staged scope of works comprising a groundwater monitoring event (GME) and further investigation to fill data gaps to enable the development of a conceptual site model (CSM) and appropriate remediation strategy.

1.3.1 Groundwater monitoring event – scope of works

WSP | Parsons Brinckerhoff was engaged by Caltex on 2 April 2015 to develop a site remediation strategy by undertaking the following scope of works:

- Undertake a GME of all accessible wells using hydra-sleeves sampling techniques to establish current groundwater conditions on-site and off-site.
- Develop a robust site conceptual model by filling known data gaps.
- Assessing the risks to human health and environment.

1.3.2 Further works – scope of works

The initial findings of the April 2015 GME identified that access was restricted by vegetation (grass) overgrowth; a number of on and offsite wells were either lost or destroyed; and well screens appeared to have been installed below the water table. WSP | Parsons Brinckerhoff was subsequently engaged by Caltex to undertake further investigation works to obtain data to facilitate the development of the remedial strategy. The following scope of works was undertaken:

- Brush cut the long grass in the area to the north of the site and in the vicinity of MW16.
- Installation of a shallow monitoring well between MWA and MWB (refer Figure 2, Appendix A) to confirm presence or absence of light non-aqueous phase liquid (LNAPL) on-site.
- Utilisation of membrane interface probe (MIP) and laser-induced fluorescence (LIF) high-resolution vertical profiling to assist with lateral delineation of impacts and determining monitoring well locations.
- Pre-existing waste drums are to remain on site until removed in 2016, under a separate scope.

- Installation of three off-site groundwater monitoring wells north and north east of the north-western portion of the site where highest dissolved phase concentration was reported in the April 2015 GME.
- Installation of four monitoring wells onsite.
- Development of newly-installed wells.
- Survey of wells to Geocentric Datum of Australia (GDA 94) and m Australian Height Datum (AHD) by a licensed surveyor.
- Groundwater sampling using hydra-sleeve sampling techniques and analysis for benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN) and total recoverable hydrocarbons (TRH) with quality assurance/quality control (QA/QC) sampling and analysis.
- Preparation of a report detailing the following:
 - ▶ works undertaken
 - ▶ assessment of beneficial use of the groundwater
 - ▶ assessment of potential risk to human health and environment on-site and off-site with respect to groundwater and soil
 - ▶ A site conceptual model
 - ▶ Remediation strategy.

1.4 Technical framework

The investigative work was undertaken with reference to the following regulatory guidelines and standards:

- National Environment Protection Council (NEPC) National Environment Protection (Assessment of Site Contamination) Measure (NEPM), Amendment Measure 2013 (No. 1) (referred to hereafter as NEPM, 2013).
- Department of Environment and Heritage Protection (EHP) October 2014, Guideline for contaminated land professionals.
- Australian Standard AS4482. 1-2005, 2005, Guide to the Sampling and Investigation of Potentially Contaminated Soil – Part 1: Non-volatile and Semi-volatile compounds.
- Australian Standard AS4482.2-1999, 1999, Guide to the Sampling and Investigation of Potentially Contaminated Soil – Part 2: Volatile Substances.
- Australian Standard AS5667.11:1998, 1998, Water Quality Sampling, Part 11: Guidance on Sampling of Groundwater.
- Australian/New Zealand Standard 5667.1, 1998, Water Quality Sampling Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.

2. Site details

2.1 Site identification details

Site identification details are provided in Table 2.1.

Table 2.1 Site identification details

Site name	Ampol Esk Former Depot
Site ID	11800
Site address	255-259 Ipswich Street, Esk, Queensland
Legal identification	Lots 1 and 3 on RP98527, and Lots 7 and 8 on RP78783 (total of 4 property lots)
Approximate site area	16,685m ²
Site elevation	109m to 111m Australian Height Datum (AHD)
Local government	Somerset Regional Council
Zoning	Residential Zone
Current site owner	Caltex Australia Petroleum Pty Ltd
Current site use	Vacant land – fully fenced
Proposed site use	North-west portion of the site proposed for commercial use with the balance of the site proposed for residential use

2.2 Site description

The topography of the site slopes down from the western boundary fronting Ipswich Street to the eastern boundary adjacent a rail easement. An open stormwater drain aligned in an east-west direction was located along the northern boundary of Lot 3 on RP98527, refer to Figure 2, Appendix A. The depth of the stormwater drain decreased as the drain progressed down slope.

The site was observed to be secured by a 2m high chain wire fence which surrounded the entire site. The site was lightly vegetated with trees (mostly in the eastern portion of the site) with the majority of the site covered by ankle high grass. The exception to this was the open stormwater drain and the area surrounding a concrete slab within Lot 7 on RP78783 (near the entrance to the site) which was vegetated with long grass. A number of 200 L drums occupied the concrete slab which were observed to contain waste water and soil along with tubing which had been previously used for sampling. Additional 200 L drums were also observed to the east of monitoring well MW4 and to the north of the site in the near vicinity of off-site monitoring well MW18.

A number of monitoring wells were observed across the site; however, two were observed to have been destroyed (i.e. MW14 and MW15) whilst three monitoring wells could not be located (i.e. MW1, MW6 and MW16).

The area immediately to the north of the site occupied by off-site monitoring wells MW17 to MW21 was observed to be well vegetated by long grass. Monitoring wells MW17 and MW18 could not be located and monitoring wells MW19 to MW21 were observed to have been destroyed, possibly during past slashing events.

2.3 Surrounding land uses

The land uses surrounding the site are described as follows:

- North – vacant land (zoned for residential use)
- South – residential and vacant land
- East – rail easement followed by vacant land and commercial land use
- West – residential land use and Ipswich Street followed by residential land use.

2.4 Geology

2.4.1 Regional geology

The Geological Survey of Queensland, 1:500,000 Moreton Geology map, 1980 indicates the site is located within an area comprising Quaternary aged flood plains and river terraces which borders the Triassic aged Esk Formation located approximately along the western site boundary (Ipswich Street) comprising shale, sandstone, conglomerate, tuff and coal.

2.4.2 Site specific geology

The natural soil profile encountered during advancement of soil bores on-site in general composed medium to high plasticity stiff silty clay/sandy clay/clay with lateral lenses of sand and gravel down the soil profile to a depth of 12m below ground level (BGL). Some of the sand and gravel lenses were observed to be cemented.

2.5 Hydrogeology

2.5.1 Regional

The Queensland Government Department Natural Resources and Water Groundwater Resources of Queensland 1: 2,500,000 scale map indicates that the underlying regional groundwater aquifer has the following characteristics:

- sedimentary strata consisting of sandstone, shale and conglomerate
- salinity of 1,500 to 5,000 mg/L indicating fair water quality which may be suitable for most stock and some domestic and irrigation uses
- typically low bore yield of <5 L/sec.

The nearest surface water body to the site is Sandy Creek, located approximately 150 m east of the site.

A review of the Department of Natural Resources and Mines (DNRM) registered groundwater bore database for the area undertaken on 16 April 2015 indicates there are four registered groundwater bores within a 1 kilometre (km) radius of the site (bore IDs: 106296, 143436, 143458 and 143567). Two of the four registered groundwater bores relate to monitoring wells MW22 and MW23 located to the west of Ipswich Street (bore IDs: 143436 and 143458). A copy of the groundwater bore search image and DNRM registered groundwater bore search results are provided in Appendix C.

2.5.2 Site specific hydrogeology

The results of the groundwater investigation undertaken at the site have been summarised in Table 2.2 Below. The assessments methodology, findings and discussions are provided in Sections 4.3, 6.1, 6.3 and 6.4 .

Table 2.2 Site-specific hydrogeology

Groundwater occurrence	Soil moisture observed on dip/interface probe tapes after leaving soil boreholes open for a period of four or more hours indicated slow infiltration occurred at the sand and gravel lenses down the soil profile. The standing water level (SWL) in wells intersecting the regional aquifer was observed to require approximately 24 hours to stabilise.
Depth to groundwater	Standing groundwater levels identified in monitoring wells gauged on October 2015 ranged from 6.295 to 8.490 m below top of casing (mBTC). The corrected measured groundwater elevations were between 103.154 mAHD (MW34) to 102.444 mAHD (MW36).
LNAPL occurrence	During the April 2015 and October 2015 GMEs, no LNAPL was detected within monitoring wells on-site or off-site.
Groundwater flow direction	Data from the April and October 2015 GMEs indicate the groundwater generally flows from the south/south-west to the north/north-east direction across the site.
Hydraulic gradient	The hydraulic gradient of the groundwater table across the site in October 2015 was approximately 0.014 m/m in a north-easterly direction (calculated between MW34 and MW36). The Coffey 2011 investigation (refer to Section 3) determined the groundwater gradient to be 0.0125 m/m to the east across the site.
Groundwater Seepage Velocity	The Coffey 2011 investigation determined the hydraulic conductivity and seepage velocity for the site to be 0.001 – 0.1 m/d and 0.045 – 4.57 m/yr respectively.
Groundwater salinity	Total dissolved solids (TDS) calculated from field electrical conductivity measurements recorded during the October 2015 GME indicated salinity beneath the site ranged from approximately 3,380 mg/L to 10,062 mg/L TDS.

3. Previous investigations

The following previous investigation reports were reviewed for the site:

- Coffey Environments, Environmental Site Assessment Summary Spreadsheet, Former Ampol Depot Esk (11800) 2008 and 2011
- Coffey Environments, Site Survey Checklist and Condition Report, Former Caltex Depot Esk (11800) 29 February 2008.
- CMPS&F, Site Management Plan, Former Solo Service Station, 255 Ipswich Road, Esk, Australian Petroleum Pty Ltd 9 July 1997

No ESA or validation assessment reports were available for the site. In summary, the main findings of the reports reviewed are provided below.

Historical environmental site assessments undertaken on the site, prior to 2000 reported LNAPL in one monitoring well (MW02). Prior to 7 November 1997, remediation using a skimmer pump recovered approximately 8,500 L of LNAPL.

Investigations after 2000 did not report LNAPL in any monitoring wells.

In 2008, a site-wide environmental assessment of 25 soil bores, ten hand auger locations, was undertaken. Sixteen (MW1-MW16) monitoring wells on-site and seven delineation monitoring wells offsite (MW17-MW23). It is not known if an ESA report exists for this work as no report was provided; however, gauging results, soil and groundwater analysis tables, figures, and bore logs were provided. Copies of the historical: gauging results and summary analysis tables for soil and groundwater are included in Appendix D the bore logs are included in Appendix E and historical figures in Appendix F

The reported soil results indicated concentrations of benzene and petroleum hydrocarbon C₆-C₉ fraction exceeding the nominated assessment criteria within the north-west corner of the site and at off-site monitoring well MW20. The elevated soil concentrations were reported for soil samples collected from between 7.0 and 11.5 m BGL.

The reported groundwater results for a number of on-site and off-site monitoring wells exceeded the benzene National Health and Medical Research Council (NHMRC) drinking water guidelines and Australian and New Zealand Environment and Conservation Council (ANZECC) investigation levels for slightly-moderately disturbed ecosystems. In general, the reported concentrations exceeding the nominated assessment criteria related to groundwater samples collected from monitoring wells located within the north-west portion of the site and from off-site monitoring wells on the adjacent northern property (i.e. MW19, MW20 and MW21).

4. Assessment methodology

4.1 Safety

A site specific Health, Environment and Safety Plan (HESP) was prepared by WSP | Parsons Brinckerhoff and all personnel working at the site were required to read, understand, sign and conform to the HESP. Intrusive works were undertaken under a WSP | Parsons Brinckerhoff Ground Penetration Permit.

4.2 Soil bores and soil sampling

Field methodologies adopted during the advancement of soil bores and soil sampling have been summarised in Table 4.1 and 4.2. The soil bore locations are shown on Figure 3, Appendix A.

Table 4.1 Soil bore methodology

Activity	Details
Service Location	Soil bore locations were checked for the presence of buried services by a professional services locator before the commencement of the field investigations. In addition, underground service plans for the area were obtained prior to the commencement of the investigations and were used to assist with locating underground services.
Drilling Method	Soil bores were undertaken by a professional drilling company (Numac Drilling services Australia). Drilling involved a combination of drilling techniques including non-destructive drilling (NDD) (air/water knifing and vacuum extraction), push-tube (MIP vertical profiling and Geoprobe) and solid stem auger drilling.
NDD Drilling	NDD Drilling techniques were used to clear the soil bore of underground services to a depth of 1.5 m.
MIP Vertical Profiling	Selected locations (SB34, SB35a, SB35b, SB36a and SB36b) were assessed using MIP vertical profiling techniques which provided real time continuous sampling. Prior to the commencement of MIP vertical profiling the MIP probe was checked to ensure the inert carrier gases were flowing and the photo-ionisation detector (PID)/flame ionization detector (FID) were responding to hydrocarbon test solutions. The MIP probe was advanced using push tube techniques.
Geoprobe	Push-tube techniques were used to obtain a continuous soil core of the strata encountered from 1.5m depth until refusal was achieved, generally at 7.6m depth,
Solid Stem Auger Drilling Techniques	Solid stem auger drilling techniques were used to advance the soil bore from Geoprobe refusal depth to the soil bore termination depth.

Soil bore log reports showing soil bore sampling and strata encountered during drilling are provided in Appendix G. The continuous vertical profile plots produced by advancing the MIP probe using push-tube drilling techniques are provided in Appendix H.

Table 4.2 Soil sampling methodology

Activity	Details
Soil Collection/Sampling Method	<p>Soil samples were collected down the soil profile from the continuous soil core provided by Geoprobe drilling techniques. Where solid stem auger drilling techniques were used the soil sample was collected from the auger ream.</p> <p>All samples were stored in glass jars supplied by the analytical laboratory. Nitrile disposable gloves were changed prior to the collection of each soil sample and the trowel was decontaminated after the collection of each sample.</p>

Activity	Details
Field Screening	Where MIP vertical profiling techniques were undertaken continuous assessment of volatile organic compounds (VOCs) down the soil profile was undertaken by a PID, FID and a halogen-specific detector which were calibrated with a known standard prior to commencing vertical profiling. Soil samples were collected down the soil profile or at locations observed to have a hydrocarbon odour. Collected soil samples were screened in the field using a hand held PID unit that was calibrated to a known concentration of isobutylene gas prior to the commencement of field work. Copies of the calibration certificate is provided in Appendix I.
Sample Preservation	Soil samples were stored on ice in an insulated chest immediately after sampling. Samples were kept chilled prior to and during delivery to the laboratory.
Sample Analysis	Selected soil samples were analysed for BTEXN and TRH. Samples were selected for analysis based on recorded PID reading and site observations.
Decontamination	All sampling and equipment was cleaned between each sampling location using mains water and a phosphate free detergent followed by rinsing with de-mineralised water.

4.3 Groundwater well installation and sampling

Field methodologies adopted during groundwater well installation and groundwater sampling are summarised in Table 4.3 and Table 4.4.

Table 4.3 Groundwater well installation methodology

Activity	Details
Service Location	As soil bores converted to groundwater wells the groundwater well locations were checked for the presence of buried services as per Table 4.1 for soil bores.
Drilling Method	Drilling and installation of the groundwater wells was undertaken by a professional drilling company. Drilling methods involved those as stated in Table 4.1 for soil bores with the resulting soil bore diameter being enlarged using solid stem auger drilling techniques.
Well Construction	<p>All wells were constructed with 50 mm, class 18 uPVC screen and casing and completed with standpipe monument covers. A filter pack comprising clean graded sands of suitable size to provide sufficient inflow of groundwater was installed within the annular space between the borehole and the well casing. The filter pack extended from the base of the screened interval to a minimum of approximately 0.1 m above the termination of the slotted casing.</p> <p>In order to minimise the likelihood of surface water infiltrating the aquifer, a bentonite plug, comprising granulated bentonite, was placed above the filter pack to a minimum thickness of 1.3 m.</p> <p>Cement grout was placed above the bentonite plug to seal the bore and concrete used to complete the standpipe to the surface.</p>
Well Development	In order to ensure interconnection between the aquifer and the well, and to remove drilling fines from the gravel pack and well, each well was developed by purging a minimum of five well volumes and/or until it purged dry.
Well Surveying	Following construction, the location of each groundwater monitoring well was surveyed to GDA 1994 by a licensed surveyor. A copy of the monitoring well survey is provided in Appendix K. The highest point on the top of the internal uPVC casing (TOC) was surveyed relative to m AHD and marked for future gauging reference.
Waste Disposal	<p>Waste soil created during the drilling and well installation was placed in 205 L drums and stored on-site on a concrete slab located near the site entrance for future disposal.</p> <p>Water removed during well development was collected placed in 205 L drums and stored on-site on a concrete slab located near the site entrance for future disposal.</p>

Monitoring well construction details are included on the soil bore logs provided in Appendix G. Groundwater gauging records are provided in Appendix J.

Table 4.4 Groundwater assessment methodology

Activity	Details
Timing of Sampling	Initial gauging and sampling of groundwater wells was undertaken at least seven days after the completion of well installation and development.
Well purging	Groundwater sampling was undertaken using hydra-sleeve 'no-purge' technique. The probes on the water quality meter were lowered into the monitoring well to measure the groundwater physio-chemical properties. The groundwater physio-chemical properties of only the newly established monitoring wells (i.e. MW30 to MW36) were measured. The parameters recorded were pH, reduction-oxidation potential (redox), electrical conductivity (EC), dissolved oxygen (DO) and temperature. Water quality meter calibration certificates and field sheets are presented in Appendix I and Appendix J respectively.
Sampling Method	Groundwater samples were collected using hydra-sleeve 'no-purge' technique. The samples were decanted from hydra-sleeves into laboratory supplied bottles. All bottles were labelled clearly with well ID and sampling date.
Equipment Decontamination	New disposal nitrile gloves were used at each location. The interface probe and probes on the water quality meter were washed using the triple wash method (i.e. washing with Decon 90 detergent and potable water followed by washing with potable water than rinsed with de-mineralised water) between sampling locations.
Sample Preservation	All samples were collected in bottles which were supplied by the primary laboratory and contained the appropriate preservatives (where required). All samples were stored on ice in an insulated chest immediately after sampling. Samples were kept chilled prior to and during delivery to the laboratory.
Sample Analysis	Groundwater samples collected during the April 2015 GME (i.e. from monitoring wells constructed prior to 2011 that were accessible) were analysed for TRH and BTEXN. A selected number of these groundwater samples were analysed for natural attenuation parameters (dissolved methane, nitrate, sulphate and ferrous ion). Groundwater samples collected during the October 2015 GME (i.e. from monitoring wells constructed in September 2015) were analysed for TRH and BTEXN.
Wastewater Disposal	The 'no-purge' method was used to collect the groundwater samples and as such, there was no requirement for storage/disposal of purge water.

4.4 Laboratory

All primary and blind field (intra-laboratory) duplicate groundwater samples were submitted to ALS for analysis. Laboratory split (inter-laboratory) duplicate groundwater samples were submitted to Eurofins MGT. Both laboratories were accredited by National Association of Testing Authorities (NATA) for the analyses performed.

5. Assessment criteria

To assess the relative concentration and significance of any potential contaminants detected through laboratory analysis the reported concentrations are compared against established human health and environmental screening criteria. These contaminant screening criteria represent threshold concentrations of specific contaminants which, if exceeded in a particular sample, may pose a health or environmental risk and may therefore warrant further site specific investigation or risk analysis.

All criteria adopted for the assessment of soil and groundwater are presented in the analytical results tables Appendix B with results exceeding the adopted criteria highlighted.

5.1 Soil

5.1.1 Health and ecological criteria

The NEPM 2013 sets out the basis for assessing the significance of soil contamination. Where available, health-based soil screening criteria have been sourced from the NEPM (2013) Schedule B1 *Guideline on the Investigation Levels for Soil and Groundwater* for residential land use. This land use has been selected to conform to the current zoning of the site and the adjoining property to the north which are identified as being within the Esk residential precinct and for the future divestment of the site. Zoning for the site is shown on map ZM1A; Town Zone – Esk provided in Appendix L.

A summary of the references used to source the health and ecological soil screening criteria is provided in Table 5.1.

Table 5.1 Sources of adopted soil screening criteria

Potential Sensitive Receptors	Reference
Human Health (HSL)	NEPM (2013) <i>Schedule B1 Guideline on Investigation Levels for Soil and Groundwater Measure Schedule B1</i> – health based screening levels for low – high density residential land uses (HSL-A & HSL-B values)
Ecological (EIL & ESL)	NEPM (2013) <i>Schedule B1 Guideline on Investigation Levels for Soil and Groundwater Measure Schedule B1</i> – ecological investigation levels (EIL) for urban residential and public open space land use.
	NEPM (2013) <i>Schedule B1 Guideline on Investigation Levels for Soil and Groundwater Measure Schedule B1</i> – ecological screening levels (ESL) for urban residential and public open space land use.

5.2 Groundwater

5.2.1 Beneficial use assessment

In accordance with NEPM (2013) Schedule B(6) *The Framework for Risk-Based Assessment of Groundwater Contamination*, the beneficial use of groundwater was considered based on both the current and realistic future uses of groundwater within the regional area of the site. Identifying what groundwater uses need to be protected aids in determining the relevant criteria.

The potential beneficial uses of groundwater in the regional surrounding area that need to be protected include the following:

- Maintenance of freshwater ecosystems – including discharge to surface water bodies such as Sandy Creek.
- Recreational uses – Sandy Creek may be used for recreational purposes.
- Industrial/commercial use – based on the salinity of groundwater beneath the site, groundwater is considered potentially suitable for stock watering but is marginal for irrigation.
- Human health in non-use scenarios - since volatile contaminants have been identified within groundwater, the generation of vapours into either indoor or outdoor areas of the site is considered possible.

The beneficial use of groundwater for drinking water has not been considered based on the salinity of groundwater beneath the site.

5.2.2 Health and ecological criteria

A summary of the references used to source the groundwater health and ecological groundwater screening criteria is provided in Table 5.2. As the proposed future use for the site and the surrounding land use to the north, west and south of the site is residential, contaminant concentrations will also be compared against screening criteria for residential land use (HSL-A/B).

Table 5.2 Sources of adopted groundwater screening criteria

Beneficial Use	Reference
Freshwater Ecosystems	NEPM (2013) <i>Schedule B1 Guideline on Investigation Levels for Soil and Groundwater – groundwater investigation levels (GILs) (freshwater)</i>
Recreation	NHMRC 2008 <i>Guidelines for Managing Risk in Recreational Water</i> suggests that ingestion of water during recreational activities make only a minor contribution to intake. The NHMRC (2008) guidelines suggest a conservative assumption of 10% of drinking water consumption (~200 ml) during recreational activities. For the purpose of this assessment it is assumed that daily intake from recreational activities would not exceed 200 ml per day. Recreational criteria have been derived from the NHMRC & National Resources Management Ministerial Council (NRMMC) 2011 <i>Australian Drinking Water Guidelines</i> , which assume a daily consumption of 2 L per day. As such a factor of 10 has been applied to the drinking water guidelines to assess risk to recreational/domestic irrigation beneficial use.
Potable	NEPM (2013) <i>National Environment Protection (Assessment of Site Contamination) Measure Schedule B1 – groundwater investigation levels (GILs) (drinking water)</i> .
Vapour Intrusion	NEPM (2013) <i>Schedule B1 Guideline on Investigation Levels for Soil and Groundwater – Groundwater health screening levels (HSLs) for residential land use (HSL-A/B)</i> .
Commercial	NEPM (2013) <i>Schedule B1 Guideline on Investigation Levels for Soil and Groundwater – Health investigations levels for soil contaminants (HSLs) for commercial/industrial (HIL D)</i> .

The predominant soil type beneath the site is silty clay/sandy clay and clay with a standing groundwater level of greater than 6.5 m BGL (measured in October 2015), HSL-A/B for clay from 4 m <8m depth has been selected to assess the vapour risk.

6. Results

The results for the investigative works undertaken from April to October 2015 is provided below in chronological order.

6.1 April 2015 – GME

6.1.1 Groundwater field measurements

The initial GME was undertaken on 21 April 2015 which comprised the gauging and sampling of groundwater within 12 accessible on-site groundwater monitoring wells and the single accessible off-site monitoring well (i.e. MW23), (refer to Figure 2, Appendix A). The depth to groundwater within the 13 monitoring wells gauged ranged from 6.049 to 8.383 mBTC. No hydrocarbon sheen was observed in any of the 13 monitoring wells sampled. However during groundwater gauging/sampling, strong hydrocarbon odour was observed within MWA and MWB; slight hydrocarbon odour was observed within MW3 and MW4; with no hydrocarbon odour observed within the remaining nine monitoring wells.

Based on the data collected during the April 2015 GME, the inferred groundwater flow direction was from the south/south-west to north/north-east across the site, refer to Figure 4A, Appendix A.

Groundwater well gauging data measured immediately prior to sampling are presented in (Appendix J).

A review of the depth to groundwater observed within each accessible monitoring well against the documented screen depth intervals as provided on the historical bore logs (Appendix E) was undertaken. Refer to groundwater levels, cross sections and screen interval summary table provided in (Appendix M).

6.1.2 April 2015 groundwater analytical results

Tables of groundwater analytical results are included in Appendix B and copies of laboratory certificates are included in Appendix N. The results for the petroleum hydrocarbon and attenuation parameter analyses are discussed separately.

Based on the data collected during the October 2015 GME, the inferred groundwater flow direction was from the south/south-west to north/north-east across the site, refer to Figure 4B, Appendix A.

6.1.2.1 Hydrocarbon analytical results

A summary of the April 2015 GME petroleum hydrocarbon analytical results is as follows:

- Reported TRH (C₆-C₁₀) less BTEX concentrations ranged from 7,370 to <20 µg/L with the highest concentration reported in monitoring well MWB.
- Reported TRH (>C₁₀-C₁₆) concentrations ranged from 2,680 to <100 µg/L with the highest concentration reported in monitoring well MWB.
- Detectable concentrations of various TRH fractions were reported for all monitoring wells sampled except MW2 and MW3; however, the criteria is not limiting indicating the derived HSL exceeds the mixture solubility limit for groundwater and would not result in vapour emissions greater than the allowable acceptable risk.

- Reported benzene concentrations ranged from 25,400 to <1 µg/L with the highest concentration reported in monitoring well MWB.
- Benzene concentrations reported in monitoring wells MWA and MWB exceeded the GILs and the HSLs for residential land use via vapour inhalation pathway (for groundwater 4m - <8m and site lithology of clay).
- Reported hydrocarbon concentrations increased in MWA, MW4, and MW12 since the previous GME in 2011; however, MWB was not sampled in 2011.
- Since the previous GME in 2011, reported benzene concentrations decreased in MW9, MW10, MW11, and MW23 with some variation in TRH concentrations.

Figure 5, Appendix A includes the sample location of the elevated groundwater results reported for the April 2015 GME.

6.1.2.2 Attenuation parameters results

A summary of the April 2015 GME attenuation parameter analytical results is as follows:

- Reported methane concentrations ranged from 9.71 mg/L to <0.01mg/L. The highest methane concentration was reported for MWA and the lowest reported concentration was in MW23 (up-gradient monitoring well).
- Reported sulfate concentrations ranged from 30 to <1 mg/L with the highest sulfate concentration reported in MW23 and the lowest concentration reported in MWA.
- Reported ferrous iron concentrations ranged from 1.17 to <0.05 mg/L with the lowest concentration reported for MW23 and the highest concentration reported in MW13.
- Reported nitrate concentrations ranged from 0.08 to <0.01 mg/L with the lowest concentration reported for MWA and the highest concentration reported in MWB.

Based on the above summary of the attenuation parameters the following comments with respect to natural attenuation are provided:

- The up-gradient measurement for nitrate is low and is not present in sufficient concentration within the natural groundwater to be used for assessing natural attenuation.
- The up-gradient measurements at MW23 indicated sulfate is present within the natural groundwater whereas methane and ferrous iron is not.
- The highest methane concentration was reported for MWA which is within the location of the former depot and in close location to the petroleum hydrocarbon source from the former depot.
- No natural attenuation parameter are available from monitoring locations down gradient from the petroleum hydrocarbon source of the former depot.
- The ferrous iron and methane concentrations reported at MW4 are down gradient of the former service location.
- The presence of methane in the location of the petroleum hydrocarbon source (i.e. MWA, MWB and MW13) and down gradient of the petroleum hydrocarbon source (i.e. MW4) indicates biodegradation of the dissolved petroleum hydrocarbons is currently occurring.

6.2 Soil investigation results

A total of five MIP's, seven soil bores and two abandoned locations were drilled during the soil investigation. The results of the soil investigation are discussed below.

6.2.1 Abandoned locations

Two nominated locations south of soil bore SB34 were checked for the presence of buried services by a professional services locator prior to commencing NDD. The target depth required by NDD could not be achieved as concrete was encountered, as such the soil bore location was abandoned. The location of the abandoned soil bores are provided on Figure 3, Appendix A.

6.2.2 MIP profiling

MIP vertical profiling was undertaken at locations: SB34, SB35a, SB 35b, SB36a and SB36b. The locations are shown on Figure 3, Appendix A. The output from MIP vertical profiling provided a plot of the PID and FID detections down the vertical soil profile. A copy of the MIP output is provided in Appendix H and a summary of the profiling is provided below:

- SB34 – bands of potential volatile organic compounds (VOCs) were identified from 1.8m to 3.5m and from 5.8 to 7.5m BGL with the inferred groundwater table at approximately 7.0m BGL.
- SB35a & SB35b – no bands of potential VOC were identified within the profiling depth. The inferred groundwater table could not be determined.
- SB36a – a band of potential VOCs was identified from 6.4m to 6.7m BGL with the inferred groundwater table at approximately 6.4m BGL.
- SB36b - a band of potential VOCs was identified from 9.2m to 9.4m BGL. The inferred groundwater table could not be determined.

6.2.3 Soil profile

Soil bores were advanced using Geoprobe drilling techniques followed by solid stem auger drilling techniques after Geoprobe refusal had been achieved. Soil bores were undertaken at the following locations: SB30, SB31, SB32, SB33, SB34, SB35a and SB36b, refer to Figure 3, Appendix A. Copies of the soil bore log reports are provided in Appendix G. The soil bore logs provide details of soil types encountered at each of the sampling locations and samples collected.

The natural soil profile encountered during advancement of soil bores on-site in general composed medium to high plasticity stiff silty clay/sandy clay/clay with sand and gravel lenses through-out the soil profile to a depth of 12m BGL.

6.2.4 Soil PID readings, odour and staining

Soil samples were collected down the soil profile. In general soil samples were targeted from locations within the soil core which were observed to be stained or had a hydrocarbon odour. Vapour headspace PID readings for the collected soil samples were recorded on the individual soil bore logs. The maximum recorded vapour headspace PID sample reading for each soil bore and sample depth is provided in Table 6.1.

Table 6.1 Maximum headspace PID reading for each soil bore

Soil Bore	Maximum PID Reading (ppm)	Depth mBGL
SB30	71.2	1.9-2.0
SB31	680.0	7.0-7.1
SB32	590.6	5.9-6.0

SB33	792.1	6.9-7.0
SB34	180.2	7.3-7.5
SB35a	0.8	11.0-11.1
SB36b	311.0	6.65-6.75

6.2.5 Soil analytical results

Tables of soil analytical results are included in Appendix B and copies of laboratory certificates are included in Appendix N. A summary of the soil analytical results compared against the adopted assessment criteria is as follows:

- Reported TRH (C₆-C₁₀) less BTEX concentrations ranged from 468 to <10 mg/kg with concentrations reported for soil bores SB31 (7.0-7.1), SB33 (6.9-7.0) and SB34 (2.3 to 2.5m) exceeding the soil HSLs for low - high density residential vapour intrusion.
- Reported benzene concentrations ranged from 17 to <0.2 mg/kg with concentrations reported for soil bores SB31 (7.0-7.1), SB32 (7.2-7.3), SB33 (6.9-7.0) and SB34 (2.3 to 2.5m) exceeding the soil HSLs for low - high density residential vapour intrusion.

Figure 6, Appendix A identifies the sample locations of the elevated reported soil results.

6.3 Well installation

Seven soil bores were converted to monitoring wells as follows: SB30/MW30, SB31/MW31, SB32/MW32, SB33/MW33, SB34/MW34, SB35a/MW35 and SB36b/MW36.

No saturated zones were encountered during drilling with the exception of SB35a/MW35 in which saturated strata was encountered after penetrating the clay/siltstone layer. Whilst drilling all locations, except for SB35a/MW35 each bore hole was left open to verify the presence of groundwater and that sufficient groundwater would be available for sampling from slow groundwater seepage.

A summary of monitoring well installation details are provided in Table 6.3.

Table 6.3 Monitoring well installation details

Well	Top of well casing elevation (m AHD)	Depth to static water level (m BTOC)	Screen interval (m BTOC)	Sand pack interval (m BTOC)	Bentonite plug interval (m BTOC)
30	110.815	7.855	6.61-9.61	6.11-9.81	4.11-6.11
31	110.028	7.350	5.97-9.17	5.67-9.67	4.37-5.67
32	110.114	7.440	5.12-9.62	5.02-9.62	3.72-5.02
33	110.625	7.690	9.08-12.68	8.88-12.68	7.08-8.88
34	111.149	7.995	7.10-9.10	7.0-9.1	5.60-7.0
35	110.805	7.747	10.59-12.59	10.09-12.59	7.69-10.09
36	109.604	7.160	6.08-10.08	5.88-10.08	4.38-5.88

6.4 October 2015 – GME

6.4.1 Groundwater field measurements

A second GME was undertaken on 1 October 2015 which comprised the gauging and sampling of groundwater within 13 on-site groundwater monitoring wells and three off-site monitoring wells (MW30 to MW32). The depth to groundwater within the 17 monitoring wells gauged ranged from 6.295 to 8.49 mBTOC. The corrected measured groundwater elevations were between 103.154 m AHD (MW34) to 102.444 m AHD (MW36).

Of the 16 monitoring wells gauged, only the 7 monitoring wells established in September 2015 were sampled of which none were observed to have a hydrocarbon sheen. However, during groundwater gauging, hydrocarbon odour was observed within 9 of the monitoring wells gauged (i.e. MWA, MWB; MW4, MW30, MW31, MW32, MW33, MW34 and MW36) with no observed hydrocarbon odour within the remaining 8 monitoring wells. A summary of recorded PID readings at individual well heads during gaging is provided in Table 6.4.

Table 6.4 Summary of well head PID readings during October 2015 gauging

Monitoring Well	PID Reading (ppm)	Monitoring Well	PID Reading (ppm)
MWA	0.2	MW13	0.0
MWB	0.5	MW30	555
MW4	9.8	MW31	870
MW5	0.0	MW32	919
MW9	0.0	MW33	790
MW10	0.0	MW34	732
MW11	0.0	MW35	0.0
MW12	0.0	MW36	415

Based on the data collected during the October 2015 GME, the inferred groundwater flow direction is similar to that observed in the April 2015 GME with the flow direction from the south/south-west to north/north-east across the site, refer to Figure 4B, Appendix A

Groundwater well gauging data and field parameters measured immediately prior to sampling are presented in Appendix J and are summarised below. Groundwater field sampling sheets are included in Appendix J.

A summary of the October 2015 GME field measurements is as follows:

- pH values ranged from 6.88 to 7.28, thereby indicating relatively neutral groundwater conditions.
- Electrical conductivity (EC) readings ranged from 5.2 mS/cm to 15.48 mS/cm (approximating 3,380 to 10,062 mg/L TDS), indicating groundwater is not suitable for potable use.
- DO readings ranged from 2.11 ppm to 3.2 ppm, indicating moderate oxygen conditions.
- Adjusted hydrogen scale redox potential readings ranged from 168 mV to 241.6 mV, thereby indicating mildly to moderately reducing conditions.

6.4.2 October 2015 groundwater analytical results

Table 1 of groundwater analytical results includes the October 2015 GME results. Table 1 is included in Appendix B and copies of laboratory certificates are included in Appendix N.

A summary of the October 2015 GME petroleum hydrocarbon analytical results is as follows:

- Reported TRH (C₆-C₁₀) less BTEX concentrations ranged from 41,700 to 20 µg/L with the highest concentration reported in off-site monitoring well MW32 and the lowest concentration in MW35.
- Reported TRH (>C₁₀-C₁₆) less naphthalene concentrations ranged from 13,700 to <100 µg/L with the highest concentration reported in monitoring well MW34 and the lowest concentration in MW35.
- Detectable concentrations of various TRH fractions were reported for all monitoring wells sampled except MW35; however, the criteria is not limiting indicating the derived HSL exceeds the mixture solubility limit for groundwater and would not result in vapour emissions greater than the allowable acceptable risk.
- Reported benzene concentrations ranged from 54,300 to 6 µg/L with the highest concentration reported in monitoring well MW32 and the lowest concentration in MW35.
- Benzene concentrations reported in off-site monitoring wells (i.e. MW30, MW31 and MW32) and on-site monitoring wells (i.e. MW34 and MW36) exceeded the GILs and the HSLs for residential land use via vapour inhalation pathway (for groundwater 4m - <8m and site lithology of clay).
- Comparing the April 2015 GME results against the October 2015 GME results indicates that the monitoring wells with screened intervals across the measured depth to groundwater reported significantly higher hydrocarbon concentrations. As such, results reported for monitoring wells with the screened interval below the measured depth to groundwater are not considered reliable.

Figure 5, Appendix A identifies the sample locations of the elevated groundwater results reported for the October 2015 GME.

7. Quality assurance/quality control

7.1 Field QA/AC procedures

Analytical results and Relative Percent Difference (RPD) calculations for the intra- and inter-laboratory field replicates are included in the analytical results tables in Appendix B. The precision of the results for each analyte between the primary sample and the field replicates was determined by calculating the Relative Percentage Difference (RPD), as follows:

$$RPD = \frac{(Concentration 1 - Concentration 2) \times 100}{(Concentration 1 + Concentration 2) / 2}$$

Based on Australian Standard AS 4482.1-2005, a field replicate RPD within the range of 30% to 50% is considered acceptable. Generally higher RPD values occur for organic compounds than for metals and where low concentrations of an analyte are recorded.

A summary of the QA/QC procedures followed during the groundwater and soil sampling works are provided in Table 7.1 below:

Table 7.1 Field QA/QC procedures

QA/QC Requirement	Completed	Comments
Appropriate sampling strategy used and representative samples collected	Yes	Soil Program Soil samples were collected from soil cores using a fresh pair of disposable gloves and a trowel, which was decontaminated prior to use. Geoprobe drilling techniques were used to obtain the soil core which was retained within a disposable sleeve to avoid cross contamination. Field sampling details were recorded on soil bore logs included in Appendix G. Groundwater Program Hydra-sleeve no purge sampling technique was utilised during the April and October GME. The adopted sampling methodology is an industry and regulatory accepted method.
Field instruments calibrated	Yes	Field equipment including PID and water quality meter were either calibrated by the hire company or calibrated in the field prior to use. Refer to Appendix I.
Appropriate and well documented sample collection, handling, transportation and decontamination procedures	Yes	All sample collection and transportation was conducted in accordance with WSP Parsons Brinckerhoff Contaminated Land Management Procedures which have been developed in accordance with published industry guidelines and standards and best practice.
Chain of custody documentation completed	Yes	All samples were transported under strict WSP Parsons Brinckerhoff chain of custody procedures and signed chain of custody documents are included in Appendix N.

QA/QC Requirement	Completed	Comments
Required number (1:20) of blind field replicates collected	Yes	<p>Soil Program</p> <p>A minimum number of quality control duplicates were collected for the primary contaminants of concern.</p> <p>Groundwater Program</p> <p>The minimum number of quality control duplicates were collected for the primary contaminants of concern.</p>
Acceptable soil and groundwater QC sample RPD results	Mostly	<p>Soil Program</p> <p>The following RPD exceedances were noted for the inter-laboratory duplicate pair analysis:</p> <ul style="list-style-type: none"> ■ Sample SB34 7.3-7.5m and QA4 (inter-lab): <ul style="list-style-type: none"> ▶ TRH C₁₀-C₁₄: 109% <p>As the QC and primary sample concentrations are below the adopted assessment criteria the results are considered acceptable.</p> <p>Soil RPD results for the intra- and inter-laboratory duplicate sample pairs are included in the analytical results tables in Appendix B.</p> <p>Groundwater</p> <p>No RPD exceedances were noted for intra- and inter-laboratory duplicate sample pairs.</p> <p>Groundwater RPD results for the intra- and inter-laboratory duplicate sample pairs are included in the analytical results tables in Appendix B.</p>
Required numbers of trip and rinsate blank samples collected	Yes	<p>Soil Program</p> <p>A trip blank accompanied each sampling batch submitted to the laboratory for sampling.</p> <p>As less than 20 samples were submitted for laboratory analyses, only one rinsate sample was collected.</p> <p>Groundwater Program</p> <p>A trip blank accompanied each sampling batch submitted to the laboratory for sampling.</p> <p>A rinsate blank was collected for each day of sampling.</p>

QA/QC Requirement	Completed	Comments
Acceptable trip and rinsate blank results	Mostly	<p>All trip blank results were reported below the laboratory LOR.</p> <p>Rinsate blank results were reported below the laboratory LOR for BTEXN and TRH/TPH volatile fractions (C₆-C₁₀ and C₆-C₉) with the exception of the following:</p> <ul style="list-style-type: none"> ■ Sample: Rinsate (dated 22/09/2015): <ul style="list-style-type: none"> ▶ TPH C₁₀-C₁₄: 90 µg/L ■ Sample: Rinsate (dated 22/09/2015): <ul style="list-style-type: none"> ▶ TPH C₁₅-C₂₈: 300 µg/L ■ Sample: Rinsate (dated 22/09/2015): <ul style="list-style-type: none"> ▶ TPH C₂₉-C₃₆: 110 µg/L ■ Sample: Rinsate (dated 22/09/2015): <ul style="list-style-type: none"> ▶ TRH C₁₆-C₃₄: 370 µg/L ■ Sample: Rinsate (dated 22/09/2015): <ul style="list-style-type: none"> ▶ TRH >C₃₄-C₄₀: 100 µg/L <p>The above reported detections are an anomaly as the reported analyte concentration for all samples collected on that sample day were all below LOR, whilst if there was a problem with cross contamination it would have related to the contaminant of concern (i.e. benzene) which was reported to be below the LOR. As such, it is considered that no cross contamination occurred.</p>
Samples delivered to laboratories within sample holding times and with correct preservative(s)	Yes	Samples were delivered to the laboratories within the sample holding times and in laboratory-supplied containers prepared with the appropriate preservative (where required).

7.2 Laboratory QA/QC

Table 7.2 indicates conformance to laboratory QA/QC procedures.

The results of internal laboratory quality control procedures are provided within the laboratory analysis reports (Appendix N). The acceptance criterion for internal laboratory replicates is generally set at an RPD of 20% to 50%. Laboratory recoveries should generally be in the range 75% to 125%.

Table 7.2 Laboratory QA/QC procedures

QA/QC Requirement	Completed	Comments
Samples extracted and analysed within relevant holding times	Yes	Refer to ALS, Envirolabs and EurofinsMGT Interpretive Quality Control reports in Appendix N.
All analyses are National Association of Testing Authorities (NATA) accredited	Yes	ALS, Envirolabs and EurofinsMGT are NATA accredited for all the analyses performed.
Appropriate analytical methodologies used, in accordance with Schedule B(3) of the NEPM	Yes	<p>ALS: Refer to the Interpretive Quality Control reports in Appendix N for methods used and relevance to Schedule B(3) of the NEPM.</p> <p>EurofinsMGT: Refer to the Certificate of Analysis in Appendix N.</p> <p>Envirolab: Refer to the Certificate of Analysis in Appendix N.</p>
Acceptable LORs adopted	Yes	<p>The laboratory LORs for soil and groundwater were below the adopted assessment criteria for the contaminants of concern.</p> <p>A summary of the limits of reporting adopted are provided in the laboratory analysis reports in Appendix N.</p>

QA/QC Requirement	Completed	Comments
Acceptable laboratory QC results	Mostly	<p>Soil</p> <p>The results of internal laboratory quality control procedures are provided within the laboratory analysis reports (Appendix N). All internal laboratory QC samples, including method blanks, laboratory control samples, matrix spikes and surrogates, were reported within the acceptable ranges with the exception of the following:</p> <ul style="list-style-type: none"> ■ ALS Report EB1529964 <ul style="list-style-type: none"> ▶ Quality control sample frequency (laboratory duplicates and matrix spikes) not within specifications for TRH – semivolatile fractions. <p>Groundwater</p> <p>The results of internal laboratory quality control procedures are provided within the laboratory analysis reports (Appendix N). All internal laboratory QC samples, including method blanks, laboratory control samples, matrix spikes and surrogates, were reported within the acceptable ranges with the exception of the following:</p> <ul style="list-style-type: none"> ■ ALS Report EB1517239 <ul style="list-style-type: none"> ▶ Quality control sample frequency (laboratory duplicates, method blanks, control samples and matrix spikes) not within specifications for TRH – semi-volatile fractions, sulfate and nitrate. ▶ Matrix spike recoveries were unable to be determined for sulfate and methane as background level greater than 4x spike level. ■ ALS Report EB1529964 <ul style="list-style-type: none"> ▶ Quality control sample frequency (laboratory duplicates and matrix spikes) not within specifications for TRH – semivolatile fractions. ▶ Matrix spike recoveries less than lower data quality objective for TRH/TPH – semi-volatile fractions. ■ ALS Report EB1530452 <ul style="list-style-type: none"> ▶ Quality control sample frequency (laboratory duplicates and matrix spikes) not within specifications for TRH – semivolatile fractions. ▶ Matrix spike recoveries were unable to be determined for TRH – volatile Fractions and BTEX as background level greater than 4x spike level.

Overall, it is considered that the QA/QC procedures and results were adequate and that the analytical results obtained were of acceptable quality for the purposes of this report.

8. Discussion

8.1 Investigation works

The findings for the investigative works conducted during this investigation can be summarised with respect to on-site findings and off-site findings as provided below.

8.1.1 On-site investigative works - findings

Based on the on-site investigative works conducted the on-site findings are as follows:

- The groundwater elevations on-site ranges from 103.154m AHD (MW34) to 102.444m AHD (MW36) which generally relates to approximately 7.40m to 6.59 m BGL on-site.
- Groundwater is flowing from the south/south-west to north/north-east direction across the site.
- Bands of potential VOCs were identified during MIP vertical profiling from:
 - ▶ 1.8m to 3.5m and from 5.8 to 7.5m BGL within SB34 which is located within an area formerly occupied by the former service station.
 - ▶ 6.4m to 6.7m BGL within SB36a which is down hydraulic gradient of the area formerly occupied by the depot.
 - ▶ 9.2m to 9.4m BGL within SB36b which is down hydraulic gradient of SB36a and the area formerly occupied by the depot.
- Soils encountered during the intrusive investigation indicated that the general soil profile overlying the site comprises medium to high plasticity stiff silty clay/sandy clay/clay with sand and gravel lenses through-out the soil profile to a depth of 12 mBGL.
- Reported TRH (C₆-C₁₀) less BTEX concentrations collected from soil bores SB33 (6.9 to 7.0m) and SB34 (2.3 to 2.5m) exceeded the adopted assessment criteria for soil (i.e. HSLs for low - high density residential vapour intrusion).
- Reported benzene concentrations collected from soil bores SB33 (6.9 to 7.0m) and SB34 (2.3 to 2.5m) exceeded the adopted assessment criteria for soil (i.e. HSLs for low - high density residential vapour intrusion).
- The reported soil impact for SB33 (6.9 to 7.0m) is consistent with a residual soil impact within the smear zone.
- The reported soil impact for SB34 (2.3 to 2.5m) is consistent with a residual soil impact.
- The extent of the residual soil hydrocarbon impact has been delineated to the east of SB36b; however, the extent of the residual soil hydrocarbon impact to the south of MW34 has not been delineated.
- Reported benzene concentrations for groundwater samples collected from on-site monitoring wells MWA, MWB, MW34 and MW36 exceeded the adopted groundwater assessment criteria (i.e. GILs and the HSLs for residential land use via vapour inhalation pathway for groundwater 4m - <8m and site lithology of clay).
- Reported benzene concentration for the groundwater sample collected from on-site monitoring well MW33 exceeded the GIL assessment criteria.
- Reported TRH fractions were detected within the on-site monitoring wells which also reported benzene; however, as the TRH fractions are not limiting for the depth to groundwater and soil classification no exceedances of TRH assessment criteria occurred.

- The extent of the groundwater hydrocarbon impact has not been delineated to the east of MW36 which marginally exceeds the adopted assessment criteria and to the south of MW34.
- Comparing the April 2015 GME results against the October 2015 GME results indicates that the monitoring wells with screened intervals across the measured depth to groundwater reported significantly higher hydrocarbon concentrations. As such, results reported for monitoring wells with the screened interval below the measured depth to groundwater are not considered reliable.

8.1.2 Off-site investigative works - findings

Based on the off-site investigative works conducted the off-site findings are as follows:

- The groundwater elevations on-site ranges from 103.21m AHD (MW23) to 102.674m AHD (MW32) which generally relates to approximately 8.383m to 7.245 m BGL.
- Groundwater is flowing to in a north/north-east direction towards Sandy Creek.
- As for the on-site intrusive works the soils encountered during the off-site intrusive investigation indicated that the general soil profile encountered comprises medium to high plasticity stiff silty clay/sandy clay/clay with sand and gravel lenses through-out the soil profile to a depth of 12m BGL.
- Reported TRH (C₆-C₁₀) less BTEX concentrations collected from soil bore SB31 (7.0 to 7.1m) exceeded the adopted assessment criteria for soil (i.e. HSLs for low - high density residential vapour intrusion).
- Reported benzene concentrations collected from soil bores SB31 (7.0 to 7.1m) and SB32 (7.2 to 7.3m) exceeded the adopted assessment criteria for soil (i.e. HSLs for low - high density residential vapour intrusion).
- The reported soil impacts for SB31 (7.0 to 7.1m) and SB32 (7.2 to 7.3m) are consistent with residual soil impacts within the smear zone.
- The extent of the residual hydrocarbon impact has not been delineated to the north-east of MW31 and MW32.
- Reported benzene concentrations for groundwater samples collected from off-site monitoring wells MW30, MW31 and MW32 exceeded the adopted groundwater assessment criteria (i.e. GILs and the HSLs for residential land use via vapour inhalation pathway for groundwater 4m - <8m and site lithology of clay).
- Reported TRH fractions were detected within the off-site monitoring wells which also reported benzene; however, as the TRH fractions are not limiting for the depth to groundwater and soil classification no exceedances of TRH assessment criteria occurred.
- The extent of the groundwater hydrocarbon impact has not been delineated to the north-east of MW30, MW31 and MW32.

8.2 Conceptual site model

A conceptual site model (CSM) for the site was developed following a review of historical data and the findings of the April 2015 and October 2015 GME's. It should be noted that the historical analytical groundwater data has mostly been discounted as the reported results are considered to be negatively biased by the monitoring well screens not transecting the groundwater table and not providing a true indication of the contaminant concentrations present. The CSM is provided in Table 8 below.

Table 8.2 Conceptual site model

Site description	The site is currently vacant land which was formerly occupied by a service station and depot. It is believed that all underground fuel related storage infrastructure has been removed from site; however, no documentation has been provided that verifies this.
Surrounding land uses	<p>Surrounding land uses are as follows:</p> <ul style="list-style-type: none"> ■ North – vacant land zoned for residential use. ■ East – rail easement followed by vacant land and commercial land use. ■ South – residential and vacant land. ■ West – residential land use and Ipswich Street followed by residential land use. <p>Historically it is understood that a property to the west of the site and across Ipswich Road formerly operated as a fuel distributor.</p>
Site geology	The natural soil profile on-site comprises medium to high plasticity stiff silty clay/sandy clay/clay with lateral lenses of sand and gravel down the soil profile to a depth of 12 m below ground level (BGL). Some of the sand and gravel lenses were observed to be cemented.
Site hydrogeology	The on-site corrected measured groundwater elevations were between 103.154 m AHD (MW34) to 102.444 m AHD (MW36). Groundwater generally flows from the south/south-west to north/north-east direction across the site towards Sandy Creek. The gradient of the groundwater table across the site was approximately 0.014 m/m in a north-easterly direction (calculated between MW34 and MW36). The hydraulic conductivity and seepage velocity for the site was formerly determined to be 0.001 – 0.1m/d and 0.045 – 4.57m/yr respectively.
Nature and extent of contamination	<p>Off-site Impacts</p> <p><u>Soil:</u></p> <p>Residual hydrocarbon impacts have been identified within the smear zone of the soil profile of off-site monitoring wells MW31 and MW32. The residual hydrocarbon impacts (i.e. benzene and TRH (C₆-C₁₀)) exceed the human health risk from the vapour exposure pathway for residential land use. The extent of the residual hydrocarbon impact has not been delineated to the north-east of MW31 and MW32.</p> <p><u>Groundwater:</u></p> <p>Groundwater hydrocarbon impacts have been identified within off-site monitoring wells to the north-east of the site. The identified benzene concentrations within the groundwater exceed the human health risk from the vapour exposure pathway for residential land use. The extent of the groundwater hydrocarbon impact has not been delineated to the north-east of MW30, MW31 and MW32.</p> <p>On-site Impacts</p> <p><u>Soil:</u></p> <p>Drilling undertaken in 2015 identified residual hydrocarbon impacts within the smear zone of the soil profile of on-site monitoring wells MW33 and within the soil profile encountered from 1.8-3.5m depth of MW34. The residual hydrocarbon impacts (i.e. benzene and TRH (C₆-C₁₀)) exceeded the human health risk from the vapour exposure pathway for residential land use. The locations of MW33 and MW34 relate to the former locations of the service station and depot. The extent of the hydrocarbon impact has been delineated to the east of MW36. However, the extent of residual soil impact to the south of MW34 has not been delineated.</p> <p><u>Groundwater:</u></p> <p>Groundwater hydrocarbon impacts have been identified to exceed adopted assessment criteria within on-site monitoring wells which have screens that transect the groundwater table. The identified benzene concentrations within the groundwater exceed the human health risk from the vapour exposure pathway for residential land use. The extent of the groundwater hydrocarbon impact has not been delineated to the east of MW36 which marginally exceeds the adopted assessment criteria and to the south of MW34.</p>

Potential receptors	<p>Potential receptors include:</p> <ul style="list-style-type: none"> ■ site workers undertaking future construction during future development of the site. ■ site workers undertaking future construction during future development of adjoining vacant land. ■ the freshwater ecosystem of Sandy Creek. ■ recreational users of Sandy Creek. ■ future residents of houses constructed on-site within the eastern portion of the site. ■ future residents of houses constructed off-site within the adjoining land to the north-east of the site.
Potential exposure pathways	<p>Potential exposure pathways include:</p> <ul style="list-style-type: none"> ■ vapour intrusion into future on-site residences within the eastern portion of the site. ■ vapour intrusion into future off-site residences to the north-east of the site. ■ vapour intrusion into offsite properties (residential homes located to the west and south of the site) ■ discharge of impacted groundwater into Sandy Creek.

9. Conclusions

Based on the findings of this investigation, the following conclusions have been made:

9.1 On-site

- Residual hydrocarbon impacts are present in soil in the vicinity of SB34 from 1.8 to 3.5m depth which is within an area formerly occupied by a service station. The residual soil hydrocarbon impact has not been delineated to the south of SB34.
- The extent of the residual soil hydrocarbon impact has been delineated to the east of SB36b.
- The identified benzene concentrations within the groundwater on-site exceed the human health risk from the vapour exposure pathway for residential land use. The extent of the groundwater hydrocarbon impact has not been delineated to the east of MW36 which marginally exceeds the adopted assessment criteria and to the south of MW34.
- No LNAPL was observed during on-site groundwater sampling.
- Future works would require delineation of residual soil impacts to the south of SB34 which is anticipated to be to a depth of 3.5m. In addition a risk assessment will be required to determine if groundwater impacts to the south of MW34 and to the east of MW36 are acceptable for human health risk from the vapour exposure pathway for the future land use (residential).

9.2 Off-site

- Residual hydrocarbon impacts have been identified within the smear zone of the soil profile of off-site monitoring wells MW31 and MW32. The residual hydrocarbon impacts (i.e. benzene and TRH (C₆-C₁₀)) exceed the human health risk from the vapour exposure pathway for residential land use. The extent of the residual hydrocarbon impact has not been delineated to the north-east of MW31 and MW32.
- Groundwater hydrocarbon impacts have been identified within off-site monitoring wells to the north-east of the site. The identified benzene concentrations within the groundwater exceed the human health risk from the vapour exposure pathway for residential land use. The extent of the groundwater hydrocarbon impact has not been delineated to the north-east of MW30, MW31 and MW32.
- No LNAPL was observed during off-site groundwater sampling.
- Future works would require delineation of the groundwater impact to the north-east of monitoring wells MW30, MW31 and MW32. In addition a risk assessment will be required to determine if residual soil and groundwater impacts to the north-east of MW30, MW31 and MW32 are acceptable for human health risk from the vapour exposure pathway for the future land use (residential).

10. Proposed remedial strategy

10.1 Remedial strategy objectives

The objectives of the proposed remedial strategy for the site are as follows:

- Proposed remedial strategy to protect human health and environmental risks
- Optimise return on site divestment.

10.2 Remedial strategy considerations

The following areas are addressed:

1. Soil impact
2. Groundwater impact
3. Soil vapour
4. Subdivision and divestment
5. Stakeholder engagement (off-site impact)

10.2.1 Soil

The geology of the general area, which includes the site comprises medium to high plasticity stiff silty clay/sandy clay/clay with lateral lenses of sand and gravel down the soil profile to a depth of at least 12 m BGL. Historical petroleum hydrocarbon releases from point sources (underground tanks) has resulted in the petroleum hydrocarbon impacts migrating laterally out rather than vertically down. As a result residual soil hydrocarbon impacts have been observed laterally out and down hydraulic gradient from the release point within the smear zone.

The area formerly used as a service station has residual hydrocarbon soil impacts from 1.8m to 3.5m BGL. The residual soil hydrocarbon impact relates to the volatile fraction which exceeded the adopted HSL assessment criteria for soil for low - high density residential vapour intrusion.

10.2.2 Groundwater

The depth to groundwater within the general area including the site and the adjoining property to the north-east of the site ranges from 8.383m to 6.59 m BGL. The groundwater is flowing in a north-east direction towards Sandy Creek, which is located approximately 150 m east of the site.

Reported benzene concentrations ranged from 1 µg/L to 54,300 µg/L, with the highest concentration reported in off-site monitoring well MW32 to the north-east of the site. Reported TRH (C₆ – C₁₀) less BTEX concentrations ranged from 20 µg/L to 41,700 µg/L with the highest concentration reported in off-site monitoring well MW32.

The extent of the petroleum hydrocarbon impact has not been delineated to the:

- ▶ north-east of the site;
- ▶ east of on-site monitoring well MW36; and

- ▶ South of on-site monitoring well MW36

No LNAPL was observed during on-site and off-site groundwater sampling.

10.2.3 Soil vapour

Soil vapour investigations have not been undertaken, therefore the vapour exposure risk from soil and groundwater impact has not yet been determined. Based on the depth to groundwater and soil impacts biodegradation may result in the observed TRH (C₆-C₁₀) and benzene concentrations being acceptable for human health risk from the vapour exposure pathway provided the appropriate conditions exist.

10.2.4 Subdivision and divestment

The objective of this portion of the remediation strategy is to optimise the return on site divestment. Investigations to date indicate that:

- The south-eastern portion of the site has not been impacted by historical site operations
- The north-eastern portion of the site has been marginally impacted
- The north-western portion has been impacted.

To facilitate divestment of the site and to optimise the return, subdivision of the site may allow 'clean' portions of the site to be removed from the EMR and divested at a higher value, with the remaining, impacted portion of the site undergoing long-term remediation.

10.2.4.1 Considerations

Zoning

The site is in a residential-zoned area, which currently limits development to predominantly residential land uses. Light commercial development would be subject to Somerset Regional Council (SRC) approval.

Market demand

The market demand and demographic (high-, medium-, low-density residential, light commercial, first home buyers, retirees, etc.) shall be investigated to determine the properties' market value and target market.

Council and State agency requirements

The SRC, Department of Transport and Main Roads (TMR) and the EHP will have their specific requirements and WSP | Parsons Brinckerhoff will liaise with these agencies to understand development options.

We understand a specific access requirement of SRC is that the minimum access width to a property is 18 metres.

10.2.4.2 Configuration

Figure 7, Appendix A shows areas of the site that:

1. (Green shade) May be removed from the EMR with relatively minor effort
2. (Orange shade) May be removed from the EMR with either:
 - a. An adjustment of the western boundary (groundwater impact not delineated to the east of MW36, or

b. With some remediation works

3. (Red shade) Require ongoing remediation to reduce risk to human health and will unlikely be removed from the EMR.

Due to the SRC access requirement, a portion of the site is proposed as an easement accessing all portions of the site, as shown in Figure 7, Appendix A.

Following a review of potential purchases and initial discussions with government agencies has been undertaken, there will be sufficient information to determine whether to:

1. Subdivide the site into large portions, for sale to a developer
2. Subdivide the site into smaller, saleable lots
3. Make no changes to the site configuration.

10.2.4.3 Timing

Market research and agency liaison may take up to 2 months.

The reconfiguration process may take between 6-12 months.

10.2.5 Stakeholder engagement

With consideration to the adjacent property:

- Soil and groundwater hydrocarbon concentrations exceed nominated criteria;
- The property is currently open space;
- The property is for sale.

Based on the above considerations it is recommended that stakeholder engagement with the property owner to be undertaken prior to and during remediation works to:

- Prevent delays'
- Maintain positive relationships
- Maintain positive reputations.

10.3 Remedial strategy development

Remedial strategy is required for the following:

- Residual volatile hydrocarbon soil impact from 1.8m to 3.5m BGL within the area formerly used as a service station.
- Hydrocarbon impacted groundwater and residual soil impacts within the smear zone (on and off site) relating to former releases from point sources.

10.3.1 Residual volatile hydrocarbon soil impact

Based on the above remedial strategy considerations, a review of potential remedial approaches was undertaken. The outcome of the review is provided in Table 10.1.

Table 10.1 Review of residual volatile soil remedial approaches

Remedial approach	Approach summary	Effective in removing impact?	Technology applicability in context of site	Technology deemed appropriate?
Cover and cap	Strategy is a management strategy where by a suitable cover is placed over the impacted area to prevent contact by site occupants and limit infiltration.	No – impact remains on site.	Installation of a capping layer would only be considered appropriate for commercial/industrial use.	Potentially appropriate where the impacted portion of the is reconfigured for commercial use
Bio-remediation	Petroleum hydrocarbons are broken down by naturally occurring bacteria are stimulated by introducing inorganic nutrients (nitrogen and phosphate) and oxygen. Oxygen availability is normally the limiting factor which can be supplied using various methods including excavation and tilling	Effective in removal volatile petroleum hydrocarbons.	As the site is vacant and has sufficient area to accommodate bio-remediation by land-farming be used Cost of excavation may be prohibitive.	Potentially appropriate where depth and the volume of impacted soil excavation can be limited as much as possible.
Thermal desorption	Thermal desorption uses heat to desorb and volatilise the contaminants. The treatment requires the provision of a system to supply the heat (i.e. injection of hot water, air or steam)	Yes – is effective in removing volatile hydrocarbons	Thermal desorption is considered not appropriate based on cost considerations to implement and run the system.	Discounted

10.3.2 Groundwater and smear zone impact

Based on the remedial strategy considerations, in Section 10.3.2, a review of potential remedial approaches was undertaken to remediate the dissolve-phase hydrocarbons within the groundwater and the residual soil impacts. The remedial approaches for hydrocarbon impacted groundwater and the residual soil impacts within the smear zone are considered to be mutually inclusive, based on the nature of the contaminant of concern mostly comprises the volatile hydrocarbon fraction. The outcome of the review is provided in Table 10.2.

Table 10.2 Review of groundwater and smear zone residual soil remedial approaches

Remedial approach	Approach summary	Effective in removing dissolved impact?	Technology applicability in context of site	Technology deemed appropriate?
Air sparging	Air is injected in-situ through the contaminated aquifer creating an underground air stripping effect removing volatile contaminants. A vapour extraction system is typically used to remove vapours generated. Typically used in unconfined permeable aquifers.	Yes - effective on dissolved hydrocarbons.	High cost to install and operate. Installation and operation would impact on adjacent property to the north-east of the site as large proportion of the impacted groundwater is off-site. Difficult to obtain adequate coverage, due to limiting geology.	Discounted
In situ bioremediation	Petroleum hydrocarbons are destroyed insitu. Naturally occurring bacteria are stimulated by introducing inorganic nutrients (nitrogen and phosphate) and oxygen. Oxygen availability is normally the limiting factor which can be supplied using air sparging, hydrogen peroxide or other oxygen releasing agents.	Yes – effective on both dissolved and adsorbed phase hydrocarbons.	Would require high density of multiple injection points and monitoring wells in order to be effective on this site. Installation and operation would impact on adjacent property to the north-east of the site as large proportion of the impacted groundwater is off-site.	Discounted
In situ chemical oxidation (ISCO) and oxygen curtain (ISOC™) technology	A chemical (oxidant) is mixed with contaminants to cause a chemical breakdown of petroleum hydrocarbons.	Remedial approach is not appropriate for LNAPL or high dissolve phase concentrations within a limiting geology (close to solubility limit).	Preferable to establish groundwater natural oxidant demand to determine oxidant quantity required. Technique requires direct contact between the oxidant and the contaminant. ISCO is typically applied through injection into the contaminant and can result in rapid breakdown of contaminants. However, based on the limiting geology this approach is not considered appropriate.	Discounted
Active groundwater recovery / containment (pump and treat)	Recovery typically involves recovery wells or well points. Recovery wells are used where soils have a high permeability and sufficient saturated thickness. Well points with well diameters less than recover wells are typically used in lower	Effective in both LNAPL and dissolved phase.	The system would incur a significant cost to install and operate. The geology of impacted soils is considered not to be a limiting factor for this technology.	Discounted

Remedial approach	Approach summary	Effective in removing dissolved impact?	Technology applicability in context of site	Technology deemed appropriate?
	permeability. cohesive fine grained soils with Extracted groundwater is treated on the surface and discharged either to sewer or returned to the subsurface.			
Mobile Multi-Phase Vacuum Extraction (MPVE)	Multi-phase vacuum extraction (MPVE) uses a high pressure vacuum to remove various combinations of contaminated groundwater, LNAPL and vapour from the subsurface.	Yes – can be very effective in LNAPL removal, but often limited by the conductivity of aquifer.	Mobile MPVE offers a significantly lower capital expenditure cost compared with a semi-permanent MPVE and is an aggressive approach to remove contaminant mass. Considered that periodic MPVE events could be beneficial in removing contaminant mass. Effectiveness would probably drop off quickly but an initial use may be beneficial. Newly installed wells where screens are installed at correct depths are considered to be suitable MPVE.	Potentially appropriate
Monitored Natural Attenuation	Monitored natural attenuation (MNA) is a passive remediation approach that relies on natural processes to degrade hydrocarbon compounds. A combination of physical and chemical processes includes aerobic and anaerobic degradation, chemical dispersion, chemical volatilisation and adsorption, and all result in hydrocarbon concentrations decreasing over time.	Effective on dissolved impacts with limited effect on LNAPL over typical timelines. Natural attenuation can be stimulated by more active technologies	MNA is considered an appropriate approach in conjunction with an active technology for the following reasons: Low cost and undertaken in conjunction with ongoing monitoring. Minimal disruption to operator and residents MNA will confirm the effectiveness of processes at reducing contaminant mass.	Potentially appropriate in conjunction with another approach

10.4 Recommended remedial strategy

With respect to the remedial strategy considerations and development the following is provided in relation to the concept configuration shown on Figure 7 (Appendix A) and off-site impacts:

- Green shaded area – no remediation required.
- Orange shaded area – requires further investigation to ensure no unacceptable risk to human health and the location of the boundary to enable the portion of land to be removed from the EMR.

- Red shaded area - requires further investigation to ensure no unacceptable risk to human health for the use of the portion of land whether it be for residential or commercial use. The remedial approach would comprise MNA and periodic MPVE events.
- Off-site impacts - requires further investigation to ensure no unacceptable risk to human health for residential use. The remedial approach would comprise MNA and periodic MPVE events.
- Stakeholder engagement should be undertaken prior to the commencement works.
- Market research will be undertaken to determine the most appropriate configuration.

Although the above remedial strategy has been provided, the adopted remedial strategy would need review by an EHP approved auditor.

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11. References

- Australian Standard AS4482.1, 2005, Guide to the investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds.
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- National Environment Protection Council, 2013. National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended in 2013 (NEPM, 1999).
- Coffey Environments, Environmental Site Assessment Summary Spreadsheet, Former Ampol Depot Esk (11800) 2008 and 2011
- Coffey Environments, Site Survey Checklist and Condition Report, Former Caltex Depot Esk (11800) 29 February 2008.
- CMPS&F, Site Management Plan, Former Solo Service Station, 255 Ipswich Road, Esk, Australian Petroleum Pty Ltd 9 July 1997

12. Limitations

Caltex ECRW Reporting Limitation Statement

4. This Report has been prepared by WSP | Parsons Brinckerhoff Australia Pty Limited ("*WSP | Parsons Brinckerhoff*") for the benefit of Caltex Australia Petroleum Pty Ltd ("*Caltex*"), the registered proprietor or tenant of the site requested to be investigated by WSP | Parsons Brinckerhoff ("*Site*") under its agreement with Caltex dated 22 September 2014 ("*Agreement*").
5. The nature and extent of the environmental consulting and remediation works at the Site detailed in the Report reflects the scope of the Services set out in the Request for Proposal under the Agreement and the Scope of Works set out in section 1.2 of Schedule 1 of the Agreement ("*Scope of Works*").
6. A potential purchaser (but not including a purchaser's successor in title) of the Site may rely on the findings contained in the Report for the purpose of considering the possible (but not actual) level of contamination of or at that Site at the time of the contamination assessment of the Site was undertaken ("*Permitted Purpose*").
7. The registered proprietor of the land to which the report relates at the time of writing the report (but not including any proprietor's successor in title) may rely on the findings contained in the Report for the purpose of assessing the possible level of contamination of that Site ("*Permitted Purpose*") and subject to the limitations set out in the Scope of Works.
8. The findings contained in the Report are subject to the qualifications, assumptions and limitations set out in the Report or otherwise communicated to, or by, Caltex. To the extent of any inconsistency between this Limitation Statement and the qualifications, assumptions and limitations in the Report, this Limitation Statement shall prevail.
9. The Report may contain information provided by others. Except as otherwise stated in the Report, WSP | Parsons Brinckerhoff has not verified the accuracy or completeness of this information. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the Report ("*Conclusions*") are based in whole or in part on this information, those Conclusions are contingent upon the accuracy and completeness of that information. WSP | Parsons Brinckerhoff accepts no responsibility for the reliability, accuracy, completeness or adequacy of information provided by others.
10. WSP | Parsons Brinckerhoff has prepared the Report without regard to any special or particular interest of any person (including that of a potential purchaser), other than Caltex when undertaking the Services or setting out its findings in the Report.
11. The Report can only be relied upon for the Permitted Purpose and may not be relied upon for any other purpose and does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the Site ("*Investment Decision*").
12. Matters material to a potential purchaser, may have been omitted from the Report, or may not have been investigated because of the scope of the Services. It follows that a potential purchaser should be cognisant of the restrictions inherent in or otherwise set out in the Report and should commission the preparation of a contamination assessment of the Site that caters for its own interests and scope of services, and which will provide findings in relation to the level of contamination of or at the Site at the time the potential purchaser is making an Investment Decision.
13. The Report has not and will not be updated for events occurring after the date of the Report or any other matter which may have a material effect on its contents which come to light after the date of the Report. WSP | Parsons Brinckerhoff will not be obliged to inform a potential purchaser of any matter arising or coming to its attention after the date of the Report, which may affect or qualify the Report.

14. WSP | Parsons Brinckerhoff is not liable to a potential purchaser in respect of errors or omissions in the Report which a potential purchaser knows of, or ought to be aware of, from:
 - a) its own actual knowledge and inquiries
 - b) inquiries made by its advisers; or
 - c) matters which a potential purchaser should have been aware of by making reasonable inquiry (including the inquiries recommended at Item 9 above).
15. To the fullest extent permitted at law, WSP | Parsons Brinckerhoff, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable to any potential purchaser for, or in relation to, any losses, damages or expenses (including any indirect, consequential or punitive losses or damages or any amounts for loss of income or profit, revenue or loss of opportunity to earn profit, loss of production, loss of contract, increased operational costs, loss of business opportunity, business interruption and pure economic loss) of any kind (and whether arising in contract, tort (including negligence), under statute, in equity or otherwise, suffered or incurred by a potential purchaser (or any other third party) arising out of or in connection with any matter outside the ambit of the Permitted Purpose in relation to the Report or findings expressed in the Report.

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Appendix A

Figures





 Site boundary



Data source: ESRI, DigitalGlobe, GeoEye,
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Map no: 2201681A_GIS_002_C

Author: MB

Approved by: JT

Date: 30/10/2015



1:8,000



Scale ratio correct when printed at A4
Projection: Transverse Mercator
Coordinate system: GDA 1994 MGA Zone 56

Site ID: 11800, Caltex Esk - Investigation and Remediation Strategy
255-259 Ipswich Street, Esk, QLD

Figure 1
Locality plan



Data source: Google Earth 2014,
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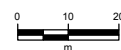
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Author: MB

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Date: 30/10/2015



1:1,500

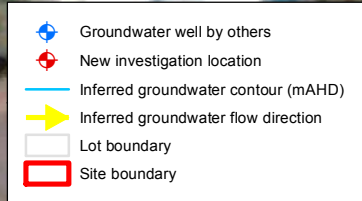
Scale ratio correct when printed at A4
Projection: Transverse Mercator
Coordinate system: GDA 1994 MGA Zone 56

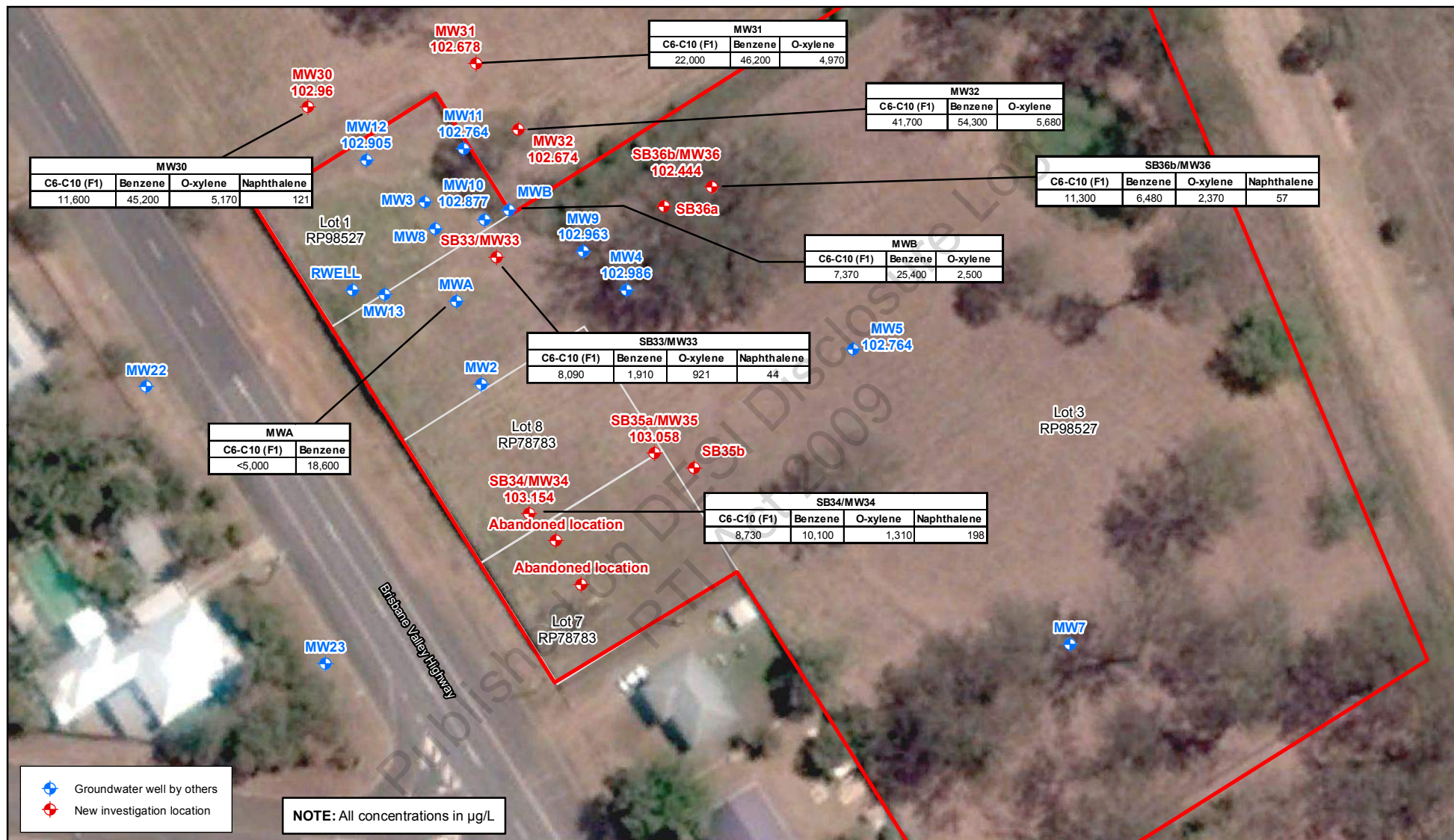
Site ID: 11800, Caltex Esk - Investigation and Remediation Strategy
255-259 Ipswich Street, Esk, QLD
Figure 2

Site layout and well locations prior to 2015











Appendix B

Analytical results tables



Table 1. Groundwater results summary table

	Units	EQL	NEPM 2013 GILs, Fresh Waters(A)	NEPM HSL-A/B Residential for Vapour Intrusion, 4m to <8m, Clay	NEPM HSL-D Commercial/In dustrial for Vapour Intrusion, 4m to <8m, Clay	Location	MWA	MWB	MW2	MW3	MW4	MW5	MW7
						Sample date	22/04/2015	22/04/2015	22/04/2015	22/04/2015	21/04/2015	21/04/2015	21/04/2015
						Lab batch ID	EB1517239	EB1517239	EB1517239	EB1517239	EB1517239	EB1517239	EB1517239
EP033: C1 - C4 Hydrocarbon Gases													
Methane	mg/L	0.01					9.71	9.08	-	-	0.027	<0.01	-
EG051G: Ferrous Iron by Discrete Analyser													
Ferrous Iron	mg/L	0.05					0.07	0.37	-	-	0.94	0.6	-
EK058G: Nitrate as N by Discrete Analyser													
Nitrate (as N)	mg/L	0.01					<0.01	0.08	-	-	-	<0.05	-
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA													
Sulfate as SO4 - Turbidimetric (Filtered)	mg/L	1					<1	<25	-	-	-	<25	-
EP080/071: Total Petroleum Hydrocarbons													
+C10 - C36 (Sum of total)	µg/L	50					1620	4820	<50	<50	120	<50	110
C10 - C14 Fraction	µg/L	50					1340	4500	<50	<50	120	<50	<50
C15 - C28 Fraction	µg/L	100					280	320	<100	<100	<100	<100	110
C29-C36 Fraction	µg/L	50					<50	<50	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
C10 - C16 Fraction	µg/L	100					1280	2680	<100	<100	<100	<100	<100
C16 - C34 Fraction	µg/L	100					200	240	<100	<100	100	<100	120
C34 - C40 Fraction	µg/L	100					<100	<100	<100	<100	<100	<100	<100
C10 - C40 Fraction (Sum)	µg/L	100					1480	2920	<100	<100	100	<100	120
TRH >C10-C16 less Naphthalene (F2)	µg/L	100					1280	2680	<100	<100	<100	<100	<100
EP080/071: Total Petroleum Hydrocarbons													
C6 - C9 Fraction	µg/L	20					20,300	47,500	<20	<20	1120	<20	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
C6 - C10 Fraction minus BTEX (F1)	µg/L	20					<5000	7370	<20	<20	<1000	<20	<20
TPH C6-C10	µg/L	20					20,900	50,700	<20	<20	1190	<20	<20
EP080: BTEXN													
Benzene	µg/L	1	950	5000	30000		18,600	25,400	<1	<1	554	<1	<1
Toluene	µg/L	2					<250	6700	<2	<2	56	<2	<2
Ethylbenzene	µg/L	2					1000	1560	<2	<2	<50	<2	<2
Naphthalene	µg/L	5	16				<250	<250	<5	<5	<50	<5	<5
Xylene (m & p)	µg/L	2					<500	7170	<2	<2	148	<2	<2
Xylene (o)	µg/L	2	350				<250	2500	<2	<2	81	<2	<2
Xylene Total	µg/L	2					<250	9670	<2	<2	229	<2	<2
Total BTEX	µg/L	1					19,600	43,300	<1	<1	839	<1	<1

Table 1. Groundwater results summary table

	Units	EQL	NEPM 2013 GILs, Fresh Waters(A)	NEPM HSL-A/B Residential for Vapour Intrusion, 4m to <8m, Clay	NEPM HSL-D Commercial/In dustrial for Vapour Intrusion, 4m to <8m, Clay	Location	MW9	MW10	MW11	MW12	MW13	MW23
						Sample date	22/04/2015	22/04/2015	22/04/2015	22/04/2015	22/04/2015	21/04/2015
						Lab batch ID	EB1517239	EB1517239	EB1517239	EB1517239	EB1517239	EB1517239
EP033: C1 - C4 Hydrocarbon Gases												
Methane	mg/L	0.01					-	-	-	-	0.48	<0.01
EG051G: Ferrous Iron by Discrete Analyser												
Ferrous Iron	mg/L	0.05					-	-	-	-	1.17	<0.05
EK058G: Nitrate as N by Discrete Analyser												
Nitrate (as N)	mg/L	0.01					-	-	-	-	<0.1	0.04
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA												
Sulfate as SO4 - Turbidimetric (Filtered)	mg/L	1					-	-	-	-	<25	30
EP080/071: Total Petroleum Hydrocarbons												
+C10 - C36 (Sum of total)	µg/L	50					<50	270	310	820	540	180
C10 - C14 Fraction	µg/L	50					<50	100	100	300	150	<50
C15 - C28 Fraction	µg/L	100					<100	170	210	520	320	<100
C29-C36 Fraction	µg/L	50					<50	<50	<50	<50	70	180
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions												
C10 - C16 Fraction	µg/L	100					<100	210	170	560	200	<100
C16 - C34 Fraction	µg/L	100					100	<100	160	260	320	210
C34 - C40 Fraction	µg/L	100					<100	<100	<100	<100	<100	<100
C10 - C40 Fraction (Sum)	µg/L	100					100	210	330	820	520	210
TRH >C10-C16 less Naphthalene (F2)	µg/L	100					<100	210	170	560	200	<100
EP080/071: Total Petroleum Hydrocarbons												
C6 - C9 Fraction	µg/L	20					90	<20	<20	320	20	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions												
C6 - C10 Fraction minus BTEX (F1)	µg/L	20					30	<20	<20	50	<20	<20
TPH C6-C10	µg/L	20					100	<20	<20	350	20	<20
EP080: BTEXN												
Benzene	µg/L	1	950	5000	30000		29	<1	<1	300	10	4
Toluene	µg/L	2					12	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	2					5	<2	<2	4	<2	<2
Naphthalene	µg/L	5	16				<5	<5	<5	<5	<5	<5
Xylene (m & p)	µg/L	2					18	<2	<2	<2	<2	<2
Xylene (o)	µg/L	2	350				9	<2	<2	<2	<2	<2
Xylene Total	µg/L	2					27	<2	<2	<2	<2	<2
Total BTEX	µg/L	1					73	<1	<1	304	10	4

Table 1. Groundwater results summary table

	Units	EQL	NEPM 2013 GILs, Fresh Waters(A)	NEPM HSL-A/B Residential for Vapour Intrusion, 4m to <8m, Clay	NEPM HSL-D Commercial/In dustrial for Vapour Intrusion, 4m to <8m, Clay	Location	MW30	MW31	MW32	MW33	MW34	MW35	MW36
						Sample date	1/10/2015	1/10/2015	1/10/2015	1/10/2015	1/10/2015	1/10/2015	1/10/2015
						Lab batch ID	EB1530452	EB1530452	EB1530452	EB1530452	EB1530452	EB1530452	EB1530452
EP033: C1 - C4 Hydrocarbon Gases													
Methane	mg/L	0.01					-	-	-	-	-	-	-
EG051G: Ferrous Iron by Discrete Analyser													
Ferrous Iron	mg/L	0.05					-	-	-	-	-	-	-
EK058G: Nitrate as N by Discrete Analyser													
Nitrate (as N)	mg/L	0.01					-	-	-	-	-	-	-
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA													
Sulfate as SO4 - Turbidimetric (Filtered)	mg/L	1					-	-	-	-	-	-	-
EP080/071: Total Petroleum Hydrocarbons													
+C10 - C36 (Sum of total)	µg/L	50					7250	5440	5600	3290	20400	<50	3990
C10 - C14 Fraction	µg/L	50					6790	5040	4980	3180	16400	<50	3750
C15 - C28 Fraction	µg/L	100					460	340	550	110	3800	<100	240
C29-C36 Fraction	µg/L	50					<50	60	70	<50	180	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
C10 - C16 Fraction	µg/L	100					2950	2130	2110	1180	13900	<100	1520
C16 - C34 Fraction	µg/L	100					370	290	470	110	2530	<100	230
C34 - C40 Fraction	µg/L	100					<100	<100	<100	<100	<100	<100	<100
C10 - C40 Fraction (Sum)	µg/L	100					3320	2420	2580	1290	16400	<100	1750
TRH >C10-C16 less Naphthalene (F2)	µg/L	100					2830	2130	2110	1140	13700	<100	1460
EP080/071: Total Petroleum Hydrocarbons													
C6 - C9 Fraction	µg/L	20					116000	134000	177000	18400	26600	20	37400
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
C6 - C10 Fraction minus BTEX (F1)	µg/L	20					11600	22000	41700	8090	8730	<20	11300
TPH C6-C10	µg/L	20					121000	139000	182000	19800	28300	30	40200
EP080: BTEXN													
Benzene	µg/L	1	950	5000	30000		45200	46200	54300	1910	10100	6	6480
Toluene	µg/L	2					43700	51100	62800	5210	3570	5	13200
Ethylbenzene	µg/L	2					2380	2780	3300	589	430	<2	1090
Naphthalene	µg/L	5	16				121	<250	<250	44	198	<5	57
Xylene (m & p)	µg/L	2					13000	12000	14200	3080	4160	7	5740
Xylene (o)	µg/L	2	350				5170	4970	5680	921	1310	2	2370
Xylene Total	µg/L	2					18200	17000	19900	4000	5470	9	8110
Total BTEX	µg/L	1					109000	117000	140000	11700	19600	20	28900

Table 1A. Groundwater duplicate results summary table

	Units	EQL	Location	MWB	QC1		QC2		RB	RB	TB	MW34	QC01		QC01a		RPD2	RS1	TB1
			Sample date	21/04/2015	21/04/2015	RPD1 (ALS)	21/04/2015	RPD2 (Eurofins)	21/04/2015	22/04/2015	21/04/2015	1/10/2015	1/10/2015	RPD1 (ALS)	1/10/2015	RPD2 (Envirolab)	1/10/2015	1/10/2015	
			Lab batch ID	EB1517239	EB1517239		454959		EB1517239	EB1517239	EB1517239	EB1530452	EB1530452		135558		EB1530452	EB1530452	
EP033: C1 - C4 Hydrocarbon Gases																			
Methane	mg/L	0.01		9.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EG051G: Ferrous Iron by Discrete Analyser																			
Ferrous Iron	mg/L	0.05		0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EK058G: Nitrate as N by Discrete Analyser																			
Nitrate (as N)	mg/L	0.01		0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA																			
Sulfate as SO4 - Turbidimetric (Filtered)	mg/L	1		<25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EP080/071: Total Petroleum Hydrocarbons																			
+C10 - C36 (Sum of total)	µg/L	50		4820	4660	3%	5200	8%	-	-	-	20400	16500	21%	-	-	<50	-	
C10 - C14 Fraction	µg/L	50		4500	4370	3%	4900	9%	-	-	-	16400	13200	22%	20000	20%	<50	-	
C15 - C28 Fraction	µg/L	100		320	290	10%	300	6%	-	-	-	3800	3210	17%	4000	5%	<100	-	
C29-C36 Fraction	µg/L	50		<50	<50	-	<100	-	-	-	-	180	130	32%	<100	-	<50	-	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																			
C10 - C16 Fraction	µg/L	100		2680	2570	4%	2600	3%	-	-	-	13900	11400	20%	16000	14%	<100	-	
C16 - C34 Fraction	µg/L	100		240	210	13%	200	18%	-	-	-	2530	2150	16%	2200	14%	<100	-	
C34 - C40 Fraction	µg/L	100		<100	<100	-	<100	-	-	-	-	<100	<100	-	<100	-	<100	-	
C10 - C40 Fraction (Sum)	µg/L	100		2920	2780	5%	-	-	-	-	-	16400	13600	19%	-	-	<100	-	
TRH >C10-C16 less Naphthalene (F2)	µg/L	100		2680	2570	4%	2500	7%	-	-	-	13700	11200	20%	16000	15%	<100	-	
EP080/071: Total Petroleum Hydrocarbons																			
C6 - C9 Fraction	µg/L	20		47500	47300	0%	92000	64%	<20	<20	<20	26600	25900	3%	37000	33%	<20	<20	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																			
C6 - C10 Fraction minus BTEX (F1)	µg/L	20		7370	7760	5%	44000	143%	<20	<20	<20	8730	6680	27%	19670	77%	<20	<20	
TPH C6-C10	µg/L	20		50700	50600	0%	96000	62%	<20	<20	<20	28300	27400	3%	42000	39%	<20	<20	
EP080: BTEXN																			
Benzene	µg/L	1		25400	25300	0%	32000	23%	<1	<1	<1	10100	11900	16%	12000	17%	<1	<1	
Toluene	µg/L	2		6700	6400	5%	8200	20%	<2	<2	<2	3570	3390	5%	3400	5%	<2	<2	
Ethylbenzene	µg/L	2		1560	1530	2%	1900	20%	<2	<2	<2	430	269	46%	520	19%	<2	<2	
Naphthalene	µg/L	5		<250	<250	-	90	-	<5	<5	<5	198	183	8%	210	6%	<5	<5	
Xylene (m & p)	µg/L	2		7170	7010	2%	8700	19%	<2	<2	<2	4160	3940	5%	4700	12%	<2	<2	
Xylene (o)	µg/L	2		2500	2600	4%	3000	18%	<2	<2	<2	1310	1220	7%	1500	14%	<2	<2	
Xylene Total	µg/L	2		9670	9610	1%	12000	22%	<2	<2	<2	5470	5160	6%	-	-	<2	<2	
Total BTEX	µg/L	1		43300	42800	1%	-	-	<1	<1	<1	19600	20700	5%	-	-	<1	<1	

Table 2. Soil Results Summary Table

	EA055: Moisture Content	EP080/071: Total Petroleum Hydrocarbons				EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions					EP080/071: Total Petroleum Hydrocarbo	EP080/071: Total Recoverable Hydrocarbons		EP080: BTEXN											
	Moisture	+C10 - C36 (Sum of total)	C10 - C14 Fraction	C15 - C28 Fraction	C29-C36 Fraction	C10 - C16 Fraction	C16 - C34 Fraction	C34 - C40 Fraction	C10 - C40 Fraction (Sum)	TRH >C10-C16 less Naphthalene (F2)	C6 - C9 Fraction	C6 - C10 Fraction minus BTEX (F1)	TPH C6-C10	Benzene	Toluene	Ethylbenzene	Naphthalene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEX				
	%	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	1	50	50	100	100	50	100	100	50	50	10	10	10	0.2	0.5	0.5	1	0.5	0.5	0.5	0.2				
NEPM 2013 Table 1A(3) D Commercial/Industrial Soil HSL for Vapour Intrusion, Clay																									
0-1m												310		4											
1-2m												480		6											
2-4m														9											
>4m														20											
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay																									
0-1m									280		50		0.7	480	NL	5				110					
1-2m									NL		90		1	NL	NL	NL				310					
2-4m									NL		150		2	NL	NL	NL				NL					
>4m									NL		290		3	NL	NL	NL				NL					
NEPM 2013 EILs and ESLs																									
EIL Commercial & Industrial																	370								
EIL Urban Res & Open Space																	170								
ESL Commercial and industrial, Fine							2500	6600		170		215		95	135	185				95					
ESL Urban residential and public open space, Fine							1300	5600		120		180		65	105	125				45					
Location Code	Field_ID	Sample_Depth_Range	Sampled_Date_Time	Lab_Report_Number																					
SB30	SB30 1.9-2.0m	1.9-2	24/09/2015	EB1529964	9.6	<50	<50	<100	<100	<50	<100	<100	<50	<50	<10	<10	<10	<0.2	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.2
	SB30 5.8-5.9m	5.8-5.9	24/09/2015	EB1529964	19.9	<50	<50	<100	<100	<50	<100	<100	<50	<50	<10	<10	<10	<0.2	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.2
SB31	SB31 5.9-6.0m	5.9-6	24/09/2015	EB1529964	10	<50	<50	<100	<100	<50	<100	<100	<50	<50	58	48	74	0.5	6.6	2.3	<1	12.2	4.4	16.6	26
	SB31 7.0-7.1m	7-7.1	24/09/2015	EB1529964	14.7	140	140	<100	<100	80	<100	<100	80	80	591	398	660	17	104	16.3	1	95.6	28.6	124	262
SB32	SB32 5.9-6.0m	5.9-6	24/09/2015	EB1529964	8.2	<50	<50	<100	<100	<50	<100	<100	<50	<50	139	117	184	0.6	17.3	5.9	1	31.6	11.2	42.8	66.6
	SB32 7.2-7.3m	7.2-7.3	24/09/2015	EB1529964	10.7	<50	<50	<100	<100	<50	<100	<100	<50	<50	107	69	127	4.6	21.9	4	<1	20.1	7.4	27.5	58
SB33	SB33 4.9-5.0m	4.9-5	23/09/2015	EB1529964	8.4	<50	<50	<100	<100	<50	<100	<100	<50	<50	<10	<10	<10	<0.2	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.2
	SB33 6.9-7.0m	6.9-7	23/09/2015	EB1529964	11.7	90	90	<100	<100	<50	<100	<100	<50	<50	380	249	450	12	76.3	14.7	1	71.9	26.2	98.1	201
SB34	SB34 2.3-2.5m	2.3-2.5	23/09/2015	EB1529964	18.6	70	70	<100	<100	<50	<100	<100	<50	<50	468	468	564	3.2	15.6	12.5	2	47.2	17.3	64.5	95.8
	SB34 7.3-7.5m	7.3-7.5	23/09/2015	EB1529964	9.4	<50	<50	<100	<100	<50	<100	<100	<50	<50	61	80	83	<0.2	<0.5	0.7	<1	1.7	0.5	2.2	2.9
SB35	SB35 1.9-2.0m	1.9-2	22/09/2015	EB1529964	16.5	<50	<50	<100	<100	<50	<100	<100	<50	<50	<10	<10	<10	<0.2	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.2
	SB35 7.0-7.1m	7-7.1	22/09/2015	EB1529964	8.3	<50	<50	<100	<100	<50	<100	<100	<50	<50	<10	<10	<10	<0.2	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.2
SB36	SB36 6.0-6.1m	6-6.1	23/09/2015	EB1529964	22.9	<50	<50	<100	<100	<50	<100	<100	<50	<50	<10	<10	<10	0.8	1.6	<0.5	<1	0.7	<0.5	0.7	3.1
	SB36 6.65-6.75m	6.65-6.75	23/09/2015	EB1529964	19.3	<50	<50	<100	<100	<50	<100	<100	<50	<50	166	128	192	2	20.4	5.6	<1	27.4	9	36.4	64.4

Table 2a - Summary of QC Results

Field Duplicates (SOIL)
Filter: ALL

SDG	82202 <-> 82204	32202 <-> 82204		82202 <-> 82204	Interlab_D	
Field ID	SB34 7.3-7.5m	QA3	RPD	SB34 7.3-7.5m	QA4	RPD
Sampled Date/Time	23/09/2015 15:35	23/09/2015		23/09/2015 15:35	23/09/2015	

Method_Type	ChemNam	Units	EQL						
TRH - Semivolatile Fraction	+C10 - C34	mg/kg	50	<50	<50	0	<50	170	109
	C10 - C16	mg/kg	50	<50	<50	0	<50	81	47
	C10 - C14	mg/kg	50 : 20 (Interlab)	<50	<50	0	<50	170	109
	C15 - C28	mg/kg	100 : 50 (Interlab)	<100	<100	0	<100	<50	0
	C16 - C34	mg/kg	100	<100	<100	0	<100	<100	0
	C34 - C40	mg/kg	100	<100	<100	0	<100	<100	0
	C10 - C40	mg/kg	50	<50	<50	0	<50		
	C29-C36 F	mg/kg	100 : 50 (Interlab)	<100	<100	0	<100	<50	0
	TRH >C10	mg/kg	50	<50	<50	0	<50	80	46
TRH Volatiles/BTEX	C6 - C9 Fra	mg/kg	10 : 20 (Interlab)	61	101	49	61	56	9
	C6 - C10 F	mg/kg	10 : 20 (Interlab)	80	127	45	80	81	1
	TPH C6-C10	mg/kg	10 : 20 (Interlab)	83	131	45	83	84	1
	Benzene	mg/kg	0.2 : 0.1 (Interlab)	<0.2	0.2	0	<0.2	<0.1	0
	Toluene	mg/kg	0.5 : 0.1 (Interlab)	<0.5	<0.5	0	<0.5	<0.1	0
	Ethylbenze	mg/kg	0.5 : 0.1 (Interlab)	0.7	1.1	44	0.7	0.6	15
	Xylene (m)	mg/kg	0.5 : 0.2 (Interlab)	1.7	2.4	34	1.7	1.8	6
	Xylene (o)	mg/kg	0.5 : 0.1 (Interlab)	0.5	0.6	18	0.5	0.6	18
	Xylene Tot	mg/kg	0.5 : 0.3 (Interlab)	2.2	3	31	2.2	2.4	9
Moisture Content	Moisture	%	1	9.4	9.2	2	9.4		
TRH Volatiles/BTEX	Naphthalen	mg/kg	1 : 0.5 (Interlab)	<1	<1	0	<1	0.9	0

*RPDs have only been considered where a concentration is greater than 10 times the EQL.

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 50 (10-30 x EQL); 50 (30-50 x EQL); 50 (> 50 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Table 2b - Summary of QA Results

Field Blanks (WATER)
Filter: ALL

SDG	82202 <-> 82204	82202 <-> 82204
Field ID	QA2	QA1
Sampled Date/Time	22/09/2015 15:00	22/09/2015
Sample Type	Rinsate	Trip_B

Method	ChemName	Units	EQL		
TRH - Sem	+C10 - C36 (Sum of total)	µg/L	50	500	<50
	C10 - C16 Fraction	µg/l	100	<100	<100
	C10 - C14 Fraction	µg/L	50	90	<60
	C15 - C28 Fraction	µg/L	100	300	<100
	C16 - C34 Fraction	µg/L	100	370	<100
	C34 - C40 Fraction	µg/L	100	100	<100
	C10 - C40 Fraction (Sum)	µg/L	100	470	<100
	C29-C36 Fraction	µg/L	50	110	<50
	TRH >C10-C16 less Naphthalene (F2)	µg/L	100	<100	<100
TRH Volat	C6 - C9 Fraction	µg/L	20	<20	<20
	Benzene	µg/L	1	<1	<1
	C6 - C10 Fraction minus BTEX (F1)	µg/L	20	<20	<20
	Toluene	µg/L	2	<2	<2
	Ethylbenzene	µg/L	2	<2	<2
	Naphthalene	µg/L	5	<5	<5
	TPH C6-C10	µg/L	20	<20	<20
	Xylene (m & p)	µg/L	2	<2	<2
	Xylene (o)	µg/L	2	<2	<2
	Xylene Total	µg/L	2	<2	<2

Appendix C

Registered groundwater bore search results

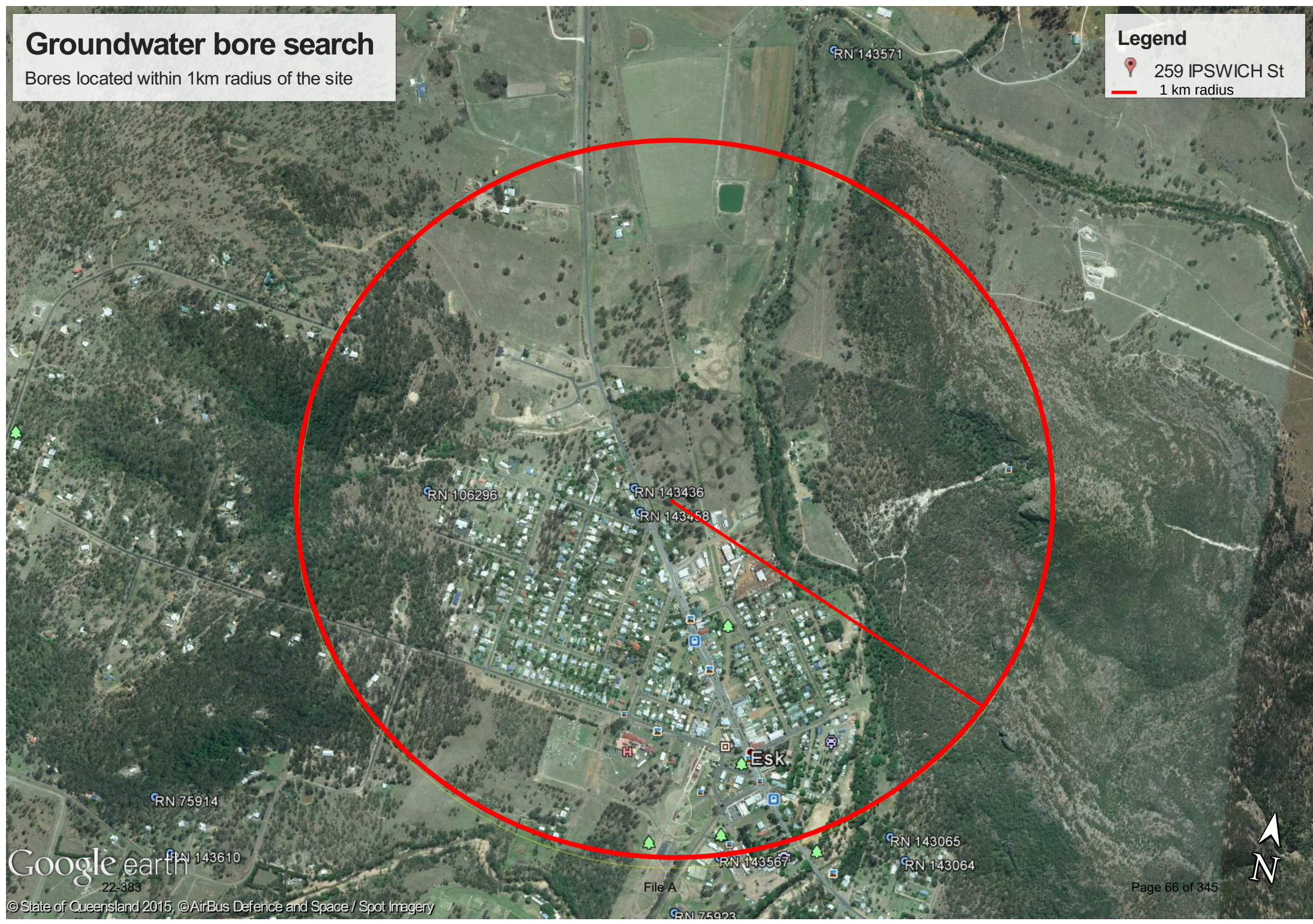


Groundwater bore search

Bores located within 1km radius of the site

Legend

 259 IPSWICH St
 1 km radius



Google earth

22-383

File A

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BORE REPORT

REG NUMBER 143567

REGISTRATION DETAILS

OFFICE Gatton	BASIN 1430	LATITUDE 27-14-33	MAP-SCALE
DATE LOG RECD 20-JAN-09	SUB-AREA	LONGITUDE 152-25-16	MAP-SERIES
D/O FILE NO. 515 000 0032	SHIRE 6580-SOMERSET REGIO	EASTING 442701	MAP-NO 9343-12
R/O FILE NO.	LOT 270	NORTHING 6986578	MAP NAME
H/O FILE NO.	PLAN CSH2475	ZONE 56	PROG SECTION
	ORIGINAL DESCRIPTION	ACCURACY GPS	PRES EQUIPMENT
		GPS ACC 10	
GIS LAT -27.2424505	PARISH NAME 1787-ESK		ORIGINAL BORE NO ESK BOWLS CLUB
GIS LNG 152.4212371	COUNTY CAVENDISH		BORE LINE -
CHECKED Y			
			POLYGON
			RN OF BORE REPLACED
			DATA OWNER
FACILITY TYPE Sub-Artesian Facility	DATE DRILLED 19/12/2008		
STATUS Existing	DRILLERS NAME sch4p4(6) Personal informa		
ROLES WS	DRILL COMPANY COR-ING DRILLING		
	METHOD OF CONST. ROTARY AIR		

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM (mm)	TOP (m)	BOTTOM (m)
A	19/12/2008	1	Polyvinyl Chloride			125	0.00	75.00
A	19/12/2008	2	Perforated or Slotted Casing	2.000	AP	125	51.00	57.00
A	19/12/2008	3	Perforated or Slotted Casing	2.000	AP	125	63.00	69.00
X	19/12/2008	4	Grout			170	0.00	5.00
X	19/12/2008	5	Gravel Pack	6.000	GR	170	5.00	75.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	0.30	TOPSOIL
2	0.30	3.00	BROWN CLAY
3	3.00	6.00	SANDY CLAY
22-383 4	6.00	14.00	CLAY BOUND ALLUVIUM

File A

BORE REPORT

REG NUMBER 143567

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
5	14.00	30.00	SANDSTONE
6	30.00	30.50	COAL
7	30.50	35.00	SANDSTONE
8	35.00	35.50	COAL
9	35.50	57.00	SANDSTONE
10	57.00	57.50	COAL
11	57.50	68.50	SANDSTONE
12	68.50	69.00	COAL
13	69.00	75.00	SANDSTONE

STRATIGRAPHY DETAILS

**** NO RECORDS FOUND ****

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	35.00	35.50	COAL	19/12/2008	-6.00	N	900 PPM	0.60	N	FR	WOOGAROO SUBGROUP
2	57.00	57.50	COAL	19/12/2008	-6.00	N	900 PPM	0.80	Y	FR	WOOGAROO SUBGROUP
3	68.50	69.00	COAL	19/12/2008	-6.00	N	900 PPM	0.90	Y	FR	WOOGAROO SUBGROUP

PUMP TEST DETAILS PART 1

**** NO RECORDS FOUND ****

PUMP TEST DETAILS PART 2

**** NO RECORDS FOUND ****

BORE CONDITION

**** NO RECORDS FOUND ****

ELEVATION DETAILS

**** NO RECORDS FOUND ****

BORE REPORT

REG NUMBER 143567

WATER ANALYSIS PART1

**** NO RECORDS FOUND ****

WATER ANALYSIS PART 2

**** NO RECORDS FOUND ****

WATER LEVEL DETAILS

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
A	19/12/2008	-6.00	R		NR

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
------	------	----------------	-----	-----	--------------

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
------	------	----------------	-----	-----	--------------

WIRE LINE LOG DETAILS

**** NO RECORDS FOUND ****

FIELD MEASUREMENTS

**** NO RECORDS FOUND ****

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

BORE REPORT

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BORE REPORT

REG NUMBER 106296

REGISTRATION DETAILS

OFFICE	Gatton	BASIN	1430	LATITUDE	27-14-05	MAP-SCALE	
DATE LOG RECD		SUB-AREA	OPA	LONGITUDE	152-24-41	MAP-SERIES	
D/O FILE NO.	515 000 32	SHIRE	6580-SOMERSET REGIO	EASTING	441717	MAP-NO	
R/O FILE NO.		LOT	7	NORTHING	6987406	MAP NAME	
H/O FILE NO.		PLAN	SP142897	ZONE	56	PROG SECTION	
		ORIGINAL DESCRIPTION		ACCURACY		PRES EQUIPMENT	
				GPS ACC			
GIS LAT	-27.234933346	PARISH NAME	1787-ESK			ORIGINAL BORE NO	S BOON
GIS LNG	152.411330848	COUNTY	CAVENDISH			BORE LINE	-
CHECKED	Y						
						POLYGON	
						RN OF BORE REPLACED	
						DATA OWNER	
FACILITY TYPE	Sub-Artesian Facility	DATE DRILLED	23/11/2002				
STATUS	Existing	DRILLERS NAME	ML MONTGOMERY				
ROLES	WS	DRILL COMPANY	ML MONTGOMERY				
		METHOD OF CONST.	ROTARY				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM (mm)	TOP (m)	BOTTOM (m)
A	23/11/2002	1	Plastic Casing	7.000	WT	125	0.00	52.00
A	23/11/2002	2	Perforated or Slotted Casing			125	30.00	33.00
A	23/11/2002	3	Perforated or Slotted Casing			125	42.00	52.00
A	23/11/2002	4	Gravel Pack	4.000	GR	216	0.00	12.00
A	23/11/2002	5	Gravel Pack	4.000	GR	187	12.00	52.00
A	23/11/2002	6	Open Hole			125	52.00	66.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	10.60	QUARTZITE
2	10.60	17.60	SHALE & COAL
22-383	17.60	66.00	SHALE WITH SANDSTONE BANDS

File A

BORE REPORT

REG NUMBER 106296

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
4			23/11/02 AIR TESTED @ 45.7M FOR 1HR
5			23/11/02 RATE 0.2L/S, SWL 29.6M
6			WATER BEDS @ 33 & 50M POTABLE

STRATIGRAPHY DETAILS

**** NO RECORDS FOUND ****

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	30.00	52.00	SHLE SDST	23/11/2002	-29.60	N	POTABLE	0.20	Y	PS	ESK FORMATION

PUMP TEST DETAILS PART 1

**** NO RECORDS FOUND ****

PUMP TEST DETAILS PART 2

**** NO RECORDS FOUND ****

BORE CONDITION

**** NO RECORDS FOUND ****

ELEVATION DETAILS

**** NO RECORDS FOUND ****

WATER ANALYSIS PART1

**** NO RECORDS FOUND ****

WATER ANALYSIS PART 2

**** NO RECORDS FOUND ****

WATER LEVEL DETAILS

22-383

PIPE DATE File A

PIPE DATE

N/R RNR

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BORE REPORT

REG NUMBER 106296

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
------	------	----------------	-----	-----	--------------

A	23/11/2002	-29.60	R		NR
---	------------	--------	---	--	----

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
------	------	----------------	-----	-----	--------------

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
------	------	----------------	-----	-----	--------------

WIRE LINE LOG DETAILS

**** NO RECORDS FOUND ****

FIELD MEASUREMENTS

**** NO RECORDS FOUND ****

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

BORE REPORT

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BORE REPORT

REG NUMBER 143436

REGISTRATION DETAILS

OFFICE Gatton	BASIN 1430	LATITUDE 27-14-02	MAP-SCALE 253
DATE LOG RECD 14-DEC-11	SUB-AREA	LONGITUDE 152-25-01	MAP-SERIES M
D/O FILE NO. 515 000 0032	SHIRE 6580-SOMERSET REGIO	EASTING 442272	MAP-NO 9343-12
R/O FILE NO.	LOT	NORTHING 6987525	MAP NAME
H/O FILE NO.	PLAN	ZONE 56	PROG SECTION
	ORIGINAL DESCRIPTION	ACCURACY GPS	PRES EQUIPMENT
		GPS ACC 10	
GIS LAT -27.23388889	PARISH NAME 1787-ESK		ORIGINAL BORE NO CALTEX
GIS LNG 152.4169444	COUNTY CAVENDISH		BORE LINE -
CHECKED Y			
			POLYGON
			RN OF BORE REPLACED
			DATA OWNER
FACILITY TYPE Sub-Artesian Facility	DATE DRILLED 19/10/2011		
STATUS Existing	DRILLERS NAME sch4p4(6) Personal infor		
ROLES SM	DRILL COMPANY PROACTIVE DRILLING		
	METHOD OF CONST. ROTARY AIR		

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM (mm)	TOP (m)	BOTTOM (m)
A	19/10/2011	1	Polyvinyl Chloride	5.000	WT	50	0.00	6.00
A	19/10/2011	2	Screen	0.400	AP	50	6.00	15.00
X	19/10/2011	3	Grout			150	0.00	4.50
X	19/10/2011	4	Bentonite Seal			150	4.50	5.50
X	19/10/2011	5	Gravel Pack	2.000	GR	150	5.50	15.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	1.00	TOPSOIL
2	1.00	5.00	BROWN CLAY
3	5.00	9.00	WEATHERED SANDSTONE
22-383 4	9.00	15.00	SANDSTONE

File A

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BORE REPORT

REG NUMBER 143436

STRATIGRAPHY DETAILS

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1	0.00	15.00	ESK FORMATION

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	13.00	15.00	SDST	19/10/2011	-8.00	N			Y	PS	ESK FORMATION

PUMP TEST DETAILS PART 1

**** NO RECORDS FOUND ****

PUMP TEST DETAILS PART 2

**** NO RECORDS FOUND ****

BORE CONDITION

**** NO RECORDS FOUND ****

ELEVATION DETAILS

**** NO RECORDS FOUND ****

WATER ANALYSIS PART1

**** NO RECORDS FOUND ****

WATER ANALYSIS PART 2

**** NO RECORDS FOUND ****

WATER LEVEL DETAILS

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
A	19/10/2011	-8.00	R		NR

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
------	------	----------------	-----	-----	--------------

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
------	------	----------------	-----	-----	--------------

WIRE LINE LOG DETAILS

File A

**** NO RECORDS FOUND ****

BORE REPORT

REG NUMBER 143436

FIELD MEASUREMENTS

**** NO RECORDS FOUND ****

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

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RTI Act 2009

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BORE REPORT

REG NUMBER 143458

REGISTRATION DETAILS

OFFICE Gatton	BASIN 1430	LATITUDE 27-14-04	MAP-SCALE 253
DATE LOG RECD 16-DEC-11	SUB-AREA	LONGITUDE 152-25-02	MAP-SERIES M
D/O FILE NO. 515 000 0032	SHIRE 6580-SOMERSET REGIO	EASTING 442299	MAP-NO 9343-12
R/O FILE NO.	LOT 1	NORTHING 6987463	MAP NAME
H/O FILE NO.	PLAN RP212145	ZONE 56	PROG SECTION
	ORIGINAL DESCRIPTION	ACCURACY GPS	PRES EQUIPMENT
		GPS ACC 10	
GIS LAT -27.23444444	PARISH NAME 1787-ESK		ORIGINAL BORE NO CALTEX
GIS LNG 152.4172222	COUNTY CAVENDISH		BORE LINE -
CHECKED Y			
			POLYGON
			RN OF BORE REPLACED
			DATA OWNER
FACILITY TYPE Sub-Artesian Facility	DATE DRILLED 19/10/2011		
STATUS Existing	DRILLERS NAME sch4p4(6) Personal info		
ROLES SM	DRILL COMPANY PROACTIVE DRILLING		
	METHOD OF CONST. AUGER		

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM (mm)	TOP (m)	BOTTOM (m)
A	19/10/2011	1	Polyvinyl Chloride	5.000	WT	50	0.00	5.50
A	19/10/2011	2	Screen	0.400	AP	50	5.50	10.00
X	19/10/2011	3	Grout			150	0.00	4.00
X	19/10/2011	4	Bentonite Seal			150	4.00	5.00
X	19/10/2011	5	Gravel Pack			150	5.00	10.00

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	1.00	TOPSOIL
2	1.00	5.00	BROWN CLAY
3	5.00	11.00	WEATHERED SANDSTONE

BORE REPORT

REG NUMBER 143458

STRATIGRAPHY DETAILS

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1	0.00	11.00	ESK FORMATION

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	11.00		SDST	19/10/2011	-8.00	N			Y	PS	ESK FORMATION

PUMP TEST DETAILS PART 1

**** NO RECORDS FOUND ****

PUMP TEST DETAILS PART 2

**** NO RECORDS FOUND ****

BORE CONDITION

**** NO RECORDS FOUND ****

ELEVATION DETAILS

**** NO RECORDS FOUND ****

WATER ANALYSIS PART1

**** NO RECORDS FOUND ****

WATER ANALYSIS PART 2

**** NO RECORDS FOUND ****

WATER LEVEL DETAILS

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
A	19/10/2011	-8.00	R		NR

PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
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PIPE	DATE	MEASURE (m)	N/R	RMK	MEAS TYPE
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WIRE LINE LOG DETAILS

File A

**** NO RECORDS FOUND ****

BORE REPORT

REG NUMBER 143458

FIELD MEASUREMENTS

**** NO RECORDS FOUND ****

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

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RTI Act 2009

BORE REPORT

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**** End of Report. Produced: 16/04/2015 02:04:56 PM ****

Appendix D

Post 2008 Results Table



TABLE 1
GROUNDWATER GAUGING RESULTS
CALTEX ESK FORMER DEPOT
GROUNDWATER MONITORING EVENT
ENVINEWS08580AA

Well ID	Date Measured	Event	Top of Well Casing Elevation (mAHD)	Total Depth of Well m(BTOC)	Depth to Water* (mBTOC)	Depth to PSHs* (mBTOC)	PSH Thickness (m)	Product Gravity	Hydraulic Equivalent (m)	Corrected Depth to Water (mBTOC)	Corrected Water Elevation (mAHD)	Comments
MW1	09-Apr-08	GME	110.329	14.605	9.900	-	-	-	-	9.900	100.429	Light brown, turbid.
MW2	09-Apr-08	GME	110.585	14.730	9.202	-	-	-	-	9.202	101.383	Light brown, turbid.
MW3	09-Apr-08	GME	110.180	14.980	9.828	-	-	-	-	9.828	100.352	Light orange-brown, turbid.
MW4	09-Apr-08	GME	109.864	14.960	9.422	-	-	-	-	9.422	100.442	Opaque, colourless.
MW5	09-Apr-08	GME	109.013	14.830	8.685	-	-	-	-	8.685	100.328	Light brown/grey, turbid.
MW6	09-Apr-08	GME	107.591	13.640	7.448	-	-	-	-	7.448	100.143	Light brown, turbid.
MW7	09-May-08	GME	109.216	11.450	8.485	-	-	-	-	8.485	100.731	No HC odour, orange/brown cloudy water. Dry @ 10L.
MW8	09-May-08	GME	110.186	10.925	9.780	-	-	-	-	9.780	100.406	Faint HC odour, dry @ 4L.
MWA	09-Apr-08	GME	111.042	13.910	10.666	-	-	-	-	10.666	100.376	Strong hydrocarbon odour and sheen.
MWB	09-Apr-08	GME	110.788	10.090	DRY	-	-	-	-	DRY	DRY	Well dry.

Field Equipment Used:
Solonist IP

TABLE 2
GROUNDWATER FIELD QUALITY PARAMETERS
CALTEX ESK FORMER DEPOT
GROUNDWATER MONITORING EVENT
ENVINEWS08580AA

Well ID	Date Measured	Event	Dissolved Oxygen (mg/L)	Electrical Conductivity (uS/cm)	Redox Potential (mV)	pH	Total Dissolved Solids* (mg/L)	Temperature (oC)	Purge Volume (L)	
MW1	9-Apr-08	Pre	4.1	7004	192	6.58	4553	21.7	80	
	9-Apr-08	Post	3.1	6913	146	6.49	4493	21.2		
MW2	9-Apr-08	Pre	4.70	7294	177	6.56	4741	21.3	80	
	9-Apr-08	Post	4.80	7186	144	6.40	4671	21.2		
MW3	9-Apr-08	Pre	4.0	7749	162	6.78	5037	20.9	Dry at 50L	
	9-Apr-08	Post	5.5	7799	149	6.68	5069	21.3		
MW4	9-Apr-08	Pre	3.60	7440	107	6.58	4836	20.6	80	
	9-Apr-08	Post	2.80	7409	95	6.52	4816	20.6		
MW5	9-Apr-08	Pre	4.5	6210	55	7.18	4037	20.4	Dry at 22L	
	9-Apr-08	Post	6.8	6431	106	7.00	4180	20.5		
MW6	9-Apr-08	Pre	4.1	4930	77	6.67	3204.5	20.3	Dry at 70L	
	9-Apr-08	Post	4.00	4900	76	6.63	3185	19.9		
MW7	9-May-08	Pre	3.20	5880	-343	7.50	3822	21.8	Dry at 10L	
	9-May-08	Post	6.00	5800	-157	7.54	3770	21.2		
MW8	9-May-08	Pre	2.10	4620	-233	7.20	3003	21.1	Dry at 4 L	
	9-May-08	Post	Not enough water for post purge							
MWA	9-Apr-08	Pre	No parameters taken due to sheen							
	9-Apr-08	Post	No parameters taken due to sheen							
MWB	9-May-08	Pre	Well Dry - Mud on IP has hydrocarbon odour							Dry
	9-May-08	Post								

Notes:

mV = millivolts

°C = degrees Celsius

NA = not applicable

NC = not conducted

* Approximate value determined using the following equation: TDS (mg/L) = EC x 0.65

TABLE 3
SOIL ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code						08-Ap01258	08-Ap01259	08-Ap01260	08-Ap01261	08-Ap01262	08-Ap01294		59881-1	08-Ap01263	
Field ID						SB01 0.4-0.6	SB01 3.9-4.1	SB01 6.9-7.1	SB02 1.9-2.1	SB02 2.9-3.1	QC1		QC1A	SB02 6.9-7.1	
Sampled Date						26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008		26/03/2008	26/03/2008	
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)						Duplicate of SB02 2.9-3.1	RPD	Triplicate of SB02 2.9-3.1	RPD	
BTEX	Benzene	mg/kg	0.05	1	1	<0.05	<0.05	<0.05	<0.05	0.35	0.19	59%	<0.5	-	0.07
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	13	3.7	111%	1.6	156%	<0.05
	Toluene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	11	3	114%	1.9	141%	0.14
	Xylene Total	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.1	75	31	83%	11	149%	0.9
	Total BTEX	mg/kg		7	NE	#	#	#	#	99.35	37.89	90%	14.5	149%	1.11
TPH	TPH C 6 - C 9 Fraction	mg/kg	20	100	NE	<20	<20	<20	<20	130	77	51%	65	67%	<20
	TPH C10 - C14 Fraction	mg/kg	50	100	NE	<50	<50	<50	<50	<50	<50	NA	<20	NA	<50
	TPH C15 - C28 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	<100	<100	NA	<50	NA	<100
	TPH C29-C36 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	<100	<100	NA	<50	NA	<100
	TPH+C10 - C36 (Sum of total)	mg/kg		NE	NE	<250	<250	<250	<250	<250	<250	NA	<50	NA	<250

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₆-C₉ = carbon chainlength fraction of petroleum hydrocarbon

NA = Not applicable

HA = hand auger, SB = soil bore

NIL = Nominated Investigation Level

Nominated Investigation Levels:

(1) QLD DoE (1998) Queensland Department of Environment (now Environmental Protection Agency - EPA) Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (Environmental Investigation levels - EILs).
(2) Chemical Hazards and Emergency Management (CHEM) Unit (1991) Draft TPH and BTEX Guidelines in Soil.

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 3
SOIL ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code						08-Ap01264	08-Ap01266	08-Ap01267	08-Ap01268	08-Ap01270	08-Ap01271	08-Ap01295		59881-2	
Field ID						SB02 12.9-13.1	SB03 2.9-3.1	SB03 6.9-7.1	SB03 11.9-12.1	SB04 1.9-2.1	SB04 5.9-6.1	QC3		QC3A	
Sampled Date						26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	27/03/2008		27/03/2008	
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)							Duplicate of SB04 5.9-6.1	RPD	Triplicate of SB04 5.9-6.1	RPD
BTEX	Benzene	mg/kg	0.05	1	1	<0.05	<0.05	0.18	<0.05	<0.05	95	10	162%	12	155%
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.05	<0.05	0.3	<0.05	<0.05	130	26	133%	23	140%
	Toluene	mg/kg	0.05	NE	NE	<0.05	<0.05	1.1	<0.05	<0.05	660	100	147%	90	152%
	Xylene Total	mg/kg	0.05	NE	NE	<0.05	<0.05	3.9	<0.05	<0.05	800	180	127%	150	137%
	Total BTEX	mg/kg		7	NE	#	#	5.48	#	#	1685	316	137%	275	144%
TPH	TPH C 6 - C 9 Fraction	mg/kg	20	100	NE	<20	<20	<20	<20	<20	6200	360	178%	720	158%
	TPH C10 - C14 Fraction	mg/kg	50	100	NE	<50	<50	<50	<50	<50	2500	200	170%	150	177%
	TPH C15 - C28 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	<100	190	<100	NA	<50	NA
	TPH C29-C36 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	<100	<100	<100	NA	<50	NA
	TPH+C10 - C36 (Sum of total)	mg/kg		NE	NE	<250	<250	<250	<250	<250	2740	300	161%	150	179%

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₆-C₉ = carbon chainlength fraction of petroleum hydrocarbon

NA = Not applicable

HA = hand auger, SB = soil bore

NIL = Nominated Investigation Level

Nominated Investigation Levels:

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- (2) Chemical Hazards and Emergency Management (CHEM) Unit (1991) Draft TPH and BTEX Guidelines in Soil.

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 3
SOIL ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code						08-Ap01272	08-Ap01274	08-Ap01275	08-Ap01276	08-Ap07681	08-Ap07682	08-Ap01277	08-Ap01278	08-Ap01279	08-Ap01280
Field ID						SB04 11.9-12.1	SB05 2.9-3.1	SB05 6.9-7.1	SB05 9.9-10.1	SB05 11.9-12	SB05 14.8-15	SB06 3.9-4.1	SB06 6.7-6.8	SB07 0-0.2	SB07 5.9-6.1
Sampled Date						26/03/2008	28/03/2008	28/03/2008	28/03/2008	26/03/2008	26/03/2008	28/03/2008	28/03/2008	28/03/2008	28/03/2008
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)										
BTEX	Benzene	mg/kg	0.05	1	1	<0.05	<0.05	0.74	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.05	<0.05	0.82	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Toluene	mg/kg	0.05	NE	NE	<0.05	<0.05	3.1	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Xylene Total	mg/kg	0.05	NE	NE	<0.05	<0.05	5.7	<0.05	-	-	<0.05	<0.05	<0.05	<0.05
	Total BTEX	mg/kg		7	NE	#	#	10.36	#	#	#	#	#	#	#
TPH	TPH C 6 - C 9 Fraction	mg/kg	20	100	NE	<20	<20	23	<20	<20	<20	<20	<20	<20	<20
	TPH C10 - C14 Fraction	mg/kg	50	100	NE	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	TPH C15 - C28 Fraction	mg/kg	100	1000	NE	<100	<100	<100	760	<100	<100	<100	<100	<100	<100
	TPH C29-C36 Fraction	mg/kg	100	1000	NE	<100	<100	<100	3200	110	<100	<100	<100	<100	<100
	TPH+C10 - C36 (Sum of total)	mg/kg		NE	NE	<250	<250	<250	3985	185	<250	<250	<250	<250	<250

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 3
SOIL ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code Field ID Sampled Date						08-Ap01282	08-Ap01283	08-Ap01284	08-Ap01285	08-Ap01286	08-Ap01296		59881-3		08-Ap01287
						SB08 0.4-0.6	SB08 4.9-5.1	SB09 0-0.2	SB09 4.9-5.1	SB10 2.9-3.1	QC6		QC6A		SB10 6.6-6.8
						28/03/2008	28/03/2008	28/03/2008	28/03/2008	29/03/2008	29/03/2008		29/03/2008		29/03/2008
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)						Duplicate of SB10 2.9-3.1	RPD	Triplicate of SB10 2.9-3.1	RPD	
BTEx	Benzene	mg/kg	0.05	1	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	<0.5	NA	<0.1
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	<0.5	NA	<0.05
	Toluene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	<0.5	NA	<0.05
	Xylene Total	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	<1.5	NA	<0.05
	Total BTEx	mg/kg		7	NE	#	#	#	#	#	#	NA	#	NA	#
TPH	TPH C 6 - C 9 Fraction	mg/kg	20	100	NE	<20	<20	<20	<20	<20	<20	NA	<20	NA	<20
	TPH C10 - C14 Fraction	mg/kg	50	100	NE	<50	<50	<50	<50	<50	<50	NA	<20	NA	<50
	TPH C15 - C28 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	<100	<100	NA	<50	NA	<100
	TPH C29-C36 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	<100	<100	NA	<50	NA	<100
	TPH+C10 - C36 (Sum of total)	mg/kg		NE	NE	<250	<250	<250	<250	<250	<250	NA	<50	NA	<250

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

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Results

Values in highlighted cells exceed nominated investigation criteria

TABLE 3
SOIL ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code						08-Ap01288	08-Ap01289	08-Ap01290	08-Ap01291	08-Ap01292	08-Ap01293	08-Ap12047	08-Ap12048	08-Ap12049	08-Ap12050
Field ID						SB11 0-0.2	SB11 5.9-6.1	SB12 0-0.2	SB12 0.9-1.1	SB13 0-0.2	SB13 7.9-8.1	SB14 0-0.2	SB14 3.9-4.1	SB15 2.9-3.1	SB15 3.9-4.1
Sampled Date						29/03/2008	29/03/2008	29/03/2008	29/03/2008	29/03/2008	29/03/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)										
BTEX	Benzene	mg/kg	0.05	1	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	15
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	60
	Toluene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	170
	Xylene Total	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	440
	Total BTEX	mg/kg		7	NE	#	#	#	#	#	#	#	#	#	685
TPH	TPH C 6 - C 9 Fraction	mg/kg	20	100	NE	<20	<20	<20	<20	<20	<20	<20	<20	<20	1600
	TPH C10 - C14 Fraction	mg/kg	50	100	NE	<50	<50	<50	<50	<50	<50	<50	<50	<50	800
	TPH C15 - C28 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	TPH C29-C36 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	TPH+C10 - C36 (Sum of total)	mg/kg		NE	NE	<250	<250	<250	<250	<250	<250	<250	<250	<250	900

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 3
SOIL ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code						08-Ap12051	08-Ap12052	08-Ap12053	08-Ap12072	60531-1	08-Ap12054	08-Ap12055	08-Ap12056
Field ID						SB15 7.9-8.1	SB15 9.9-10.1	SB16 0.9-1.1	QC14	QC14A	SB16 4.2-4.5	SB17 0.0-0.2	SB17 4.3-4.5
Sampled Date						21/04/2008	21/04/2008	22/04/2008	21/04/2008	21/04/2008	22/04/2008	22/04/2008	22/04/2008
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)				Duplicate of SB16 0.9-1.1	RPD	Triplicate of SB16 0.9-1.1	RPD	
BTEX	Benzene	mg/kg	0.05	1	1	2.7	<0.05	<0.05	<0.05	NA	<0.5	NA	<0.05
	Ethylbenzene	mg/kg	0.05	NE	NE	13	0.08	<0.05	<0.05	NA	<0.5	NA	<0.05
	Toluene	mg/kg	0.05	NE	NE	40	0.07	<0.05	<0.05	NA	<0.5	NA	<0.05
	Xylene Total	mg/kg	0.05	NE	NE	84	0.67	<0.1	<0.05	NA	<1.5	NA	<0.05
	Total BTEX	mg/kg		7	NE	139.7	2.17	#	#	NA	#	NA	#
TPH	TPH C 6 - C 9 Fraction	mg/kg	20	100	NE	300	<20	<20	<20	NA	<20	NA	<20
	TPH C10 - C14 Fraction	mg/kg	50	100	NE	160	<50	<50	<50	NA	<20	NA	<50
	TPH C15 - C28 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	NA	<50	NA	<100
	TPH C29-C36 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	NA	<50	NA	<100
	TPH+C10 - C36 (Sum of total)	mg/kg		NE	NE	260	<250	<250	<250	NA	<50	NA	<250

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₆-C₉ = carbon chainlength fraction of petroleum hydrocarbon

NA = Not applicable

HA = hand auger, SB = soil bore

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Nominated Investigation Levels:

- (1) QLD DoE (1998) Queensland Department of Environment (now Environmental Protection Agency - EPA) Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (Environmental Investigation levels - EILs).
- (2) Chemical Hazards and Emergency Management (CHEM) Unit (1991) Draft TPH and BTEX Guidelines in Soil.

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 3
SOIL ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code						08-Ap12057	08-Ap12058	08-Ap12059	08-Ap12073	60531-2	08-Ap12060	08-Ap12061	08-Ap12062
Field ID						SB18 0.4-0.6	SB18 4.9-5.1	SB19 0.4-0.6	QC15	QC15A	SB19 6.2-6.3	SB20 0.0-0.2	SB20 3.9-4.1
Sampled Date						22/04/2008	22/04/2008	22/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)				Duplicate of SB19 0.4-0.6	RPD	Triplicate of SB19 0.4-0.6	RPD	
BTEX	Benzene	mg/kg	0.05	1	1	<0.05	<0.05	<0.05	<0.05	NA	<0.5	NA	<0.05
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	NA	<0.5	NA	<0.05
	Toluene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	NA	<0.5	NA	<0.05
	Xylene Total	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	NA	<1.5	NA	<0.05
	Total BTEX	mg/kg		7	NE	#	#	#	#	NA	#	NA	#
TPH	TPH C 6 - C 9 Fraction	mg/kg	20	100	NE	<20	<20	<20	<20	NA	<20	NA	<20
	TPH C10 - C14 Fraction	mg/kg	50	100	NE	<50	<50	<50	<50	NA	<20	NA	<50
	TPH C15 - C28 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	NA	<50	NA	<100
	TPH C29-C36 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	NA	<50	NA	<100
	TPH+C10 - C36 (Sum of total)	mg/kg		NE	NE	<250	<250	<250	<250	NA	<50	NA	<250

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₆-C₉ = carbon chainlength fraction of petroleum hydrocarbon

NA = Not applicable

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 3
SOIL ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code						08-Ap12063	08-Ap12064	08-Ap12065	08-Ap12066	08-Ap12067	08-Ap12068	08-Ap12069	08-Ap12070	08-Ap12071
Field ID						SB21 0.0-0.2	SB21 6.2-6.3	SB22 0.4-0.6	SB22 2.9-3.1	SB23 0.4-0.6	SB23 1.9-2.1	SB24 0.0-0.2	SB24 0.9-1.1	SB25 0.9-1.1
Sampled Date						21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)									
BTEX	Benzene	mg/kg	0.05	1	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Toluene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Xylene Total	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Total BTEX	mg/kg		7	NE	#	#	#	#	#	#	#	#	#
TPH	TPH C 6 - C 9 Fraction	mg/kg	20	100	NE	<20	<20	<20	<20	<20	<20	<20	<20	<20
	TPH C10 - C14 Fraction	mg/kg	50	100	NE	<50	<50	<50	<50	<50	<50	<50	<50	<50
	TPH C15 - C28 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	<100	<100	<100	<100	<100
	TPH C29-C36 Fraction	mg/kg	100	1000	NE	<100	<100	<100	<100	<100	<100	<100	<100	<100
	TPH+C10 - C36 (Sum of total)	mg/kg		NE	NE	<250	<250	<250	<250	<250	<250	<250	<250	<250

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₆-C₉ = carbon chainlength fraction of petroleum hydrocarbon

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 3
SOIL ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS08580AA

Sample Code						08-Ap12079	08-Ap12074	60531-3		08-Ap12077	
Field ID						SB25 4.8	QC16		QC16A		SEDIMENT SAMPLE
Sampled Date						21/04/2008	21/04/2008		21/04/2008		21/04/2008
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)		Duplicate of SB25 4.8	RPD	Triplicate of SB25 4.8	RPD	
BTEX	Benzene	mg/kg	0.05	1	1	<0.05	<0.05	NA	<0.5	NA	<0.05
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.05	<0.05	NA	<0.5	NA	<0.05
	Toluene	mg/kg	0.05	NE	NE	<0.05	<0.05	NA	<0.5	NA	<0.05
	Xylene Total	mg/kg	0.05	NE	NE	<0.05	<0.05	NA	<1.5	NA	<0.05
	Total BTEX	mg/kg		7	NE	#	#	NA	#	NA	#
TPH	TPH C 6 - C 9 Fraction	mg/kg	20	100	NE	<20	<20	NA	<20	NA	<20
	TPH C10 - C14 Fraction	mg/kg	50	100	NE	<50	<50	NA	<20	NA	<50
	TPH C15 - C28 Fraction	mg/kg	100	1000	NE	<100	<100	NA	<50	NA	<100
	TPH C29-C36 Fraction	mg/kg	100	1000	NE	<100	<100	NA	<50	NA	<100
	TPH+C10 - C36 (Sum of total)	mg/kg		NE	NE	<250	<250	NA	<50	NA	<250

(All results in mg/kg unless otherwise noted)

Notes:

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Results

Values in highlighted cells exceed nominated investigation criteria

TABLE 4
SOIL ANALYTICAL RESULTS - METALS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS08580AA

Sample Code						08-Ap01258	08-Ap01259	08-Ap01260	08-Ap01261	08-Ap01262	08-Ap01294	59881-1	08-Ap01263		
Field ID						SB01 0.4-0.6	SB01 3.9-4.1	SB01 6.9-7.1	SB02 1.9-2.1	SB02 2.9-3.1	QC1	QC1A	SB02 6.9-7.1		
Sampled Date						26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008		
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)						Duplicate of SB02 2.9-3.1	RPD	Triplicate of SB02 2.9-3.1	RPD	
Metals	Arsenic	mg/kg	2	NE	20	-	2	9.1	-	3.1	8.1	89%	7	77%	<2
	Cadmium	mg/kg	0.5	NE	3	-	<0.5	<0.5	-	<0.5	<0.5	NA	<0.3	NA	<0.5
	Chromium (total)	mg/kg	5	NE	50	-	13	28	-	10	9.5	5%	2.9	110%	7.4
	Copper	mg/kg	5	NE	60	-	8.5	<5	-	6.5	7.5	14%	6.1	6%	<5
	Lead	mg/kg	5	300	300	51	16	13	12	13	20	42%	11	17%	10
	Mercury	mg/kg	0.1	NE	1	-	<0.1	<0.1	-	<0.1	<0.1	NA	<0.05	NA	<0.1
	Nickel	mg/kg	5	NE	60	-	12	<5	-	<5	<5	NA	4.3	NA	5.8
	Zinc	mg/kg	5	NE	200	-	36	24	-	13	27	70%	14	7%	26

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 4
SOIL ANALYTICAL RESULTS - METALS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS08580AA

Sample Code				08-Ap01264		08-Ap01266	08-Ap01267	08-Ap01268	08-Ap01269	08-Ap01270	08-Ap01271	08-Ap01295		59881-2		
Field ID				SB02 12.9-13.1		SB03 2.9-3.1	SB03 6.9-7.1	SB03 11.9-12.1	SB04 0-0.2	SB04 1.9-2.1	SB04 5.9-6.1	QC3		QC3A		
Sampled Date				26/03/2008		26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	27/03/2008		27/03/2008		
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)							Duplicate of SB04 5.9-6.1	RPD	Triplicate of SB04 5.9-6.1	RPD	
Metals	Arsenic	mg/kg	2	NE	20	-	2.8	-	-	2.7	-	<2	<2	NA	<3	NA
	Cadmium	mg/kg	0.5	NE	3	-	<0.5	-	-	<0.5	-	<0.5	<0.5	NA	<0.3	NA
	Chromium (total)	mg/kg	5	NE	50	-	11	-	-	11	-	7.6	7	8%	5	41%
	Copper	mg/kg	5	NE	60	-	6	-	-	<5	-	<5	<5	NA	3.7	NA
	Lead	mg/kg	5	300	300	8.5	10	14	7	17	23	18	13	32%	15	18%
	Mercury	mg/kg	0.1	NE	1	-	<0.1	-	-	<0.1	-	<0.1	<0.1	NA	<0.05	NA
	Nickel	mg/kg	5	NE	60	-	<5	-	-	<5	-	<5	<5	NA	2.8	NA
	Zinc	mg/kg	5	NE	200	-	13	-	-	23	-	26	31	18%	21	21%

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 4
SOIL ANALYTICAL RESULTS - METALS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS08580AA

Sample Code				08-Ap01272		08-Ap01274		08-Ap01275		08-Ap01276		08-Ap01277		08-Ap01278		08-Ap01279		08-Ap01280		08-Ap01282		08-Ap01283		08-Ap01284		08-Ap01285		
Field ID				SB04 11.9-12.1		SB05 2.9-3.1		SB05 6.9-7.1		SB05 9.9-10.1		SB06 3.9-4.1		SB06 6.7-6.8		SB07 0-0.2		SB07 5.9-6.1		SB08 0.4-0.6		SB08 4.9-5.1		SB09 0-0.2		SB09 4.9-5.1		
Sampled Date				26/03/2008		28/03/2008		28/03/2008		28/03/2008		28/03/2008		28/03/2008		28/03/2008		28/03/2008		28/03/2008		28/03/2008		28/03/2008		28/03/2008		
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)																							
Metals	Arsenic	mg/kg	2	NE	20	-	3.4	<2	-	-	<2	5	-	17	-	6.3	-											
	Cadmium	mg/kg	0.5	NE	3	-	<0.5	<0.5	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-											
	Chromium (total)	mg/kg	5	NE	50	-	8	7.7	-	-	10	15	-	17	-	15	-											
	Copper	mg/kg	5	NE	60	-	6.7	<5	-	-	<5	10	-	7.3	-	12	-											
	Lead	mg/kg	5	300	300	6.9	11	<5	15	17	6.7	49	<5	45	5.1	140	9.4											
	Mercury	mg/kg	0.1	NE	1	-	<0.1	<0.1	-	-	<0.1	<0.1	-	<0.1	-	<0.1	-											
	Nickel	mg/kg	5	NE	60	-	<5	<5	-	-	<5	5.2	-	5.8	-	8.1	-											
	Zinc	mg/kg	5	NE	200	-	23	18	-	-	27	140	-	36	-	71	-											

(All results in mg/kg unless otherwise noted)

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 4
SOIL ANALYTICAL RESULTS - METALS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS08580AA

Sample Code						08-Ap01286	08-Ap01296	59881-3	08-Ap01287	08-Ap01288	08-Ap01289	08-Ap01290	08-Ap01291	08-Ap01292		
Field ID						SB10 2.9-3.1	QC6	QC6A	SB10 6.6-6.8	SB11 0-0.2	SB11 5.9-6.1	SB12 0-0.2	SB12 0.9-1.1	SB13 0-0.2		
Sampled Date						29/03/2008	29/03/2008	29/03/2008	29/03/2008	29/03/2008	29/03/2008	29/03/2008	29/03/2008	29/03/2008		
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)		Duplicate of SB10 2.9-3.1	RPD	Triplicate of SB10 2.9-3.1	RPD						
Metals	Arsenic	mg/kg	2	NE	20	<2	<2	NA	4	NA	-	-	13	3.9	6	
	Cadmium	mg/kg	0.5	NE	3	<0.5	<0.5	NA	<0.3	NA	-	-	<0.5	<0.5	<0.5	
	Chromium (total)	mg/kg	5	NE	50	13	8.8	39%	8.4	43%	-	-	13	14	15	
	Copper	mg/kg	5	NE	60	7.4	5.5	29%	10	30%	-	-	5.4	6.3	9.8	
	Lead	mg/kg	5	300	300	15	7.8	63%	15	0%	<5	22	28	49	13	26
	Mercury	mg/kg	0.1	NE	1	<0.1	<0.1	NA	<0.05	NA	-	-	<0.1	-	<0.1	<0.1
	Nickel	mg/kg	5	NE	60	13	5.7	78%	11	17%	-	-	19	-	<5	5.9
	Zinc	mg/kg	5	NE	200	40	30	29%	36	11%	-	-	27	-	13	70

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 4
SOIL ANALYTICAL RESULTS - METALS
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code			08-Ap01293	08-Ap12047	08-Ap12048	08-Ap12049	08-Ap12050	08-Ap12051	08-Ap12052	08-Ap12053	08-Ap12072	60531-1					
Field ID			SB13 7.9-8.1	SB14 0-0.2	SB14 3.9-4.1	SB15 2.9-3.1	SB15 3.9-4.1	SB15 7.9-8.1	SB15 9.9-10.1	SB16 0.9-1.1	QC14	QC14A					
Sampled Date			29/03/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	22/04/2008	21/04/2008	21/04/2008					
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)							Duplicate of SB16 0.9-1.1	RPD	Triplicate of SB16 0.9-1.1	RPD		
Metals	Arsenic	mg/kg	2	NE	20	-	4.6	-	5.4	-	-	5.6	5.1	9%	5	11%	
	Cadmium	mg/kg	0.5	NE	3	-	<0.5	-	<0.5	-	-	<0.5	<0.5	NA	<0.3	NA	
	Chromium (total)	mg/kg	5	NE	50	-	13	-	13	-	-	10	11	10%	8.3	19%	
	Copper	mg/kg	5	NE	60	-	8.3	-	7.7	-	-	6.2	5.1	19%	6.9	11%	
	Lead	mg/kg	5	300	300	6.1	12	8.6	14	8.4	<5	<5	5.5	11	67%	9	48%
	Mercury	mg/kg	0.1	NE	1	-	<0.1	-	<0.1	-	-	<0.1	<0.1	NA	<0.05	NA	
	Nickel	mg/kg	5	NE	60	-	<5	-	5.7	-	-	<5	<5	NA	1.2	NA	
	Zinc	mg/kg	5	NE	200	-	19	-	28	-	-	5.5	7.5	31%	6.3	14%	

(All results in mg/kg unless otherwise noted)

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 4
SOIL ANALYTICAL RESULTS - METALS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS08580AA

Sample Code				08-Ap12054		08-Ap12055		08-Ap12056		08-Ap12057		08-Ap12058		08-Ap12059		08-Ap12073		60531-2		08-Ap12060		08-Ap12061		08-Ap12062				
Field ID				SB16 4.2-4.5		SB17 0.0-0.2		SB17 4.3-4.5		SB18 0.4-0.6		SB18 4.9-5.1		SB19 0.4-0.6		QC15		QC15A		SB19 6.2-6.3		SB20 0.0-0.2		SB20 3.9-4.1				
Sampled Date				22/04/2008		22/04/2008		22/04/2008		22/04/2008		22/04/2008		22/04/2008		21/04/2008		21/04/2008		21/04/2008		21/04/2008		21/04/2008				
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)							Duplicate of SB19 0.4-0.6	RPD	Triplicate of SB19 0.4-0.6	RPD													
Metals	Arsenic	mg/kg	2	NE	20	-	-	2.2	13	-	3.2	2.5	25%	4	22%	-	9.7	-										
	Cadmium	mg/kg	0.5	NE	3	-	-	<0.5	<0.5	-	<0.5	<0.5	NA	<0.3	NA	-	<0.5	-										
	Chromium (total)	mg/kg	5	NE	50	-	-	80	32	-	14	8.4	50%	8	55%	-	24	-										
	Copper	mg/kg	5	NE	60	-	-	8.6	6	-	10	<5	NA	4.9	68%	-	8	-										
	Lead	mg/kg	5	300	300	<5	20	5.2	13	<5	24	15	46%	23	4%	13	18	<5										
	Mercury	mg/kg	0.1	NE	1	-	-	<0.1	<0.1	-	<0.1	<0.1	NA	<0.05	NA	-	<0.1	-										
	Nickel	mg/kg	5	NE	60	-	-	9.8	5.5	-	<5	<5	NA	2.6	NA	-	<5	-										
	Zinc	mg/kg	5	NE	200	-	-	47	15	-	84	49	53%	53	45%	-	17	-										

(All results in mg/kg unless otherwise noted)

Notes:

LOR = Limit of Reporting

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₆-C₉ = carbon chainlength fraction of petroleum hydrocarbon

NA = Not applicable

HA = hand auger, SB = soil bore

NIL = Nominated Investigation Level

Nominated Investigation Levels:

(1) QLD DoE (1998) Queensland Department of Environment (now Environmental Protection Agency - EPA) Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (Environmental Investigation Levels - EILs).

(2) Chemical Hazards and Emergency Management (CHEM) Unit (1991) Draft TPH and BTEX Guidelines in Soil.

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 4
SOIL ANALYTICAL RESULTS - METALS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS08580AA

Sample Code					08-Ap12063	08-Ap12064	08-Ap12065	08-Ap12066	08-Ap12067	08-Ap12068	08-Ap12069	08-Ap12070	08-Ap12071
Field ID					SB21 0.0-0.2	SB21 6.2-6.3	SB22 0.4-0.6	SB22 2.9-3.1	SB23 0.4-0.6	SB23 1.9-2.1	SB24 0.0-0.2	SB24 0.9-1.1	SB25 0.9-1.1
Sampled Date					21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)								
Metals	Arsenic	mg/kg	2	NE	20	9.3	-	11	-	9.9	-	7	-
	Cadmium	mg/kg	0.5	NE	3	<0.5	-	<0.5	-	<0.5	-	<0.5	-
	Chromium (total)	mg/kg	5	NE	50	28	-	28	-	22	-	19	-
	Copper	mg/kg	5	NE	60	<5	-	7.4	-	7.9	-	9.2	-
	Lead	mg/kg	5	300	300	28	8.9	30	17	26	16	23	25
	Mercury	mg/kg	0.1	NE	1	<0.1	-	<0.1	-	<0.1	-	<0.1	-
	Nickel	mg/kg	5	NE	60	7.2	-	8.9	-	7.1	-	6.5	-
	Zinc	mg/kg	5	NE	200	30	-	16	-	21	-	27	-

(All results in mg/kg unless otherwise noted)

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 4
SOIL ANALYTICAL RESULTS - METALS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS08580AA

Sample Code Field ID						08-Ap12079	08-Ap12074	60531-3	08-Ap12077		
						SB25 4.8	QC16	QC16A	SEDIMENT SAMPLE		
Sampled Date						21/04/2008	21/04/2008	21/04/2008	21/04/2008		
Chemistry Group	Analyte	Units	LOR	NIL (1)	NIL (2)		Duplicate of SB25 4.8	RPD	Triplicate of SB25 4.8	RPD	
Metals	Arsenic	mg/kg	2	NE	20	<2	2.8	NA	<3	NA	6
	Cadmium	mg/kg	0.5	NE	3	<0.5	<0.5	NA	<0.3	NA	<0.5
	Chromium (total)	mg/kg	5	NE	50	14	13	7%	9.7	36%	18
	Copper	mg/kg	5	NE	60	8.9	11	21%	7	24%	8.5
	Lead	mg/kg	5	300	300	7.9	22	94%	8	1%	21
	Mercury	mg/kg	0.1	NE	1	<0.1	<0.1	NA	<0.05	NA	<0.1
	Nickel	mg/kg	5	NE	60	8.2	8.4	2%	4.2	65%	7.3
	Zinc	mg/kg	5	NE	200	59	60	2%	37	46%	38

(All results in mg/kg unless otherwise noted)

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C₆-C₉ = carbon chainlength fraction of petroleum hydrocarbon

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Nominated Investigation Levels:

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(2) Chemical Hazards and Emergency Management (CHEM) Unit (1991) Draft TPH and BTEX Guidelines in Soil.

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 5
SOIL ANALYTICAL RESULTS - VHCs
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code Field ID Sampled Date					08-Ap01260	08-Ap01263	08-Ap01267	08-Ap01271	08-Ap01275	08-Ap01278	08-Ap01279	08-Ap01288	08-Ap12048	08-Ap12051	08-Ap12054
					SB01 6.9-7.1	SB02 6.9-7.1	SB03 6.9-7.1	SB04 5.9-6.1	SB05 6.9-7.1	SB06 6.7-6.8	SB07 0-0.2	SB11 0-0.2	SB14 3.9-4.1	SB15 7.9-8.1	SB16 4.2-4.5
					26/03/2008	26/03/2008	26/03/2008	26/03/2008	28/03/2008	28/03/2008	28/03/2008	29/03/2008	21/04/2008	21/04/2008	22/04/2008
Chemistry Group	Analyte	Units	LOR	NIL (1&2)											
VHC	1,1,1,2-tetrachloroethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,1,1-trichloroethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,1,2,2-tetrachloroethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,1,2-trichloroethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	2.6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,1-dichloroethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,1-dichloroethene	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,2,3-trichloropropane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,2-dibromoethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	0.53	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,2-dichlorobenzene	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,2-dichloroethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05
	1,2-dichloropropane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,3-dichlorobenzene	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,3-dichloropropane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,4-dichlorobenzene	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Bromodichloromethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Bromoform	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Bromomethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Carbon tetrachloride	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chlorobenzene	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chlorodibromomethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chloroform	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chloromethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	cis-1,2-dichloroethene	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	cis-1,3-dichloropropene	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dibromomethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloromethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Iodomethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	TCE	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Tetrachloroethene	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	trans-1,2-dichloroethene	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	trans-1,3-dichloropropene	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Trichlorofluoromethane	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Vinyl chloride	mg/kg	0.05	NE	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

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Results Values in highlighted cells exceed nominated investigation criteria

TABLE 5
SOIL ANALYTICAL RESULTS - VHCs
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code				08-Ap12058	08-Ap12059	08-Ap12073	08-Ap12061	08-Ap12063	08-Ap12066	08-Ap12067	08-Ap12071	08-Ap12072	08-Ap12074	08-Ap12077
Field ID				SB18 4.9-5.1	SB19 0.4-0.6	QC15	SB20 0.0-0.2	SB21 0.0-0.2	SB22 2.9-3.1	SB23 0.4-0.6	SB25 0.9-1.1	QC14	QC16	SEDIMENT SAMPLE
Sampled Date				22/04/2008	22/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008	21/04/2008
Chemistry Group	Analyte	Units	LOR											
VHC	1,1,1,2-tetrachloroethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,1,1-trichloroethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,1,2,2-tetrachloroethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,1,2-trichloroethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,1-dichloroethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,1-dichloroethene	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,2,3-trichloropropane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,2-dibromoethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,2-dichlorobenzene	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,2-dichloroethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,2-dichloropropane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,3-dichlorobenzene	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,3-dichloropropane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	1,4-dichlorobenzene	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Bromodichloromethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Bromoform	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Bromomethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Carbon tetrachloride	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chlorobenzene	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chlorodibromomethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chloroform	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Chloromethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	cis-1,2-dichloroethene	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	cis-1,3-dichloropropene	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dibromomethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dichloromethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Iodomethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	TCE	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Tetrachloroethene	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	trans-1,2-dichloroethene	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	trans-1,3-dichloropropene	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Trichlorofluoromethane	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Vinyl chloride	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₆-C₉ = carbon chainlength fraction of petroleum hydrocarbon

NA = Not applicable

HA = hand auger, SB = soil bore

Nominated Investigation Levels:

- (1) QLD DoE (1998) Queensland Department of Environment (now Environmental Protection Agency - EPA) Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (Environmental Investigation levels - EILs).
- (2) Chemical Hazards and Emergency Management (CHEM) Unit (1991) Draft TPH and BTEX Guidelines in Soil.

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 6
SOIL ANALYTICAL RESULTS - PAHS AND PHENOLS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS0880AA

Sample Code Field ID Sampled Date					08-Ap01259	08-Ap01260	08-Ap01261	08-Ap01263	08-Ap01264	08-Ap01266	08-Ap01267	08-Ap01268	08-Ap01271	08-Ap01272	08-Ap01275	08-Ap01278
					SB01 3.9-4.1	SB01 6.9-7.1	SB02 1.9-2.1	SB02 6.9-7.1	SB02 12.9-13.1	SB03 2.9-3.1	SB03 6.9-7.1	SB03 11.9-12.1	SB04 5.9-6.1	SB04 11.9-12.1	SB05 6.9-7.1	SB06 6.7-6.8
					26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	26/03/2008	28/03/2008	28/03/2008
Chemistry Group	Analyte	Units	LOR	NIL (1)												
PAH	Acenaphthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Acenaphthylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(a)anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(a) pyrene	mg/kg	0.1	1*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(b)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(g,h,i)perylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(k)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chrysene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Dibenz(a,h)anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Fluorene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Naphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	20	<0.1	<0.1	<0.1
	Phenanthrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1
	Pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	PAHs (Sum of total)	mg/kg	0.1	20*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	20.3	<0.1	<0.1	<0.1
Phenol	2,4,6-trichlorophenol	mg/kg	0.1		<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	2,4-dichlorophenol	mg/kg	0.1		<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	2,4-dimethylphenol	mg/kg	0.1		<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	2,6-dichlorophenol	mg/kg	0.1		<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	2-chlorophenol	mg/kg	0.1		<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	2-methylphenol	mg/kg	0.1		<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	2-nitrophenol	mg/kg	0.5		<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	3-&4-methylphenol	mg/kg	0.2		<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	4-chloro-3-methylphenol	mg/kg	0.1		<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Pentachlorophenol	mg/kg	0.5		<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenol	mg/kg	0.1		<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₉-C₉ = carbon chainlength fraction of petroleum hydrocarbon

NA = Not applicable

HA = hand auger, SB = soil bore

Nominated Investigation Levels:

(1) QLD DoE (1998) Queensland Department of Environment (now Environmental Protection Agency
- EPA) Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland
(Environmental Investigation levels - EILs).

* = no EILs established so health based investigation levels for standard residential sites (Exposure Setting A) have been used.

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 6
SOIL ANALYTICAL RESULTS - PAHS AND PHENOLS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS0880AA

Sample Code Field ID Sampled Date					08-Ap01279 SB07 0-0.2 28/03/2008	08-Ap01280 SB07 5.9-6.1 28/03/2008	08-Ap01283 SB08 4.9-5.1 28/03/2008	08-Ap01285 SB09 4.9-5.1 28/03/2008	08-Ap01288 SB11 0-0.2 29/03/2008	08-Ap01290 SB12 0-0.2 29/03/2008	08-Ap01293 SB13 7.9-8.1 29/03/2008	08-Ap07681 SB05 11.9-12 26/03/2008	08-Ap07682 SB05 14.8-15 26/03/2008	08-Ap07683 SB05 9.9-10 26/03/2008	08-Ap12048 SB14 3.9-4.1 21/04/2008	08-Ap12050 SB15 3.9-4.1 21/04/2008	08-Ap12053 SB16 0.9-1.1 22/04/2008	08-Ap12072 QC14 21/04/2008		60531-1 QC14A 21/04/2008		
Chemistry Group	Analyte	Units	LOR	NIL (1)														Duplicate of SB16 0.9-1.1	RPD	Triplicate of SB16 0.9-1.1	RPD	
PAH	Acenaphthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1		
	Acenaphthylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Benzo(a)anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Benzo(a) pyrene	mg/kg	0.1	1*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.05	NA	
	Benzo(b)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Benzo(g,h,i)perylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Benzo(k)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Chrysene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Dibenz(a,h)anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Fluorene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Naphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.5	<0.1	<0.1	NA	<0.1	NA
	Phenanthrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA
	Pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA
	PAHs (Sum of total)	mg/kg	0.1	20*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.5	<0.1	<0.1	NA	<0.1	NA
Phenol	2,4,6-trichlorophenol	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	2,4-dichlorophenol	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	2,4-dimethylphenol	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	2,6-dichlorophenol	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	2-chlorophenol	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	2-methylphenol	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	2-nitrophenol	mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	NA	<0.5	NA	
	3-&4-methylphenol	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	<0.2	<0.2	<0.2	<0.2	NA	<0.2	NA	
	4-chloro-3-methylphenol	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	
	Pentachlorophenol	mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	NA	<0.5	NA	
Phenol	mg/ka	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA		

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₉-C₉ = carbon chainlength fraction of petroleum hydrocarbon

NA = Not applicable

HA = hand auger, SB = soil bore

Nominated Investigation Levels:

(1) QLD DoE (1998) Queensland Department of Environment (now Environmental Protection Agency - EPA) Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (Environmental Investigation levels - EILs).

* = no EILs established so health based investigation levels for standard residential sites (Exposure Setting A) have t

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 6
SOIL ANALYTICAL RESULTS - PAHs AND PHENOLS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVINEWS0880AA

Sample Code Field ID Sampled Date					08-Ap12054 SB16 4.2-4.5 22/04/2008
Chemistry Group	Analyte	Units	LOR	NIL (1)	
PAH	Acenaphthene	mg/kg	0.1		<0.1
	Acenaphthylene	mg/kg	0.1		<0.1
	Anthracene	mg/kg	0.1		<0.1
	Benz(a)anthracene	mg/kg	0.1		<0.1
	Benzo(a) pyrene	mg/kg	0.1	1*	<0.1
	Benzo(b)fluoranthene	mg/kg	0.1		<0.1
	Benzo(g,h,i)perylene	mg/kg	0.1		<0.1
	Benzo(k)fluoranthene	mg/kg	0.1		<0.1
	Chrysene	mg/kg	0.1		<0.1
	Dibenz(a,h)anthracene	mg/kg	0.1		<0.1
	Fluoranthene	mg/kg	0.1		<0.1
	Fluorene	mg/kg	0.1		<0.1
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1		<0.1
	Naphthalene	mg/kg	0.1		<0.1
	Phenanthrene	mg/kg	0.1		<0.1
	Pyrene	mg/kg	0.1		<0.1
	PAHs (Sum of total)	mg/kg	0.1	20*	<0.1
Phenol	2,4,6-trichlorophenol	mg/kg	0.1		<0.1
	2,4-dichlorophenol	mg/kg	0.1		<0.1
	2,4-dimethylphenol	mg/kg	0.1		<0.1
	2,6-dichlorophenol	mg/kg	0.1		<0.1
	2-chlorophenol	mg/kg	0.1		<0.1
	2-methylphenol	mg/kg	0.1		<0.1
	2-nitrophenol	mg/kg	0.5		<0.5
	3-&4-methylphenol	mg/kg	0.2		<0.2
	4-chloro-3-methylphenol	mg/kg	0.1		<0.1
	Pentachlorophenol	mg/kg	0.5		<0.5
	Phenol	mg/kg	0.1		<0.1

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₆-C₉ = carbon chainlength fraction of petroleum hydrocarbon

NA = Not applicable

HA = hand auger, SB = soil bore

been used.

TABLE 6
SOIL ANALYTICAL RESULTS - PAHS AND PHENOLS
ENVIRONMENTAL SITE ASSESSMENT
CALTEx ESK
ENVNEWS0880AA

Sample Code Field ID Sampled Date					08-Ap12058 SB18 4.9-5.1 22/04/2008	08-Ap12059 SB19 0.4-0.6 22/04/2008	08-Ap12073 QC15 21/04/2008		60531-2 QC15A 21/04/2008		08-Ap12061 SB20 0.0-0.2 21/04/2008	08-Ap12066 SB22 2.9-3.1 21/04/2008	08-Ap12067 SB23 0.4-0.6 21/04/2008	08-Ap12069 SB24 0.0-0.2 21/04/2008	08-Ap12071 SB25 0.9-1.1 21/04/2008	08-Ap12079 SB25 4.8 21/04/2008	08-Ap12074 QC16 21/04/2008		60531-3 QC16A 21/04/2008	08-Ap12077 SEDIMENT SAMPLE 21/04/2008		
Chemistry Group	Analyte	Units	LOR	NIL (1)			Duplicate of SB19 0.4-0.6	RPD	Triplicate of SB19 0.4-0.6	RPD							Duplicate of SB25 4.8	RPD	Triplicate of SB25 4.8	RPD		
PAH	Acenaphthene	mg/kg	0.1		<0.1	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	
	Acenaphthylene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	
	Anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	
	Benz(a)anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Benzo(a) pyrene	mg/kg	0.1	1*	<0.1	<0.1	<0.1	NA	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.05	NA	<0.1
	Benzo(b)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Benzo(g,h,i)perylene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Benzo(k)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Chrysene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Dibenz(a,h)anthracene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Fluorene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Naphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Phenanthrene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Pyrene	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	PAHs (Sum of total)	mg/kg	0.1	20*	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
Phenol	2,4,6-trichlorophenol	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	2,4-dichlorophenol	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	2,4-dimethylphenol	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	2,6-dichlorophenol	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	2-chlorophenol	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	2-methylphenol	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	2-nitrophenol	mg/kg	0.5		<0.5	<0.5	<0.5	NA	<0.5	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	<0.5	NA	<0.5
	3-&4-methylphenol	mg/kg	0.2		<0.2	<0.2	<0.2	NA	<0.2	NA	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA	<0.2	NA	<0.2
	4-chloro-3-methylphenol	mg/kg	0.1		<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	NA	<0.1
	Pentachlorophenol	mg/kg	0.5		<0.5	<0.5	<0.5	NA	<0.5	NA	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	<0.5	NA	<0.5
Phenol	mg/kg	0.1		<0.1	<0.1	<0.1	NA	0.4	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	0.4	NA	<0.1	

(All results in mg/kg unless otherwise noted)

Notes:

"#" = all constituent analytes below LOR

"-" = not analysed

ppm = parts per million

mg/kg = milligrams per kilogram

NE = not established

TPH = total petroleum hydrocarbons

C₆-C₉ = carbon chainlength fraction of petroleum hydrocarbon

NA = Not applicable

HA = hand auger, SB = soil bore

Nominated Investigation Levels:

(1) QLD DoE (1998) Queensland Department of Environment (now Environmental Protection Agency - EPA) Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (Environmental Investigation levels - EILs).

* = no EILs established so health based investigation levels for standard residential sites (Exposure Setting A) have been used.

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 7
GROUNDWATER ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code						08-Ap05318	08-Ap05319	08-Ap05320	08-Ap05321	08-Ap05322	08-Ap05323	08-MY04513
Field ID						MW01	MW02	MW03	MW04	MW05	MW06	MW07
Sampled Date						9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/05/2008
Chemistry Group	Analyte	Units	LOR	ANZECC 2000 Freshwater 95% (2)	DUTCH 2000 Intervention (1)							
BTEX	Benzene	µg/L	1	950	30	4	<1	800	<1	<1	<1	<1
	Ethylbenzene	µg/L	1	80	150	<1	<1	32	<1	<1	<1	<1
	Toluene	µg/L	1	180	1000	2	<1	690	<1	<1	<1	<1
	Xylene Total	µg/L	1	75	70	5	<1	120	<1	<1	<1	<1
TPH	TPH C 6 - C 9 Fraction	µg/L	20	NE	NE	120	<20	2300	<20	<20	<20	<20
	TPH C10 - C14 Fraction	µg/L	50	NE	NE	<50	<50	<50	<50	<50	<50	<50
	TPH C15 - C28 Fraction	µg/L	100	NE	NE	<100	<100	<100	<100	<100	<100	<100
	TPH C29-C36 Fraction	µg/L	100	NE	NE	<100	<100	<100	<100	<100	<100	<100
	TPH+C10 - C36 (Sum of total)	µg/L		NE	600	<250	<250	<250	<250	<250	<250	<250

Notes:

SB = Soil Bore; MW = Permanent Groundwater Monitoring Well; QC = Quality Control Sample; FD = Field Duplicate.

"*" = See Lab Methods & Description Table

"#" = All constituent analyte concentrations are below LOR.

"-" = Analysis not requested

"m" = metres

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

Nominated Investigation Levels:

1. Dutch Intervention Guidelines (2000) Guideline indicator for 'significant' level of impact impairing multifunctional land uses
2. Australia and New Zealand Environment and Conservation (ANZECC)(2000) Australian Water Quality Guidelines for Protection of 95% of Species in Fresh and Marine Waters

Results

Values in highlighted cells exceed nominated investigation criteria

TABLE 7
GROUNDWATER ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code						08-MY04514	08-MY04515	60915-1		
Field ID						MW08	QC17	QC17A		
Sampled Date						9/05/2008	9/05/2008	9/05/2008		
Chemistry Group	Analyte	Units	LOR	ANZECC 2000 Freshwater 95% (2)	DUTCH 2000 Intervention (1)		Duplicate of MW08	RPD	Triplicate of MW08	RPD
BTEX	Benzene	µg/L	1	950	30	8000	8100	1%	8600	7%
	Ethylbenzene	µg/L	1	80	150	650	690	6%	740	13%
	Toluene	µg/L	1	180	1000	15000	15000	0%	13000	14%
	Xylene Total	µg/L	1	75	70	9400	9600	2%	10951	15%
TPH	TPH C 6 - C 9 Fraction	µg/L	20	NE	NE	33000	33000	0%	48000	37%
	TPH C10 - C14 Fraction	µg/L	50	NE	NE	4700	4300	9%	4400	7%
	TPH C15 - C28 Fraction	µg/L	100	NE	NE	100	200	67%	<200	NA
	TPH C29-C36 Fraction	µg/L	100	NE	NE	<100	<100	NA	<200	NA
	TPH+C10 - C36 (Sum of total)	µg/L		NE	600	4800	4500	6%	4400	9%

Notes:

SB = Soil Bore; MW = Permanent Groundwater Monitoring Well; QC = Quality Control Sample; FI Duplicate.

"*" = See Lab Methods & Description Table

"#" = All constituent analyte concentrations are below LOR.

-' = Analysis not requested

"m" = metres

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

Nominated Investigation Criteria:

1. Dutch Intervention Guidelines (2000) Guideline indicator for 'significant' level of impact impairing multifunctional land uses
2. Australia and New Zealand Environment and Conservation (2000) Australian Water Quality Guidelines for Protection of 95% of Species in Fresh and Marine Waters

Results

Values in highlighted cells exceed nominated investigation criteria

TABLE 7
GROUNDWATER ANALYTICAL RESULTS - TPH AND BTEX
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code						08-Ap05324	08-Ap05325	60164-1	08-Ap05326	08-Ap05327	08-MY04516	08-MA01584
Field ID						MWA	QC8	QC8A	QC9	QC10	QC18	POND
Sampled Date						9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/05/2008	29/02/2008
Chemistry Group	Analyte	Units	LOR	ANZECC 2000 Freshwater 95% (2)	DUTCH 2000 Intervention (1)		Duplicate of MWA	RPD	Triplicate of MWA	RPD		
BTEX	Benzene	µg/L	1	950	30	7300	7600	4%	5800	23%	<1	<1
	Ethylbenzene	µg/L	1	80	150	1500	1600	6%	1500	0%	<1	<1
	Toluene	µg/L	1	180	1000	6200	6100	2%	5200	18%	<1	<1
	Xylene Total	µg/L	1	75	70	7600	7800	3%	7383	3%	<1	<1
TPH	TPH C 6 - C 9 Fraction	µg/L	20	NE	NE	23000	24000	4%	31000	30%	<20	<20
	TPH C10 - C14 Fraction	µg/L	50	NE	NE	6100	9900	48%	6800	11%	<50	<50
	TPH C15 - C28 Fraction	µg/L	100	NE	NE	<100	<100	NA	<200	NA	<100	<100
	TPH C29-C36 Fraction	µg/L	100	NE	NE	<100	<100	NA	<200	NA	<100	<100
	TPH+C10 - C36 (Sum of total)	µg/L		NE	600	6100	9900	48%	6800	11%	<250	<250

Notes:

SB = Soil Bore; MW = Permanent Groundwater Monitoring Well; QC = Quality Control Sample; FI Duplicate.

"*" = See Lab Methods & Description Table

"#" = All constituent analyte concentrations are below LOR.

"-" = Analysis not requested

"m" = metres

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

Nominated Investigation Levels:

1. Dutch Intervention Guidelines (2000) Guideline indicator for 'significant' level of impact impairing multifunctional land uses

2. Australia and New Zealand Environment and Conservation (2000) Australian Water Quality Guidelines for Protection of 95% of Species in Fresh and Marine Waters

Results

Values in highlighted cells exceed nominated investigation criteria

TABLE 8
GROUNDWATER ANALYTICAL RESULTS - METALS
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code					08-Ap05318	08-Ap05319	08-Ap05320	08-Ap05321	08-Ap05322	08-Ap05323	08-Ap05324
Field ID					MW01	MW02	MW03	MW04	MW05	MW06	MWA
Sampled Date					9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Chemistry Group	Analyte	Units	LOR	NIL							
Metals	Arsenic	mg/L	0.001	0.0013 ⁽²⁾	0.003	0.005	0.007	0.008	0.014	0.007	0.009
	Cadmium	mg/L	0.0002	0.0002 ⁽²⁾	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium (total)	mg/L	0.001	0.001 ⁽²⁾	0.028	0.02	0.027	0.031	0.053	0.021	0.033
	Copper	mg/L	0.001	0.0014 ⁽²⁾	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Lead	mg/L	0.001	0.0034 ⁽²⁾	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
	Mercury	mg/L	0.0001	0.0006 ⁽²⁾	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Nickel	mg/L	0.001	0.011 ⁽²⁾	0.003	0.003	0.003	0.003	0.002	0.005	0.003
	Zinc	mg/L	0.001	0.008 ⁽²⁾	0.027	0.026	0.015	0.015	0.017	0.047	<0.001

Notes:

SB = Soil Bore; MW = Permanent Groundwater Monitoring Well;

QC = Quality Control Sample; FD = Field duplicate

"*" = See Lab Methods & Description Table

"#" = All constituent analyte concentrations are below

"-" = Analysis not requested

"m" = metres

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

Nominated Investigation Levels:

1. Dutch Intervention Guidelines (2000) Guideline indicator for 'significant' level of impact impairing multifunctional land uses

2. Australia and New Zealand Environment and Conservation (2000) Australian Water Quality Guidelines for Protection of 95% of Species in Fresh Waters

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 8
GROUNDWATER ANALYTICAL RESULTS - METALS
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code					08-Ap05325	60164-1		08-Ap05326	08-MY04513	08-MY04514	08-MY04515		08-MY04516	
Field ID					QC8	QC8A		QC9	MW07	MW08	QC17		QC18	
Sampled Date					9/04/2008		9/04/2008		9/04/2008	9/05/2008	9/05/2008	9/05/2008		9/05/2008
Chemistry Group	Analyte	Units	LOR	NIL	Duplicate of MWA	RPD	Triplicate of MWA	RPD				Duplicate of MW08	RPD	
Metals	Arsenic	mg/L	0.001	0.0013 ⁽²⁾	0.008	12%	0.0046	65%	<0.001	0.002	0.002	0.002	0%	<0.001
	Cadmium	mg/L	0.0002	0.0002 ⁽²⁾	<0.0002	NA	<0.0001	NA	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002
	Chromium (total)	mg/L	0.001	0.001 ⁽²⁾	0.032	3%	0.0049	148%	<0.001	0.012	0.007	0.005	33%	<0.001
	Copper	mg/L	0.001	0.0014 ⁽²⁾	<0.001	NA	NA	NA	<0.001	<0.001	<0.001	<0.001	NA	<0.001
	Lead	mg/L	0.001	0.0034 ⁽²⁾	0.003	0%	0.0039	26%	<0.001	<0.001	<0.001	<0.001	NA	<0.001
	Mercury	mg/L	0.0001	0.0006 ⁽²⁾	<0.0001	NA	NA	NA	<0.0001	<0.0001	<0.0001	<0.0005	NA	<0.0001
	Nickel	mg/L	0.001	0.011 ⁽²⁾	0.003	0%	0.0069	79%	<0.001	<0.001	0.005	0.006	18%	<0.001
	Zinc	mg/L	0.001	0.008 ⁽²⁾	0.027	NA	0.0082	NA	<0.001	0.064	0.034	0.036	6%	<0.001

Notes:

SB = Soil Bore; MW = Permanent Groundwater Monitoring Well;

QC = Quality Control Sample; FD = Field duplicate

"*" = See Lab Methods & Description Table

"#" = All constituent analyte concentrations are below

'-' = Analysis not requested

"m" = metres

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

Nominated Investigation Levels:

1. Dutch Intervention Guidelines (2000) Guideline indicator for 'significant' level of impact impairing multifunctional land uses

2. Australia and New Zealand Environment and Conservation (2000) Australian Water Quality Guidelines for Protection of 95% of Species in Fresh and Waters

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 9
GROUNDWATER ANALYTICAL RESULTS - PAHs AND PHENOLS
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code Field ID						08-Ap05318	08-Ap05319	08-Ap05320	08-Ap05321	08-Ap05322	08-Ap05323
Sampled Date						MW01	MW02	MW03	MW04	MW05	MW06
						9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Chemistry Group	Analyte	Units	LOR	ANZECC 2000 Freshwater 95%	DUTCH 2000 Intervention						
PAH	Acenaphthene	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1
	Acenaphthylene	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1
	Anthracene	µg/L	1	NE	5	<1	<1	<1	<1	<1	<1
	Benz(a)anthracene	µg/L	1	NE	0.5	<1	<1	<1	<1	<1	<1
	Benzo(a) pyrene	µg/L	1	NE	0.05	<1	<1	<1	<1	<1	<1
	Benzo(b)fluoranthene	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1
	Benzo(g,h,i)perylene	µg/L	1	NE	0.05	<1	<1	<1	<1	<1	<1
	Benzo(k)fluoranthene	µg/L	1	NE	0.05	<1	<1	<1	<1	<1	<1
	Chrysene	µg/L	1	NE	0.2	<1	<1	<1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1
	Fluoranthene	µg/L	1	NE	1	<1	<1	<1	<1	<1	<1
	Fluorene	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	NE	0.05	<1	<1	<1	<1	<1	<1
	Naphthalene	µg/L	1	16	70	<1	<1	<1	<1	<1	<1
	Phenanthrene	µg/L	1	NE	5	<1	<1	<1	<1	<1	<1
	Pyrene	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1
	PAHs (Sum of total)	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1
	2,4,6-trichlorophenol	µg/L	1	20	NE	<1	<1	<1	<1	<1	<1
	2,4-dichlorophenol	µg/L	1	160	NE	<1	<1	<1	<1	<1	<1
Phenol	2,4-dimethylphenol	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1
	2,6-dichlorophenol	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1
	2-chlorophenol	µg/L	1	490	NE	<1	<1	<1	<1	<1	<1
	2-methylphenol	µg/L	1	NE	NE	<1	<1	8	<1	<1	<1
	2-nitrophenol	µg/L	5	NE	NE	<5	<5	<5	<5	<5	<5
	3-&4-methylphenol	µg/L	2	NE	NE	<2	<2	<2	<2	<2	<2
	4-chloro-3-methylphenol	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1
	Pentachlorophenol	µg/L	5	10	NA	<5	<5	<5	<5	<5	<5
	Phenol	µg/L	1	320	NA	<1	<1	2	<1	<1	<1

Notes:

SB = Soil Bore; MW = Permanent Groundwater Monitoring Well; QC = Quality Control
Sample; FD = Field duplicate
"nt" = See Lab Methods & Description Table
"#" = All constituent analyte concentrations are below
"-" = Analysis not requested

"m" = metres

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

Nominated Investigation Levels:

1. Dutch Intervention Guidelines (2000) Guideline indicator for "significant" level of impact impairing multifunctional land
2. Australia and New Zealand Environment and Conservation (2000) Australian Water Quality Guidelines for Protection of 95% of Species in Fresh Waters

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 9
GROUNDWATER ANALYTICAL RESULTS - PAHs AND PHENOLS
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code					08-Ap05324	08-Ap05325	60164-1	08-Ap05326			
Field ID					MWA	QC8	QC8A	QC9			
Sampled Date					9/04/2008	9/04/2008	9/04/2008	9/04/2008			
Chemistry Group	Analyte	Units	LOR	ANZECC 2000 Freshwater 95%	DUTCH 2000 Intervention	Duplicate of MWA	RPD	Triplicate of MWA	RPD		
PAH	Acenaphthene	µg/L	1	NE	NE	<1	<1	NA	<0.5	NA	<1
	Acenaphthylene	µg/L	1	NE	NE	<1	<1	NA	<0.5	NA	<1
	Anthracene	µg/L	1	NE	5	<1	<1	NA	<0.5	NA	<1
	Benz(a)anthracene	µg/L	1	NE	0.5	<1	<1	NA	<0.5	NA	<1
	Benzo(a) pyrene	µg/L	1	NE	0.05	<1	<1	NA	<0.5	NA	<1
	Benzo(b)fluoranthene	µg/L	1	NE	NE	<1	<1	NA	<0.5	NA	<1
	Benzo(g,h,i)perylene	µg/L	1	NE	0.05	<1	<1	NA	<0.5	NA	<1
	Benzo(k)fluoranthene	µg/L	1	NE	0.05	<1	<1	NA	<0.5	NA	<1
	Chrysene	µg/L	1	NE	0.2	<1	<1	NA	<0.5	NA	<1
	Dibenz(a,h)anthracene	µg/L	1	NE	NE	<1	<1	NA	<0.5	NA	<1
	Fluoranthene	µg/L	1	NE	1	<1	<1	NA	<0.5	NA	<1
	Fluorene	µg/L	1	NE	NE	<1	<1	NA	<0.5	NA	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	NE	0.05	<1	<1	NA	<0.5	NA	<1
	Naphthalene	µg/L	1	16	70	91	150	49%	110	19%	<1
	Phenanthrene	µg/L	1	NE	5	<1	<1	NA	<0.5	NA	<1
	Pyrene	µg/L	1	NE	NE	<1	<1	NA	<0.5	NA	<1
	Phenol	PAHs (Sum of total)	µg/L	1	NE	NE	91	150	NA	<0.5	NA
2,4,6-trichlorophenol		µg/L	1	20	NE	<1	<1	NA	<0.5	NA	<1
2,4-dichlorophenol		µg/L	1	160	NE	<1	<1	NA	<0.5	NA	<1
2,4-dimethylphenol		µg/L	1	NE	NE	26	<20	NA	<0.5	NA	<1
2,6-dichlorophenol		µg/L	1	NE	NE	<1	<1	NA	<0.5	NA	<1
2-chlorophenol		µg/L	1	490	NE	<1	<1	NA	<0.5	NA	<1
2-methylphenol		µg/L	1	NE	NE	38	<50	NA	<0.5	NA	<1
2-nitrophenol		µg/L	5	NE	NE	<5	<5	NA	<0.5	NA	<5
3-&4-methylphenol		µg/L	2	NE	NE	9	<10	NA	<0.5	NA	<2
4-chloro-3-methylphenol		µg/L	1	NE	NE	<1	<1	NA	<0.5	NA	<1
Pentachlorophenol		µg/L	5	10	NA	<5	<5	NA	<0.5	NA	<5
Phenol	µg/L	1	320	NA	18	<1	NA	<0.5	NA	<1	

Notes:

SB = Soil Bore; MW = Permanent Groundwater Monitoring Well; QC = Quality Control
Sample; FD = Field duplicate

"*" = See Lab Methods & Description Table

"#" = All constituent analyte concentrations are below

"-" = Analysis not requested

"m" = metres

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

Nominated Investigation Levels:

1. Dutch Intervention Guidelines (2000) Guideline indicator for 'significant' level of impact impairing multifunctional land uses
2. Australia and New Zealand Environment and Conservation (2000) Australian Water Quality Guidelines for Protection of 95% of Species in Fresh Waters

Results Values in highlighted cells exceed nominated investigation criteria

TABLE 10
GROUNDWATER ANALYTICAL RESULTS - VHCs
ENVIRONMENTAL SITE ASSESSMENT
CALTEX ESK
ENVINEWS08580AA

Sample Code Field ID Sampled Date						08-Ap05318	08-Ap05319	08-Ap05320	08-Ap05321	08-Ap05322	08-Ap05323	08-Ap05324	08-Ap05325	08-Ap05326
						MW01	MW02	MW03	MW04	MW05	MW06	MWA	QC8	QC9
						9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Chemistry Group	Analyte	Units	LOR	ANZECC 2000 Freshwater 95%	DUTCH 2000 Intervention								Duplicate of MWA	RPD
VHC	1,1,1,2-tetrachloroethane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,1,1-trichloroethane	µg/L	1	NE	300	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,1,2,2-tetrachloroethane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,1,2-trichloroethane	µg/L	1	6500	130	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,1-dichloroethane	µg/L	1	NE	900	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,1-dichloroethene	µg/L	1	NE	10	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,2,3-trichloropropane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,2-dibromoethane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,2-dichlorobenzene	µg/L	1	160	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,2-dichloroethane	µg/L	1	NE	400	<1	<1	2	<1	<1	<1	16	14	13%
	1,2-dichloropropane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,3-dichlorobenzene	µg/L	1	260	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,3-dichloropropane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	1,4-dichlorobenzene	µg/L	1	60	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Bromodichloromethane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Bromoform	µg/L	1	NE	630	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Bromomethane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Carbon tetrachloride	µg/L	1	NE	10	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Chlorobenzene	µg/L	1	NE	180	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Chlorodibromomethane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Chloroform	µg/L	1	NE	400	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Chloromethane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	cis-1,2-dichloroethene	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	cis-1,3-dichloropropene	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Dibromomethane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Dichloromethane	µg/L	1	NE	1000	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Iodomethane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	TCE	µg/L	1	NE	500	<1	<1	<1	<1	<1	<1	1	1	NA
	Tetrachloroethene	µg/L	1	NE	40	<1	<1	<1	<1	<1	<1	<1	<1	NA
	trans-1,2-dichloroethene	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	trans-1,3-dichloropropene	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Trichlorofluoromethane	µg/L	1	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NA
	Vinyl chloride	µg/L	1	NE	5	<1	<1	<1	<1	<1	<1	<1	<1	NA

Notes:

SB = Soil Bore; MW = Permanent Groundwater Monitoring Well; QC = Quality Control Sample; FD =

Field duplicate

"*" = See Lab Methods & Description Table

"#" = All constituent analyte concentrations are below LOR.

"-" = Analysis not requested

"m" = metres

LOR = Limit of Reporting (= Method Detection Limit)

NE = Guideline not established

NA = Not Applicable

Nominated Investigation Levels:

1. Dutch Intervention Guidelines (2000) Guideline indicator for 'significant' level of impact impairing

2. Australia and New Zealand Environment and Conservation (2000) Australian Water Quality Guidelines for Protection of 95% of Species in Fresh Waters

Results

Values in highlighted cells exceed nominated investigation criteria

Table 2
Groundwater Analytical Results
Former Ampol Depot Esk

Field ID	MW1	MW2	MW3	QC2A	QC2	MW4	MW5	MW6	MW7	MW8	MW9	MWA	MWB	MW10	MW11	QC6A	QC6	MW12	MW13	MW14	MW15	MW16
Sample Code	M10-Ap03276	M10-JN00088	M10-Ap03277	SE77337-1	M10-Ap03286	M10-Ap03278	M10-Ap03279	M10-Ap03280	M10-Ap03281	M10-Ap03282	M10-JN00080	M10-Ap03283	M10-Ap03284	M10-JN00081	M10-JN00082	SE78686-1	M10-JN00090	M10-JN00083	M10-JN00084	M10-JN00085	M10-JN00086	M10-JN00087
Sampled Date	9/04/2010	27/05/2010	8/04/2010	8/04/2010	8/04/2010	9/04/2010	9/04/2010	9/04/2010	9/04/2010	8/04/2010	27/05/2010	8/04/2010	8/04/2010	27/05/2010	27/05/2010	27/05/2010	27/05/2010	26/05/2010	27/05/2010	27/05/2010	27/05/2010	27/05/2010

Analyte		Units	EQL	ANZECC 2000 Freshwater 95%																						
	TPH Aliphatic - >C10-C12	mg/L	0.05		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.49	-	-	-	<0.05	-	-	-
	TPH Aliphatic - >C12-C16	mg/L	0.1		-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	
	TPH Aliphatic - >C16-C21	mg/L	0.1		-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	
	TPH Aliphatic - >C21-C35	mg/L	0.1		-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	
	TPH Aliphatic - >C6-C8	mg/L	0.02		-	-	-	-	-	-	-	-	-	-	-	-	-	3.8	-	-	-	0.43	-	-	-	
	TPH Aliphatic - >C8-C10	mg/L	0.02		-	-	-	-	-	-	-	-	-	-	-	-	-	7.4	-	-	-	0.32	-	-	-	
	TPH > C35 Aliphatic	mg/L	0.25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	-	-	-	-	
	TPH Aromatic - >C10-C12	mg/L	0.05		-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	-	-	-	0.16	-	-	-	
	TPH Aromatic - >C12-C16	mg/L	0.1		-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	-	-	-	<0.1	-	-	-	
	TPH Aromatic - >C16-C21	mg/L	0.1		-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	
	TPH Aromatic - >C21-C35	mg/L	0.1		-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	
	TPH Aromatic - >C5-C7 (Benzene)	mg/L	0.02		-	-	-	-	-	-	-	-	-	-	-	-	-	3.2	-	-	-	0.83	-	-	-	
TPH Aromatic - >C7-C8	mg/L	0.02		-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	1.2	-	-	-		
TPH Aromatic - >C8-C10	mg/L	0.02		-	-	-	-	-	-	-	-	-	-	-	-	-	<20	-	-	-	<1	-	-	-		
BTX	Benzene	µg/L	0.5	950	56	48	3300	2800	3400	31	<1	<1	<1	8700	670	3600	32,000	73	3200	2600	3300	280	830	750	29	<1
	Ethylbenzene	µg/L	0.5	80	<1	1	140	130	150	2	<1	<1	<1	390	78	400	2400	14	1300	1400	1300	73	92	67	6	<1
	Toluene	µg/L	0.5	180	2	10	1200	1300	1300	<1	<1	<1	<1	2500	1400	460	40,000	130	10,000	9100	11,000	600	1200	750	36	<1
	Xylene (m & p)	µg/L	1	275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6700	-	-	-	-	-	-
	Xylene (o)	µg/L	0.5	350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2400	-	-	-	-	-	-
	Xylene Total	µg/L	1.5		<3	11	360	370	330	<3	<3	<3	<3	1100	560	290	14,000	80	8000	9100	8000	770	580	570	28	<3
Inorganics	TDS	mg/L	5		-	2700	-	-	-	2800	-	-	-	-	2800	-	-	2900	3100	2625	2800	2800	2800	2800	3200	
MAH	1,3,5-trimethylbenzene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	19	-	-	7	530	350	450	51	27	100	6	<1
	n-butylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21	-	-	-	-	-	-
	n-propylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250	-	-	-	-	-	-
	p-isopropyltoluene	µg/L	0.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	-	-	-	-	-	-
	sec-butylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-
	tert-butylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
Metals	Arsenic	mg/L	0.001		<0.001	<0.001	0.002	0.004	0.003	0.003	0.007	0.005	<0.001	0.024	<0.001	0.009	-	<0.001	<0.001	0.002	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0001	0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
	Chromium (III+VI)	mg/L	0.001		<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	Cobalt	mg/L	0.001		-	<0.001	-	-	-	-	-	-	-	-	0.002	-	-	0.002	0.002	-	0.002	0.002	0.003	0.005	0.001	0.002
	Copper	mg/L	0.001	0.0014	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	Lead	mg/L	0.001	0.0034	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	Mercury	mg/L	0.0001	0.0006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
	Molybdenum	mg/L	0.005		-	<0.005	-	-	-	-	-	-	-	-	<0.005	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	
	Nickel	mg/L	0.001	0.011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.003	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	Selenium	mg/L	0.001	0.011	-	<0.001	-	-	-	-	-	-	-	-	<0.001	-	-	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	
	Tin	mg/L	0.005		-	<0.005	-	-	-	-	-	-	-	-	<0.005	-	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	
	Zinc	mg/L	0.001	0.008	0.003	0.016	0.002	0.002	0.004	<0.001	0.002	<0.001	0.005	0.002	0.005	<0.001	-	<0.001	0.004	0.007	0.005	0.006	0.013	0.019	0.017	0.019
PAH	1-Methylnaphthalene	µg/L	0.5		-	-	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	µg/L	0.5		<1	-	-	<1	<0.5	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	µg/L	0.5		<1	-	-	<1	<0.5	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	µg/L	0.5		<1	-	-	<1	<0.5	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)anthracene	µg/L	0.5		<1	-	-	<1	<0.5	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	µg/L	0.5		<1	-	-	<1	<0.5	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)&(k)fluoranthene	µg/L	1		-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	µg/L	1		<1	-	-	<1	-	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	µg/L	0.5		<1	-	-	<1	<0.5	<1	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	µg/L	1		<1	-	-	<1	-	<1	<1	<1	<1	<1	-	-</										

Field ID	MW1	MW2	MW3	QC2A	QC2	MW4	MW5	MW6	MW7	MW8	MW9	MWA	MWB	MW10	MW11	QC6A	QC6	MW12	MW13	MW14	MW15	MW16
Sample Code	M10-Ap03276	M10-JN00088	M10-Ap03277	SE77337-1	M10-Ap03286	M10-Ap03278	M10-Ap03279	M10-Ap03280	M10-Ap03281	M10-Ap03282	M10-JN00080	M10-Ap03283	M10-Ap03284	M10-JN00081	M10-JN00082	SE78686-1	M10-JN00090	M10-JN00083	M10-JN00084	M10-JN00085	M10-JN00086	M10-JN00087
Sampled Date	9/04/2010	27/05/2010	8/04/2010	8/04/2010	8/04/2010	9/04/2010	9/04/2010	9/04/2010	9/04/2010	8/04/2010	27/05/2010	8/04/2010	8/04/2010	27/05/2010	27/05/2010	27/05/2010	27/05/2010	26/05/2010	27/05/2010	27/05/2010	27/05/2010	27/05/2010

Analyte		Units	EQL	ANZECC 2000 Freshwater 95%																							
TPH	TPH C6 - C9	µg/L	20		240	70	4900	6071	5200	30	<20	<20	<20	<20	13,000	2700	4700	89,000	880	32,000	27,000	32,000	2700	4700	4800	400	<20
	TPH C10 - C14	µg/L	50		<50	<50	160	<100	180	<50	<50	<50	<50	1200	320	1100	-	<50	3800	2270	4400	570	230	1100	<50	<50	
	TPH C15 - C28	µg/L	100		<100	<100	<100	<200	<100	<100	<100	<100	<100	<100	<100	<100	-	<100	<100	<200	<100	<100	<100	<100	<100	<100	
	TPH C29 - C36	µg/L	100		<100	<100	<100	<200	<100	200	<100	<100	<100	<100	<100	<100	-	<100	<100	<200	<100	<100	<100	<100	<100	<100	
	TPH+C10 - C36 (Sum of total)	µg/L		600	<250	<250	260	<500	280	275	<250	<250	<250	<250	1300	420	1200	-	<250	3900	2470	4500	670	330	1200	<250	<250
VHC	1,1,1,2-tetrachloroethane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,1,1-trichloroethane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,1,2,2-tetrachloroethane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,1,2-trichloroethane	µg/L	0.5	6500	-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,1-dichloroethane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,1-dichloroethene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,1-dichloropropene	µg/L	0.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
	1,2,3-trichlorobenzene	µg/L	0.5	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
	1,2,3-trichloropropane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,2,4-trichlorobenzene	µg/L	0.5	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
	1,2-dibromo-3-chloropropane	µg/L	0.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
	1,2-dibromoethane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<2	<0.5	<2	<1	<1	<1	<1	<1
	1,2-dichlorobenzene	µg/L	0.5	160	-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,2-dichloroethane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	8	-	-	-	<1	<1	<1	18	<1	<1	<1	<1	<1
	1,2-dichloropropane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,3-dichlorobenzene	µg/L	0.5	260	-	<1	-	-	-	-	-	-	-	-	<1	<1	<1	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,3-dichloropropane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	<1	<1	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	1,4-dichlorobenzene	µg/L	0.3	60	-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.3	<1	<1	<1	<1	<1	<1
	2-chlorotoluene	µg/L	0.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
	4-chlorotoluene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Bromobenzene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Bromochloromethane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Bromodichloromethane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Bromoform	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Bromomethane	µg/L	1		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<10	<1	<1	<1	<1	<1	<1
	Carbon tetrachloride	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Chlorobenzene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Chlorodibromomethane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Chloroethane	µg/L	1		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<5	<1	<1	<1	<1	<1	<1
	Chloroform	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Chloromethane	µg/L	1		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<5	<1	<1	<1	<1	<1	<1
	cis-1,2-dichloroethene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	cis-1,3-dichloropropene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	cis-1,4-Dichloro-2-butene	µg/L	1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-
	Dibromomethane	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Dichlorodifluoromethane	µg/L	1		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<5	<1	<1	<1	<1	<1	<1
	Dichloromethane	µg/L	1		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<5	<1	<1	<1	<1	<1	<1
	Hexachlorobutadiene	µg/L	1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-
	Iodomethane	µg/L	1		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<5	<1	<1	<1	<1	<1	<1
	Trichloroethene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	Tetrachloroethene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	trans-1,2-dichloroethene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	trans-1,3-dichloropropene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
	trans-1,4-Dichloro-2-butene	µg/L	1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-
	Trichlorofluoromethane	µg/L	1		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Vinyl chloride	µg/L	0.3		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.3	<1	<1	<1	<1	<1	<1
VOCs	1,2,4-trimethylbenzene	µg/L	0.5		-	3	-	-	-	-	-	-	-	-	60	-	-	-	17	1500	1500	1300	130	81	270	3	<1
	2,2-dichloropropane	µg/L	0.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
	2-Nitropropane	mg/L	0.1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-
	Isopropylbenzene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	4	-	-	-	2	98	110	100	7	8	15	1	<1
	Styrene	µg/L	0.5		-	<1	-	-	-	-	-	-	-	-	<1	-	-	-	<1	<1	<0.5	<1	<1	<1	<1	<1	<1

Coffey Environments Pty Ltd QLD
Level 2, 12 Creek Street
Brisbane
Queensland 4000

Certificate of Analysis



NATA Accredited
Accreditation Number 1261
Site Number 1254

This document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention sch4p4(6) Pers

Report 293524-S
Client Reference CALTEX ESK | ENAUBRIS08580
Received Date Mar 16, 2011

Client Sample ID			HA1_ 0.75-0.85	HA2_ 0.0-0.1	HA3_ 0.8-0.9	HA4_ 0.5-0.6
Sample Matrix			Soil	Soil	Soil	Soil
mgt-LabMark Sample No.			B11-MA57731	B11-MA57733	B11-MA57739	B11-MA57742
Date Sampled			Mar 14, 2011	Mar 14, 2011	Mar 15, 2011	Mar 15, 2011
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9 Fraction by GC	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14 Fraction by GC	50	mg/kg	< 50	< 50	< 50	< 50
TRH C15-C28 Fraction by GC	100	mg/kg	< 100	< 100	< 100	< 100
TRH C29-C36 Fraction by GC	100	mg/kg	< 100	< 100	< 100	< 100
TRH C10-36 (Total)	100	mg/kg	< 100	< 100	< 100	< 100
Monocyclic Aromatic Hydrocarbons						
Benzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
o-Xylene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Total m+p-Xylenes	0.10	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes(ortho.meta and para)	0.15	mg/kg	< 0.15	< 0.15	< 0.15	< 0.15
Fluorobenzene (surr.)	1	%	94	96	80	82
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.1	mg/kg	< 0.1	-	-	-
Acenaphthylene	0.1	mg/kg	< 0.1	-	-	-
Anthracene	0.1	mg/kg	< 0.1	-	-	-
Benz(a)anthracene	0.1	mg/kg	< 0.1	-	-	-
Benzo(a)pyrene	0.1	mg/kg	< 0.1	-	-	-
Benzo(b)fluoranthene	0.1	mg/kg	< 0.1	-	-	-
Benzo(g,h,i)perylene	0.1	mg/kg	< 0.1	-	-	-
Benzo(k)fluoranthene	0.1	mg/kg	< 0.1	-	-	-
Chrysene	0.1	mg/kg	< 0.1	-	-	-
Dibenz(a,h)anthracene	0.1	mg/kg	< 0.1	-	-	-
Fluoranthene	0.1	mg/kg	< 0.1	-	-	-
Fluorene	0.1	mg/kg	< 0.1	-	-	-
Indeno(1,2,3-cd)pyrene	0.1	mg/kg	< 0.1	-	-	-
Naphthalene	0.1	mg/kg	< 0.1	-	-	-
Phenanthrene	0.1	mg/kg	< 0.1	-	-	-
Pyrene	0.1	mg/kg	< 0.1	-	-	-
Total PAH	0.1	mg/kg	< 0.1	-	-	-
p-Terphenyl-d14 (surr.)	1	%	85	-	-	-
2-Fluorobiphenyl (surr.)	1	%	84	-	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	-	-	-
2,4-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	-
2,4,5-Trichlorophenol	1.0	mg/kg	< 1	-	-	-
2,4,6-Trichlorophenol	1.0	mg/kg	< 1	-	-	-

Client Sample ID Sample Matrix mgt-LabMark Sample No. Date Sampled			HA1_ 0.75-0.85 Soil B11-MA57731 Mar 14, 2011	HA2_0.0-0.1 Soil B11-MA57733 Mar 14, 2011	HA3_ 0.8-0.9 Soil B11-MA57739 Mar 15, 2011	HA4_ 0.5-0.6 Soil B11-MA57742 Mar 15, 2011
Test/Reference	LOR	Unit				
2,6-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	-
4-Chloro-3-methylphenol	1.0	mg/kg	< 1	-	-	-
Pentachlorophenol	1.0	mg/kg	< 1	-	-	-
Tetrachlorophenols - Total	5.0	mg/kg	< 5	-	-	-
Total Halogenated Phenol	1	mg/kg	< 1	-	-	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	20	mg/kg	< 20	-	-	-
2-Methyl-4,6-dinitrophenol	5	mg/kg	< 5	-	-	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	-	-	-
2-Nitrophenol	1.0	mg/kg	< 1	-	-	-
2,4-Dimethylphenol	0.5	mg/kg	< 0.5	-	-	-
2,4-Dinitrophenol	5	mg/kg	< 5	-	-	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	-	-	-
4-Nitrophenol	5	mg/kg	< 5	-	-	-
Dinoseb	20	mg/kg	< 20	-	-	-
Phenol	0.5	mg/kg	< 0.5	-	-	-
Total Non-Halogenated Phenol	20	mg/kg	< 20	-	-	-
Phenol-d6 (surr.)	1	%	74	-	-	-
% Moisture	0.1	%	15	21	21	12
Heavy Metals						
Lead	5	mg/kg	6.1	130	12	18

Client Sample ID			HA5_0.9-1.0	HA6_0.0-0.1	HA7_0.9-1.0	HA8_0.5-0.6
Sample Matrix			Soil	Soil	Soil	Soil
mgt-LabMark Sample No.			B11-MA57747	B11-MA57749	B11-MA57755	B11-MA57758
Date Sampled			Mar 14, 2011	Mar 14, 2011	Mar 15, 2011	Mar 15, 2011
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9 Fraction by GC	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14 Fraction by GC	50	mg/kg	< 50	< 50	< 50	< 50
TRH C15-C28 Fraction by GC	100	mg/kg	< 100	< 100	< 100	< 100
TRH C29-C36 Fraction by GC	100	mg/kg	< 100	< 100	< 100	< 100
TRH C10-36 (Total)	100	mg/kg	< 100	< 100	< 100	< 100
Monocyclic Aromatic Hydrocarbons						
Benzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
o-Xylene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Total m+p-Xylenes	0.10	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes(ortho.meta and para)	0.15	mg/kg	< 0.15	< 0.15	< 0.15	< 0.15
Fluorobenzene (surr.)	1	%	76	87	82	83
% Moisture	0.1	%	16	17	16	13
Heavy Metals						
Lead	5	mg/kg	9.5	16	8.6	20

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Client Sample ID			HA9_0.9-1.0	HA10_0.9-1.0	QC101
Sample Matrix			Soil	Soil	Soil
mgt-LabMark Sample No.			B11-MA57763	B11-MA57767	B11-MA57769
Date Sampled			Mar 15, 2011	Mar 14, 2011	Mar 14, 2011
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons					
TRH C6-C9 Fraction by GC	20	mg/kg	< 20	< 20	< 20
TRH C10-C14 Fraction by GC	50	mg/kg	< 50	< 50	< 50
TRH C15-C28 Fraction by GC	100	mg/kg	< 100	< 100	< 100
TRH C29-C36 Fraction by GC	100	mg/kg	< 100	< 100	< 100
TRH C10-36 (Total)	100	mg/kg	< 100	< 100	< 100
Monocyclic Aromatic Hydrocarbons					
Benzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Toluene	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Ethylbenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05
o-Xylene	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Total m+p-Xylenes	0.10	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes(ortho.meta and para)	0.15	mg/kg	< 0.15	< 0.15	< 0.15
Fluorobenzene (surr.)	1	%	79	77	82
% Moisture	0.1	%	17	16	15
Heavy Metals					
Lead	5	mg/kg	12	8.2	11

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Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - Method: TRH C6-C36 - MGT 100A	Melbourne	Mar 17, 2011	14 Day
Monocyclic Aromatic Hydrocarbons - Method: USEPA 8260B - MGT 350A Monocyclic Aromatic Hydrocarbons	Melbourne	Mar 17, 2011	14 Day
Polycyclic Aromatic Hydrocarbons - Method: USEPA 8270C Polycyclic Aromatic Hydrocarbons	Melbourne	Mar 17, 2011	14 Day
Phenols (Halogenated) - Method: USEPA 8270C Phenols	Melbourne	Mar 17, 2011	14 Day
Phenols (non-Halogenated) - Method: USEPA 8270C Phenols	Melbourne	Mar 17, 2011	14 Day
% Moisture - Method: Method 102 - ANZECC - % Moisture	Melbourne	Mar 17, 2011	14 Day
Heavy Metals - Method: USEPA 6020 Heavy Metals & USEPA 7470/71 Mercury	Melbourne	Mar 17, 2011	6 Month

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Company Name: Coffey Environments Pty Ltd QLD
Address: Level 2, 12 Creek Street
Brisbane
Queensland 4000

Order No.:
Report #: 293524
Phone: 07 3002 0400
Fax: 07 3002 0444

Received: Mar 16, 2011 12:00
Due: Mar 21, 2011 06:30
Priority: 3 Day
Contact name: sch4p4(6) Pers

Client Job No.: CALTEX ESK | ENAUBRIS08580

mgt-LabMark Client Manager: sch4p4(6)

Sample Detail					% Moisture	HOLD	Lead	Lead (filtered)	Monocyclic Aromatic Hydrocarbons	Polycyclic Aromatic Hydrocarbons	Total Recoverable Hydrocarbons	Phenols (IWRG 621)
Laboratory where analysis is conducted												
Melbourne Laboratory - NATA Site #1261					X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site #1645												
Sample ID	Sample Date	Sampling Time	Matrix	LAB ID								
HA1_0.0-0.1	Mar 14, 2011		Soil	B11-MA57729		X						
HA1_0.5-0.6	Mar 14, 2011		Soil	B11-MA57730		X						
HA1_0.75-0.85	Mar 14, 2011		Soil	B11-MA57731	X		X		X	X	X	X
HA1_1.9-2.0	Mar 14, 2011		Soil	B11-MA57732		X						
HA2_0.0-0.1	Mar 14, 2011		Soil	B11-MA57733	X		X		X		X	
HA2_0.5-0.6	Mar 14, 2011		Soil	B11-MA57734		X						
HA2_0.9-1.0	Mar 14, 2011		Soil	B11-MA57735		X						
HA2_1.9-2.0	Mar 14, 2011		Soil	B11-MA57736		X						
HA3_0.0-0.1	Mar 15, 2011		Soil	B11-MA57737		X						
HA3_0.5-0.6	Mar 15, 2011		Soil	B11-MA57738		X						

Company Name: Coffey Environments Pty Ltd QLD
Address: Level 2, 12 Creek Street
Brisbane
Queensland 4000

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Received: Mar 16, 2011 12:00
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mgt-LabMark Client Manager: sch4p4(6)

Sample Detail					% Moisture	HOLD	Lead	Lead (filtered)	Monocyclic Aromatic Hydrocarbons	Polycyclic Aromatic Hydrocarbons	Total Recoverable Hydrocarbons	Phenols (IWRG 621)
Laboratory where analysis is conducted												
Melbourne Laboratory - NATA Site #1261					X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site #1645												
HA3_0.8-0.9	Mar 15, 2011		Soil	B11-MA57739	X		X		X		X	
HA3_1.9-2.0	Mar 15, 2011		Soil	B11-MA57740		X						
HA4_0.0-0.1	Mar 15, 2011		Soil	B11-MA57741		X						
HA4_0.5-0.6	Mar 15, 2011		Soil	B11-MA57742	X		X		X		X	
HA4_0.9-1.0	Mar 15, 2011		Soil	B11-MA57743		X						
HA4_1.9-2.0	Mar 15, 2011		Soil	B11-MA57744		X						
HA5_0.0-0.1	Mar 14, 2011		Soil	B11-MA57745		X						
HA5_0.5-0.6	Mar 14, 2011		Soil	B11-MA57746		X						
HA5_0.9-1.0	Mar 14, 2011		Soil	B11-MA57747	X		X		X		X	
HA5_1.9-2.0	Mar 14, 2011		Soil	B11-MA57748		X						
HA6_0.0-0.1	Mar 14, 2011		Soil	B11-MA57749	X		X		X		X	
HA6_0.5-0.6	Mar 14, 2011		Soil	B11-MA57750		X						

Company Name: Coffey Environments Pty Ltd QLD
Address: Level 2, 12 Creek Street
Brisbane
Queensland 4000

Order No.:
Report #: 293524
Phone: 07 3002 0400
Fax: 07 3002 0444

Received: Mar 16, 2011 12:00
Due: Mar 21, 2011 06:30
Priority: 3 Day
Contact name: sch4p4(6) Per

Client Job No.: CALTEX ESK | ENAUBRIS08580

mgt-LabMark Client Manager: sch4p4(6)

Sample Detail					% Moisture	HOLD	Lead	Lead (filtered)	Monocyclic Aromatic Hydrocarbons	Polycyclic Aromatic Hydrocarbons	Total Recoverable Hydrocarbons	Phenols (IWRG 621)
Laboratory where analysis is conducted												
Melbourne Laboratory - NATA Site #1261					X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site #1645												
HA6_0.9-1.0	Mar 14, 2011		Soil	B11-MA57751		X						
HA6_1.9-2.0	Mar 14, 2011		Soil	B11-MA57752		X						
HA7_0.0-0.1	Mar 15, 2011		Soil	B11-MA57753		X						
HA7_0.5-0.6	Mar 15, 2011		Soil	B11-MA57754		X						
HA7_0.9-1.0	Mar 15, 2011		Soil	B11-MA57755	X		X		X		X	
HA7_1.9-2.0	Mar 15, 2011		Soil	B11-MA57756		X						
HA8_0.0-0.1	Mar 15, 2011		Soil	B11-MA57757		X						
HA8_0.5-0.6	Mar 15, 2011		Soil	B11-MA57758	X		X		X		X	
HA8_0.9-1.0	Mar 15, 2011		Soil	B11-MA57759		X						
HA8_1.9-2.0	Mar 15, 2011		Soil	B11-MA57760		X						
HA9_0.0-0.1	Mar 15, 2011		Soil	B11-MA57761		X						
HA9_0.5-0.6	Mar 15, 2011		Soil	B11-MA57762		X						

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Sample Detail					% Moisture	HOLD	Lead	Lead (filtered)	Monocyclic Aromatic Hydrocarbons	Polycyclic Aromatic Hydrocarbons	Total Recoverable Hydrocarbons	Phenols (IWRG 621)
Laboratory where analysis is conducted												
Melbourne Laboratory - NATA Site #1261					X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site #1645												
HA9_0.9-1.0	Mar 15, 2011		Soil	B11-MA57763	X		X		X		X	
HA9_1.9-2.0	Mar 15, 2011		Soil	B11-MA57764		X						
HA10_0.0-0.1	Mar 14, 2011		Soil	B11-MA57765		X						
HA10_0.3-0.4	Mar 14, 2011		Soil	B11-MA57766		X						
HA10_0.9-1.0	Mar 14, 2011		Soil	B11-MA57767	X		X		X		X	
HA10_1.9-2.0	Mar 14, 2011		Soil	B11-MA57768		X						
QC101	Mar 14, 2011		Soil	B11-MA57769	X		X		X		X	
QCW101	Mar 14, 2011		Water	B11-MA57770				X	X		X	
QCW102	Mar 14, 2011		Water	B11-MA57771				X	X		X	
HA1_0.9-1.0	Mar 14, 2011		Soil	B11-MA57772		X						

mgt-LabMark Internal Quality Control Review

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis.
7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001)

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as an RPD

UNITS

mg/kg: milligrams per Kilogram	mg/L: milligrams per litre
µg/l: micrograms per litre	ppm: Parts per million
ppb: Parts per billion	%: Percentage
org/100ml: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units

TERMS

Dry:	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR:	Limit Of Reporting.
SPIKE:	Addition of the analyte to the sample and reported as percentage recovery.
RPD:	Relative Percent Difference between two Duplicate pieces of analysis.
LCS:	Laboratory Control Sample - reported as percent recovery.
CRM:	Certified Reference Material - reported as percent recovery.
Method Blank:	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate:	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate:	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate:	A second piece of analysis from a sample outside of the client's batch of samples but run within the laboratory batch of analysis.
Batch SPIKE:	Spike recovery reported on a sample from outside of the client's batch of samples but run within the laboratory batch of analysis.
USEPA:	U.S Environmental Protection Agency
APHA:	American Public Health Association
ASLP:	Australian Standard Leaching Procedure (AS4439.3)
TCCLP:	Toxicity Characteristic Leaching Procedure
COC:	Chain Of Custody
SRA:	Sample Receipt Advice

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-20%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data below the LOR with a positive RPD
- eg: LOR 0.1, Result A = <0.1 (raw data is 0.02) & Result B = <0.1 (raw data is 0.03) resulting in a RPD of 40% calculated from the raw data.

Quality Control Results

Sample, Test, Result Reference	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Codes
Method Blank							
Total Recoverable Hydrocarbons TRH C6-C36 - MGT 100A							
TRH C6-C9 Fraction by GC	mg/kg	< 20			20	Pass	
TRH C10-C14 Fraction by GC	mg/kg	< 50			50	Pass	
TRH C15-C28 Fraction by GC	mg/kg	< 100			100	Pass	
TRH C29-C36 Fraction by GC	mg/kg	< 100			100	Pass	
Method Blank							
Monocyclic Aromatic Hydrocarbons USEPA 8260B - MGT 350A							
Benzene	mg/kg	< 0.05			0.05	Pass	
Toluene	mg/kg	< 0.05			0.05	Pass	
Ethylbenzene	mg/kg	< 0.05			0.05	Pass	
o-Xylene	mg/kg	< 0.05			0.05	Pass	
Total m+p-Xylenes	mg/kg	< 0.1			0.10	Pass	
Xylenes(ortho.meta and para)	mg/kg	< 0.15			0.15	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons USEPA 8270C Polycyclic A							
Acenaphthene	mg/kg	< 0.1			0.1	Pass	
Acenaphthylene	mg/kg	< 0.1			0.1	Pass	
Anthracene	mg/kg	< 0.1			0.1	Pass	
Benz(a)anthracene	mg/kg	< 0.1			0.1	Pass	
Benzo(a)pyrene	mg/kg	< 0.1			0.1	Pass	
Benzo(b)fluoranthene	mg/kg	< 0.1			0.1	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.1			0.1	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.1			0.1	Pass	
Chrysene	mg/kg	< 0.1			0.1	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.1			0.1	Pass	
Fluoranthene	mg/kg	< 0.1			0.1	Pass	
Fluorene	mg/kg	< 0.1			0.1	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1			0.1	Pass	
Naphthalene	mg/kg	< 0.1			0.1	Pass	
Phenanthrene	mg/kg	< 0.1			0.1	Pass	
Pyrene	mg/kg	< 0.1			0.1	Pass	
Method Blank							
Phenols (Halogenated) USEPA 8270C Phenols							
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2,4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2,4,5-Trichlorophenol	mg/kg	< 1			1.0	Pass	
2,4,6-Trichlorophenol	mg/kg	< 1			1.0	Pass	
2,6-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1			1.0	Pass	
Pentachlorophenol	mg/kg	< 1			1.0	Pass	
Tetrachlorophenols - Total	mg/kg	< 5			5.0	Pass	
Method Blank							
Phenols (non-Halogenated) USEPA 8270C Phenols							
2-Cyclohexyl-4,6-dinitrophenol	mg/kg	< 20			20	Pass	
2-Methyl-4,6-dinitrophenol	mg/kg	< 5			5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2			0.2	Pass	
2-Nitrophenol	mg/kg	< 1			1.0	Pass	
2,4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2,4-Dinitrophenol	mg/kg	< 5			5	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4			0.4	Pass	
4-Nitrophenol	mg/kg	< 5			5	Pass	
Dinoseb	mg/kg	< 20			20	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals USEPA 6020 Heavy Metals & USEPA 7470/71 Me							
Lead	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons TRH C6-C36 - MGT 100A		Result 1					
TRH C6-C9 Fraction by GC	%	98			70-130	Pass	
TRH C10-C14 Fraction by GC	%	81			70-130	Pass	
LCS - % Recovery							
Monocyclic Aromatic Hydrocarbons USEPA 8260B - MGT 350A		Result 1					
Benzene	%	99			70-130	Pass	

Sample, Test, Result Reference	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Codes
Toluene	%	95			70-130	Pass	
Ethylbenzene	%	96			70-130	Pass	
Xylenes(ortho.meta and para)	%	95			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons USEPA 8270C Polycyclic A		Result 1					
Acenaphthene	%	93			70-130	Pass	
Acenaphthylene	%	97			70-130	Pass	
Anthracene	%	94			70-130	Pass	
Benz(a)anthracene	%	81			70-130	Pass	
Benzo(a)pyrene	%	108			70-130	Pass	
Benzo(b)fluoranthene	%	92			70-130	Pass	
Benzo(g,h,i)perylene	%	114			70-130	Pass	
Benzo(k)fluoranthene	%	105			70-130	Pass	
Chrysene	%	109			70-130	Pass	
Dibenz(a,h)anthracene	%	90			70-130	Pass	
Fluoranthene	%	113			70-130	Pass	
Fluorene	%	93			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	81			70-130	Pass	
Naphthalene	%	93			70-130	Pass	
Phenanthrene	%	89			70-130	Pass	
Pyrene	%	115			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated) USEPA 8270C Phenols		Result 1					
2-Chlorophenol	%	78			30-130	Pass	
2,4-Dichlorophenol	%	65			30-130	Pass	
2,4,5-Trichlorophenol	%	70			30-130	Pass	
2,4,6-Trichlorophenol	%	51			30-130	Pass	
2,6-Dichlorophenol	%	74			30-130	Pass	
4-Chloro-3-methylphenol	%	77			30-130	Pass	
Pentachlorophenol	%	44			30-130	Pass	
LCS - % Recovery							
Phenols (non-Halogenated) USEPA 8270C Phenols		Result 1					
2-Methylphenol (o-Cresol)	%	80			30-130	Pass	
2-Nitrophenol	%	62			30-130	Pass	
2,4-Dimethylphenol	%	83			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	76			30-130	Pass	
4-Nitrophenol	%	48			30-130	Pass	
Phenol	%	80			30-130	Pass	
LCS - % Recovery							
Heavy Metals USEPA 6020 Heavy Metals & USEPA 7470/71 Mer		Result 1					
Lead	%	112			80-120	Pass	
[Duplicate of B11-MA57731]							
Total Recoverable Hydrocarbons		Result 1	Result 2	RPD			
TRH C6-C9 Fraction by GC	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14 Fraction by GC	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C15-C28 Fraction by GC	mg/kg	< 100	< 100	<1	30%	Pass	
TRH C29-C36 Fraction by GC	mg/kg	< 100	< 100	<1	30%	Pass	
[Duplicate of B11-MA57731]							
Monocyclic Aromatic Hydrocarbons		Result 1	Result 2	RPD			
Benzene	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toluene	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Ethylbenzene	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
o-Xylene	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Total m+p-Xylenes	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes(ortho.meta and para)	mg/kg	< 0.15	< 0.15	<1	30%	Pass	
[Duplicate of B11-MA57731]							
Polycyclic Aromatic Hydrocarbons		Result 1	Result 2	RPD			
Acenaphthene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Acenaphthylene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Anthracene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Benz(a)anthracene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Benzo(a)pyrene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Benzo(b)fluoranthene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Chrysene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	

Sample, Test, Result Reference	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Codes
Dibenz(a,h)anthracene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Fluoranthene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Fluorene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Naphthalene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Pyrene	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
[Duplicate of B11-MA57731]							
Phenols (Halogenated)		Result 1	Result 2	RPD			
2-Chlorophenol	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2,4-Dichlorophenol	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2,4,5-Trichlorophenol	mg/kg	< 1	< 1	<1	30%	Pass	
2,4,6-Trichlorophenol	mg/kg	< 1	< 1	<1	30%	Pass	
2,6-Dichlorophenol	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1	< 1	<1	30%	Pass	
Pentachlorophenol	mg/kg	< 1	< 1	<1	30%	Pass	
Tetrachlorophenols - Total	mg/kg	< 5	< 5	<1	30%	Pass	
[Duplicate of B11-MA57731]							
Phenols (non-Halogenated)		Result 1	Result 2	RPD			
2-Cyclohexyl-4,6-dinitrophenol	mg/kg	< 20	< 20	<1	30%	Pass	
2-Methyl-4,6-dinitrophenol	mg/kg	< 5	< 5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
2-Nitrophenol	mg/kg	< 1	< 1	<1	30%	Pass	
2,4-Dimethylphenol	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2,4-Dinitrophenol	mg/kg	< 5	< 5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
4-Nitrophenol	mg/kg	< 5	< 5	<1	30%	Pass	
Dinoseb	mg/kg	< 20	< 20	<1	30%	Pass	
Phenol	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
[Duplicate of B11-MA57731]							
Heavy Metals		Result 1	Result 2	RPD			
Lead	mg/kg	6.1	5.4	13	30%	Pass	
[Duplicate of B11-MA57769]							
Total Recoverable Hydrocarbons		Result 1	Result 2	RPD			
TRH C6-C9 Fraction by GC	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14 Fraction by GC	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C15-C28 Fraction by GC	mg/kg	< 100	< 100	<1	30%	Pass	
TRH C29-C36 Fraction by GC	mg/kg	< 100	< 100	<1	30%	Pass	
[Duplicate of B11-MA57769]							
Monocyclic Aromatic Hydrocarbons		Result 1	Result 2	RPD			
Benzene	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toluene	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Ethylbenzene	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
o-Xylene	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Total m+p-Xylenes	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes(ortho.meta and para)	mg/kg	< 0.15	< 0.15	<1	30%	Pass	
[Duplicate of B11-MA57769]							
Heavy Metals		Result 1	Result 2	RPD			
Lead	mg/kg	11	11	<1	30%	Pass	
[Spike of B11-MA57731] - % Recovery							
Total Recoverable Hydrocarbons		Result 1					
TRH C6-C9 Fraction by GC	%	78			70 - 130	Pass	
TRH C10-C14 Fraction by GC	%	90			70 - 130	Pass	
[Spike of B11-MA57731] - % Recovery							
Monocyclic Aromatic Hydrocarbons		Result 1					
Benzene	%	82			70 - 130	Pass	
Toluene	%	78			70 - 130	Pass	
Ethylbenzene	%	77			70 - 130	Pass	
o-Xylene	%	77			75 - 125	Pass	
Xylenes(ortho.meta and para)	%	77			70 - 130	Pass	
[Spike of B11-MA57731] - % Recovery							
Polycyclic Aromatic Hydrocarbons		Result 1					
Acenaphthene	%	94			70 - 130	Pass	
Acenaphthylene	%	98			70 - 130	Pass	
Anthracene	%	99			70 - 130	Pass	
Benz(a)anthracene	%	83			70 - 130	Pass	

Sample, Test, Result Reference	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Codes
Benzo(a)pyrene	%	113			70 - 130	Pass	
Benzo(b)fluoranthene	%	104			70 - 130	Pass	
Benzo(g,h,i)perylene	%	111			70 - 130	Pass	
Benzo(k)fluoranthene	%	108			70 - 130	Pass	
Chrysene	%	103			70 - 130	Pass	
Dibenz(a,h)anthracene	%	89			70 - 130	Pass	
Fluoranthene	%	93			70 - 130	Pass	
Fluorene	%	96			70 - 130	Pass	
Indeno(1,2,3-cd)pyrene	%	91			70 - 130	Pass	
Naphthalene	%	93			70 - 130	Pass	
Phenanthrene	%	93			70 - 130	Pass	
Pyrene	%	94			70 - 130	Pass	
[Spike of B11-MA57731] - % Recovery							
Phenols (Halogenated)		Result 1					
2-Chlorophenol	%	82			30 - 130	Pass	
2,4-Dichlorophenol	%	77			30 - 130	Pass	
2,4,5-Trichlorophenol	%	76			30 - 130	Pass	
2,4,6-Trichlorophenol	%	53			30 - 130	Pass	
2,6-Dichlorophenol	%	81			30 - 130	Pass	
4-Chloro-3-methylphenol	%	78			30 - 130	Pass	
Pentachlorophenol	%	74			30 - 130	Pass	
Tetrachlorophenols - Total	%	62			30 - 130	Pass	
[Spike of B11-MA57731] - % Recovery							
Phenols (non-Halogenated)		Result 1					
2-Cyclohexyl-4,6-dinitrophenol	%	49			30 - 130	Pass	
2-Methyl-4,6-dinitrophenol	%	71			30 - 130	Pass	
2,4-Dimethylphenol	%	46			30 - 130	Pass	
2,4-Dinitrophenol	%	37			30 - 130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	70			30 - 130	Pass	
4-Nitrophenol	%	68			30 - 130	Pass	
Dinoseb	%	58			30 - 130	Pass	
Phenol	%	83			30 - 130	Pass	
[Spike of B11-MA57731] - % Recovery							
Heavy Metals		Result 1					
Lead	%	88			75 - 125	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Organic samples had Teflon liners	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	Yes

Authorised By

sch4p4(6) Personal information

viously issued Report

- Indicates Not Requested

sch4p4(6) Personal information accreditation does not cover the performance of this service
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RTI Act 2009

Table 1
Soil Analytical Results
Former Caltex Esk 2011

Field_ID	SB101_0.9-1.0	SB101_3.8-3.9	SB102_12.0-12.1	SB102_2.6-2.7	SB102_8.5-8.6
Sampled_Date-Time	16/03/2011	16/03/2011	16/03/2011	16/03/2011	16/03/2011
SampleCode	B11-MA60546	B11-MA60548	B11-MA60557	B11-MA60552	B11-MA60554

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)					
Amino Aliphatics	N-nitrosodi-n-butylamine	mg/kg	0.5	NE	NE	-	-	-	-	-
	N-nitrosodi-n-propylamine	mg/kg	0.5	NE	NE	-	-	-	-	-
Amino Aromatics	1-naphthylamine	mg/kg	0.5	NE	NE	-	-	-	-	-
	2-naphthylamine	mg/kg	0.5	NE	NE	-	-	-	-	-
	Diphenylamine	mg/kg	0.5	NE	NE	-	-	-	-	-
Anilines	2-nitroaniline	mg/kg	0.5	NE	NE	-	-	-	-	-
	Aniline	mg/kg	0.5	NE	NE	-	-	-	-	-
BTEX	Benzene	mg/kg	0.05	NE	1	<0.05	<0.05	0.32	<0.05	<0.05
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05
	Toluene	mg/kg	0.05	NE	NE	<0.05	<0.05	0.55	<0.05	<0.05
	Xylene (m & p)	mg/kg	0.1	NE	NE	<0.1	<0.1	0.26	<0.1	0.13
	Xylene (o)	mg/kg	0.05	NE	NE	<0.05	<0.05	0.11	<0.05	0.07
	Xylene Total	mg/kg	0.15	NE	NE	<0.15	<0.15	0.36 - 0.37	<0.15	0.2
Chlorinated Hydrocarbons	Benzyl chloride	mg/kg	0.5	NE	NE	-	-	-	-	-
	Hexachlorocyclopentadiene	mg/kg	0.5	NE	NE	-	-	-	-	-
	Hexachloroethane	mg/kg	0.5	NE	NE	-	-	-	-	-
Explosives	2,4-Dinitrotoluene	mg/kg	0.5	NE	NE	-	-	-	-	-
	2,6-dinitrotoluene	mg/kg	0.5	NE	NE	-	-	-	-	-
	Nitrobenzene	mg/kg	0.5	NE	NE	-	-	-	-	-
Halogenated Benzenes	1,2,3,4-tetrachlorobenzene	mg/kg	0.5	NE	NE	-	-	-	-	-
	1,2,3,5-Tetrachlorobenzene	mg/kg	0.5	NE	NE	-	-	-	-	-
	1,2,4,5-tetrachlorobenzene	mg/kg	0.5	NE	NE	-	-	-	-	-
	1,3,5-Trichlorobenzene	mg/kg	0.5	NE	NE	-	-	-	-	-
	Pentachlorobenzene	mg/kg	0.5	NE	NE	-	-	-	-	-
Halogenated Phenols	tetrachlorophenols	mg/kg	5	NE	NE	-	<5	-	-	<5
Herbicides	Pronamide	mg/kg	0.5	NE	NE	-	-	-	-	-
	Trifluralin	mg/kg	0.5	NE	NE	-	-	-	-	-
Inorganics	Cyanide Total	mg/kg	5	500	NE	-	-	-	-	-
	Fluoride	mg/kg	100	NE	NE	-	-	-	-	-
	Moisture									
	Moisture Content (dried @ 103°C)	%	0.1	NE	NE	18	10	23	16	9
	pH (aqueous extract)	pH Units	0.1	NE	NE	-	-	-	-	-
MAH	1,2,4-trimethylbenzene	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,3,5-trimethylbenzene	mg/kg	0.05	NE	NE	-	-	-	-	-
	Isopropylbenzene	mg/kg	0.05	NE	NE	-	-	-	-	-
	Styrene	mg/kg	0.05	NE	NE	-	-	-	-	-
Metals	Antimony	mg/kg	10	NE	NE	-	-	-	-	-
	Arsenic	mg/kg	2	100	NE	-	-	-	-	-
	Barium	mg/kg	10	NE	NE	-	-	-	-	-
	Beryllium	mg/kg	2	20	NE	-	-	-	-	-
	Boron	mg/kg	10	NE	NE	-	-	-	-	-
	Cadmium	mg/kg	0.5	20	NE	-	-	-	-	-
	Chromium (III+VI)	mg/kg	5	NE	NE	-	-	-	-	-

Field_ID	SB101_0.9-1.0	SB101_3.8-3.9	SB102_12.0-12.1	SB102_2.6-2.7	SB102_8.5-8.6
Sampled_Date-Time	16/03/2011	16/03/2011	16/03/2011	16/03/2011	16/03/2011
SampleCode	B11-MA60546	B11-MA60548	B11-MA60557	B11-MA60552	B11-MA60554

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)					
	Cobalt	mg/kg	5	NE	NE	-	-	-	-	-
	Copper	mg/kg	5	1000	NE	-	-	-	-	-
	Lead	mg/kg	5	300	300	12	7.2	9.1	7.5	7.3
	Manganese	mg/kg	5	1500	NE	-	-	-	-	-
	Mercury	mg/kg	0.1	15	NE	-	-	-	-	-
	Molybdenum	mg/kg	10	NE	NE	-	-	-	-	-
	Nickel	mg/kg	5	600	NE	-	-	-	-	-
	Selenium	mg/kg	2	NE	NE	-	-	-	-	-
	Silver	mg/kg	5	NE	NE	-	-	-	-	-
	Tin	mg/kg	10	NE	NE	-	-	-	-	-
	Zinc	mg/kg	5	7000	NE	-	-	-	-	-
Nitroaromatics	2-Picoline	mg/kg	0.5	NE	NE	-	-	-	-	-
	4-aminobiphenyl	mg/kg	0.5	NE	NE	-	-	-	-	-
	Pentachloronitrobenzene	mg/kg	0.5	NE	NE	-	-	-	-	-
OCP	4,4-DDE	mg/kg	0.05	NE	NE	-	-	-	-	-
	a-BHC	mg/kg	0.05	NE	NE	-	-	-	-	-
	Aldrin	mg/kg	0.05	NE	NE	-	-	-	-	-
	Aldrin + Dieldrin	mg/kg		10	NE	-	-	-	-	-
	b-BHC	mg/kg	0.05	NE	NE	-	-	-	-	-
	Chlordane	mg/kg	0.1	50	NE	-	-	-	-	-
	d-BHC	mg/kg	0.05	NE	NE	-	-	-	-	-
	DDD	mg/kg	0.05	NE	NE	-	-	-	-	-
	DDT	mg/kg	0.05	NE	NE	-	-	-	-	-
	DDT+DDE+DDD	mg/kg		200	NE	-	-	-	-	-
	Dieldrin	mg/kg	0.05	NE	NE	-	-	-	-	-
	Endosulfan I	mg/kg	0.05	NE	NE	-	-	-	-	-
	Endosulfan II	mg/kg	0.05	NE	NE	-	-	-	-	-
	Endosulfan sulphate	mg/kg	0.05	NE	NE	-	-	-	-	-
	Endrin	mg/kg	0.05	NE	NE	-	-	-	-	-
	Endrin aldehyde	mg/kg	0.05	NE	NE	-	-	-	-	-
	Endrin ketone	mg/kg	0.05	NE	NE	-	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.05	NE	NE	-	-	-	-	-
	Heptachlor	mg/kg	0.05	10	NE	-	-	-	-	-
	Heptachlor epoxide	mg/kg	0.05	NE	NE	-	-	-	-	-
	Hexachlorobenzene	mg/kg	0.05	NE	NE	-	-	-	-	-
	Methoxychlor	mg/kg	0.05	NE	NE	-	-	-	-	-
	Toxaphene	mg/kg	0.1	NE	NE	-	-	-	-	-
OPP	Azinophos methyl	mg/kg	0.2	NE	NE	-	-	-	-	-
	Bolstar (Sulprofos)	mg/kg	0.2	NE	NE	-	-	-	-	-
	Chlorpyrifos	mg/kg	0.2	NE	NE	-	-	-	-	-
	Demeton-O	mg/kg	0.2	NE	NE	-	-	-	-	-
	Diazinon	mg/kg	0.2	NE	NE	-	-	-	-	-
	Dichlorvos	mg/kg	0.2	NE	NE	-	-	-	-	-
	Disulfoton	mg/kg	0.2	NE	NE	-	-	-	-	-

Table 1
Soil Analytical Results
Former Caltex Esk 2011

Field_ID	SB101_0.9-1.0	SB101_3.8-3.9	SB102_12.0-12.1	SB102_2.6-2.7	SB102_8.5-8.6
Sampled_Date-Time	16/03/2011	16/03/2011	16/03/2011	16/03/2011	16/03/2011
SampleCode	B11-MA60546	B11-MA60548	B11-MA60557	B11-MA60552	B11-MA60554

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)					
	Ethion	mg/kg	0.2	NE	NE	-	-	-	-	-
	Ethoprop	mg/kg	0.2	NE	NE	-	-	-	-	-
	Fenitrothion	mg/kg	0.2	NE	NE	-	-	-	-	-
	Fensulfothion	mg/kg	0.2	NE	NE	-	-	-	-	-
	Fenthion	mg/kg	0.2	NE	NE	-	-	-	-	-
	Merphos	mg/kg	0.2	NE	NE	-	-	-	-	-
	Methyl parathion	mg/kg	0.2	NE	NE	-	-	-	-	-
	Mevinphos (Phosdrin)	mg/kg	0.2	NE	NE	-	-	-	-	-
	Naled (Dibrom)	mg/kg	0.5	NE	NE	-	-	-	-	-
	Phorate	mg/kg	0.2	NE	NE	-	-	-	-	-
	Ronnel	mg/kg	0.2	NE	NE	-	-	-	-	-
	Trichloronate	mg/kg	0.2	NE	NE	-	-	-	-	-
	Tokuthion	mg/kg	0.2	NE	NE	-	-	-	-	-
PAH	1-Chloronaphthalene	mg/kg	0.5	NE	NE	-	-	-	-	-
	3-methylcholanthrene	mg/kg	0.5	NE	NE	-	-	-	-	-
	7,12-dimethylbenz(a)anthracene	mg/kg	0.5	NE	NE	-	-	-	-	-
	Acenaphthene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Acenaphthylene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Anthracene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Benz(a)anthracene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Benzo(a)pyrene	mg/kg	0.1	1	1	-	<0.1	-	-	<0.1
	Benzo(b)fluoranthene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Benzo(g,h,i)perylene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Benzo(k)fluoranthene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Chrysene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Dibenz(a,h)anthracene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Fluoranthene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Fluorene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Naphthalene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	PAHs (Sum of total)	mg/kg	0.1	20	20	-	<0.1	-	-	<0.1
	Phenanthrene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
	Pyrene	mg/kg	0.1	NE	NE	-	<0.1	-	-	<0.1
PAH/Phenols	2-chloronaphthalene	mg/kg	0.5	NE	NE	-	-	-	-	-
	2-methylnaphthalene	mg/kg	0.5	NE	NE	-	-	-	-	-
	Acetophenone	mg/kg	0.5	NE	NE	-	-	-	-	-
Phenol	2,3,4,6-tetrachlorophenol	mg/kg	0.5	NE	NE	-	-	-	-	-
	2,4,5-trichlorophenol	mg/kg	1	NE	NE	-	<1	-	-	<1
	2,4,6-trichlorophenol	mg/kg	1	NE	NE	-	<1	-	-	<1
	2,4-dichlorophenol	mg/kg	0.5	NE	NE	-	<0.5	-	-	<0.5
	2,4-dimethylphenol	mg/kg	0.5	NE	NE	-	<0.5	-	-	<0.5
	2,4-dinitrophenol	mg/kg	5	NE	NE	-	<5	-	-	<5
	2,6-dichlorophenol	mg/kg	0.5	NE	NE	-	<0.5	-	-	<0.5
	2-chlorophenol	mg/kg	0.5	NE	NE	-	<0.5	-	-	<0.5

Field_ID	SB101_0.9-1.0	SB101_3.8-3.9	SB102_12.0-12.1	SB102_2.6-2.7	SB102_8.5-8.6
Sampled_Date-Time	16/03/2011	16/03/2011	16/03/2011	16/03/2011	16/03/2011
SampleCode	B11-MA60546	B11-MA60548	B11-MA60557	B11-MA60552	B11-MA60554

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)					
	2-methylphenol	mg/kg	0.2	NE	NE	-	<0.2	-	-	<0.2
	2-nitrophenol	mg/kg	1	NE	NE	-	<1	-	-	<1
	3-&4-methylphenol	mg/kg	0.4	NE	NE	-	<0.4	-	-	<0.4
	4,6-Dinitro-2-methylphenol	mg/kg	5	NE	NE	-	<5	-	-	<5
	4,6-Dinitro-o-cyclohexyl phenol	mg/kg	20	NE	NE	-	<20	-	-	<20
	4-chloro-3-methylphenol	mg/kg	1	NE	NE	-	<1	-	-	<1
	4-nitrophenol	mg/kg	5	NE	NE	-	<5	-	-	<5
	Dinoseb	mg/kg	20	NE	NE	-	<20	-	-	<20
	Pentachlorophenol	mg/kg	1	NE	NE	-	<1	-	-	<1
	Phenol	mg/kg	0.5	NE	NE	-	<0.5	-	-	<0.5
	Phenols (Total Halogenated)	mg/kg	1	NE	NE	-	<1	-	-	<1
	Phenols (Total Non Halogenated)	mg/kg	20	NE	NE	-	<20	-	-	<20
Phthalates	Bis(2-ethylhexyl) phthalate	mg/kg	0.5	NE	NE	-	-	-	-	-
	Butyl benzyl phthalate	mg/kg	0.5	NE	NE	-	-	-	-	-
	Diethylphthalate	mg/kg	0.5	NE	NE	-	-	-	-	-
	Dimethyl phthalate	mg/kg	0.5	NE	NE	-	-	-	-	-
	Di-n-butyl phthalate	mg/kg	0.5	NE	NE	-	-	-	-	-
	Di-n-octyl phthalate	mg/kg	0.5	NE	NE	-	-	-	-	-
Solvents	Methyl Ethyl Ketone	mg/kg	0.05	NE	NE	-	-	-	-	-
	4-Methyl-2-pentanone	mg/kg	0.05	NE	NE	-	-	-	-	-
	Acetone	mg/kg	0.05	NE	NE	-	-	-	-	-
	Allyl chloride	mg/kg	0.05	NE	NE	-	-	-	-	-
	Carbon disulfide	mg/kg	0.05	NE	NE	-	-	-	-	-
SVOCs	3,3-Dichlorobenzidine	mg/kg	0.5	NE	NE	-	-	-	-	-
	4-(dimethylamino) azobenzene	mg/kg	0.5	NE	NE	-	-	-	-	-
	4-bromophenyl phenyl ether	mg/kg	0.5	NE	NE	-	-	-	-	-
	4-chlorophenyl phenyl ether	mg/kg	0.5	NE	NE	-	-	-	-	-
	Bis(2-chloroethoxy) methane	mg/kg	0.5	NE	NE	-	-	-	-	-
	Bis(2-chloroisopropyl) ether	mg/kg	0.5	NE	NE	-	-	-	-	-
	Dibenz(a,j)acridine	mg/kg	0.5	NE	NE	-	-	-	-	-
	Dibenzofuran	mg/kg	0.5	NE	NE	-	-	-	-	-
	N-nitrosopiperidine	mg/kg	0.5	NE	NE	-	-	-	-	-
TPH	F2-NAPHTHALENE	mg/kg	50	NE	NE	-	-	-	-	-
	TPH C6 - C9	mg/kg	20	NE	100	<20	<20	<20	<20	<20
	TPH C10 - C14	mg/kg	20	NE	100	<50	<50	<50	<50	<50
	TPH C15 - C28	mg/kg	50	NE	1000	<100	<100	<100	<100	<100
	TPH C29 - C36	mg/kg	50	NE	1000	<100	<100	<100	<100	<100
	TPH C10 - C36 (Sum of total)	mg/kg	50	NE	NE	<100	<100	<100	<100	<100
VHC	1,1,1,2-tetrachloroethane	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,1-dichloroethane	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,1-dichloroethene	mg/kg	0.05	NE	NE	-	-	-	-	-

Table 1
Soil Analytical Results
Former Caltex Esk 2011

Field_ID	SB101_0.9-1.0	SB101_3.8-3.9	SB102_12.0-12.1	SB102_2.6-2.7	SB102_8.5-8.6
Sampled_Date-Time	16/03/2011	16/03/2011	16/03/2011	16/03/2011	16/03/2011
SampleCode	B11-MA60546	B11-MA60548	B11-MA60557	B11-MA60552	B11-MA60554

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)					
	1,2,3-trichlorobenzene	mg/kg	0.5	NE	NE	-	-	-	-	-
	1,2,3-trichloropropane	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,2,4-trichlorobenzene	mg/kg	0.5	NE	NE	-	-	-	-	-
	1,2-dibromoethane	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,2-dichloroethane	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,2-dichloropropane	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,3-dichlorobenzene	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,3-dichloropropane	mg/kg	0.05	NE	NE	-	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.05	NE	NE	-	-	-	-	-
	4-chlorotoluene	mg/kg	0.05	NE	NE	-	-	-	-	-
	Bromobenzene	mg/kg	0.05	NE	NE	-	-	-	-	-
	Bromochloromethane	mg/kg	0.05	NE	NE	-	-	-	-	-
	Bromodichloromethane	mg/kg	0.05	NE	NE	-	-	-	-	-

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Field_ID	QC102
Sampled_Date-Time	16/03/2011
SampleCode	B11-MA60566

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)	duplicate of SB102_8.5-8.6
Amino Aliphatics	N-nitrosodi-n-butylamine	mg/kg	0.5	NE	NE	-
	N-nitrosodi-n-propylamine	mg/kg	0.5	NE	NE	-
Amino Aromatics	1-naphthylamine	mg/kg	0.5	NE	NE	-
	2-naphthylamine	mg/kg	0.5	NE	NE	-
	Diphenylamine	mg/kg	0.5	NE	NE	-
Anilines	2-nitroaniline	mg/kg	0.5	NE	NE	-
	Aniline	mg/kg	0.5	NE	NE	-
BTEX	Benzene	mg/kg	0.05	NE	1	<0.05
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.05
	Toluene	mg/kg	0.05	NE	NE	<0.05
	Xylene (m & p)	mg/kg	0.1	NE	NE	0.13
	Xylene (o)	mg/kg	0.05	NE	NE	0.07
	Xylene Total	mg/kg	0.15	NE	NE	0.2 - 0.21
Chlorinated Hydrocarbons	Benzyl chloride	mg/kg	0.5	NE	NE	-
	Hexachlorocyclopentadiene	mg/kg	0.5	NE	NE	-
	Hexachloroethane	mg/kg	0.5	NE	NE	-
Explosives	2,4-Dinitrotoluene	mg/kg	0.5	NE	NE	-
	2,6-dinitrotoluene	mg/kg	0.5	NE	NE	-
	Nitrobenzene	mg/kg	0.5	NE	NE	-
Halogenated Benzenes	1,2,3,4-tetrachlorobenzene	mg/kg	0.5	NE	NE	-
	1,2,3,5-Tetrachlorobenzene	mg/kg	0.5	NE	NE	-
	1,2,4,5-tetrachlorobenzene	mg/kg	0.5	NE	NE	-
	1,3,5-Trichlorobenzene	mg/kg	0.5	NE	NE	-
	Pentachlorobenzene	mg/kg	0.5	NE	NE	-
Halogenated Phenols	tetrachlorophenols	mg/kg	5	NE	NE	<5
Herbicides	Pronamide	mg/kg	0.5	NE	NE	-
	Trifluralin	mg/kg	0.5	NE	NE	-
Inorganics	Cyanide Total	mg/kg	5	500	NE	-
	Fluoride	mg/kg	100	NE	NE	-
	Moisture					
	Moisture Content (dried @ 103°C)	%	0.1	NE	NE	7.4
	pH (aqueous extract)	pH Units	0.1	NE	NE	-
MAH	1,2,4-trimethylbenzene	mg/kg	0.05	NE	NE	-
	1,3,5-trimethylbenzene	mg/kg	0.05	NE	NE	-
	Isopropylbenzene	mg/kg	0.05	NE	NE	-
	Styrene	mg/kg	0.05	NE	NE	-
Metals	Antimony	mg/kg	10	NE	NE	-
	Arsenic	mg/kg	2	100	NE	-
	Barium	mg/kg	10	NE	NE	-
	Beryllium	mg/kg	2	20	NE	-
	Boron	mg/kg	10	NE	NE	-
	Cadmium	mg/kg	0.5	20	NE	-
	Chromium (III+VI)	mg/kg	5	NE	NE	-

Table 1
Soil Analytical Results
Former Caltex Esk 2011

Field_ID	QC102
Sampled_Date-Time	16/03/2011
SampleCode	B11-MA60566

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)	duplicate of SB102_8.5-8.6
	Cobalt	mg/kg	5	NE	NE	-
	Copper	mg/kg	5	1000	NE	-
	Lead	mg/kg	5	300	300	7.5
	Manganese	mg/kg	5	1500	NE	-
	Mercury	mg/kg	0.1	15	NE	-
	Molybdenum	mg/kg	10	NE	NE	-
	Nickel	mg/kg	5	600	NE	-
	Selenium	mg/kg	2	NE	NE	-
	Silver	mg/kg	5	NE	NE	-
	Tin	mg/kg	10	NE	NE	-
	Zinc	mg/kg	5	7000	NE	-
Nitroaromatics	2-Picoline	mg/kg	0.5	NE	NE	-
	4-aminobiphenyl	mg/kg	0.5	NE	NE	-
	Pentachloronitrobenzene	mg/kg	0.5	NE	NE	-
OCP	4,4-DDE	mg/kg	0.05	NE	NE	-
	a-BHC	mg/kg	0.05	NE	NE	-
	Aldrin	mg/kg	0.05	NE	NE	-
	Aldrin + Dieldrin	mg/kg		10	NE	-
	b-BHC	mg/kg	0.05	NE	NE	-
	Chlordane	mg/kg	0.1	50	NE	-
	d-BHC	mg/kg	0.05	NE	NE	-
	DDD	mg/kg	0.05	NE	NE	-
	DDT	mg/kg	0.05	NE	NE	-
	DDT+DDE+DDD	mg/kg		200	NE	-
	Dieldrin	mg/kg	0.05	NE	NE	-
	Endosulfan I	mg/kg	0.05	NE	NE	-
	Endosulfan II	mg/kg	0.05	NE	NE	-
	Endosulfan sulphate	mg/kg	0.05	NE	NE	-
	Endrin	mg/kg	0.05	NE	NE	-
	Endrin aldehyde	mg/kg	0.05	NE	NE	-
	Endrin ketone	mg/kg	0.05	NE	NE	-
	g-BHC (Lindane)	mg/kg	0.05	NE	NE	-
	Heptachlor	mg/kg	0.05	10	NE	-
	Heptachlor epoxide	mg/kg	0.05	NE	NE	-
	Hexachlorobenzene	mg/kg	0.05	NE	NE	-
	Methoxychlor	mg/kg	0.05	NE	NE	-
	Toxaphene	mg/kg	0.1	NE	NE	-
OPP	Azinophos methyl	mg/kg	0.2	NE	NE	-
	Bolstar (Sulprofos)	mg/kg	0.2	NE	NE	-
	Chlorpyrifos	mg/kg	0.2	NE	NE	-
	Demeton-O	mg/kg	0.2	NE	NE	-
	Diazinon	mg/kg	0.2	NE	NE	-
	Dichlorvos	mg/kg	0.2	NE	NE	-
	Disulfoton	mg/kg	0.2	NE	NE	-

Field_ID	QC102
Sampled_Date-Time	16/03/2011
SampleCode	B11-MA60566

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)	duplicate of SB102_8.5-8.6
	Ethion	mg/kg	0.2	NE	NE	-
	Ethoprop	mg/kg	0.2	NE	NE	-
	Fenitrothion	mg/kg	0.2	NE	NE	-
	Fensulfothion	mg/kg	0.2	NE	NE	-
	Fenthion	mg/kg	0.2	NE	NE	-
	Merphos	mg/kg	0.2	NE	NE	-
	Methyl parathion	mg/kg	0.2	NE	NE	-
	Mevinphos (Phosdrin)	mg/kg	0.2	NE	NE	-
	Naled (Dibrom)	mg/kg	0.5	NE	NE	-
	Phorate	mg/kg	0.2	NE	NE	-
	Ronnel	mg/kg	0.2	NE	NE	-
	Trichloronate	mg/kg	0.2	NE	NE	-
	Tokuthion	mg/kg	0.2	NE	NE	-
PAH	1-Chloronaphthalene	mg/kg	0.5	NE	NE	-
	3-methylcholanthrene	mg/kg	0.5	NE	NE	-
	7,12-dimethylbenz(a)anthracene	mg/kg	0.5	NE	NE	-
	Acenaphthene	mg/kg	0.1	NE	NE	<0.1
	Acenaphthylene	mg/kg	0.1	NE	NE	<0.1
	Anthracene	mg/kg	0.1	NE	NE	<0.1
	Benz(a)anthracene	mg/kg	0.1	NE	NE	<0.1
	Benzo(a)pyrene	mg/kg	0.1	1	1	<0.1
	Benzo(b)fluoranthene	mg/kg	0.1	NE	NE	<0.1
	Benzo(g,h,i)perylene	mg/kg	0.1	NE	NE	<0.1
	Benzo(k)fluoranthene	mg/kg	0.1	NE	NE	<0.1
	Chrysene	mg/kg	0.1	NE	NE	<0.1
	Dibenz(a,h)anthracene	mg/kg	0.1	NE	NE	<0.1
	Fluoranthene	mg/kg	0.1	NE	NE	<0.1
	Fluorene	mg/kg	0.1	NE	NE	<0.1
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	NE	NE	<0.1
	Naphthalene	mg/kg	0.1	NE	NE	<0.1
	PAHs (Sum of total)	mg/kg	0.1	20	20	<0.1
	Phenanthrene	mg/kg	0.1	NE	NE	<0.1
	Pyrene	mg/kg	0.1	NE	NE	<0.1
PAH/Phenols	2-chloronaphthalene	mg/kg	0.5	NE	NE	-
	2-methylnaphthalene	mg/kg	0.5	NE	NE	-
	Acetophenone	mg/kg	0.5	NE	NE	-
Phenol	2,3,4,6-tetrachlorophenol	mg/kg	0.5	NE	NE	-
	2,4,5-trichlorophenol	mg/kg	1	NE	NE	<1
	2,4,6-trichlorophenol	mg/kg	1	NE	NE	<1
	2,4-dichlorophenol	mg/kg	0.5	NE	NE	<0.5
	2,4-dimethylphenol	mg/kg	0.5	NE	NE	<0.5
	2,4-dinitrophenol	mg/kg	5	NE	NE	<5
	2,6-dichlorophenol	mg/kg	0.5	NE	NE	<0.5
	2-chlorophenol	mg/kg	0.5	NE	NE	<0.5

Table 1
Soil Analytical Results
Former Caltex Esk 2011

Field_ID	QC102
Sampled_Date-Time	16/03/2011
SampleCode	B11-MA60566

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)	duplicate of SB102_8.5-8.6
	2-methylphenol	mg/kg	0.2	NE	NE	<0.2
	2-nitrophenol	mg/kg	1	NE	NE	<1
	3-&4-methylphenol	mg/kg	0.4	NE	NE	<0.4
	4,6-Dinitro-2-methylphenol	mg/kg	5	NE	NE	<5
	4,6-Dinitro-o-cyclohexyl phenol	mg/kg	20	NE	NE	<20
	4-chloro-3-methylphenol	mg/kg	1	NE	NE	<1
	4-nitrophenol	mg/kg	5	NE	NE	<5
	Dinoseb	mg/kg	20	NE	NE	<20
	Pentachlorophenol	mg/kg	1	NE	NE	<1
	Phenol	mg/kg	0.5	NE	NE	<0.5
	Phenols (Total Halogenated)	mg/kg	1	NE	NE	<1
	Phenols (Total Non Halogenated)	mg/kg	20	NE	NE	<20
Phthalates	Bis(2-ethylhexyl) phthalate	mg/kg	0.5	NE	NE	-
	Butyl benzyl phthalate	mg/kg	0.5	NE	NE	-
	Diethylphthalate	mg/kg	0.5	NE	NE	-
	Dimethyl phthalate	mg/kg	0.5	NE	NE	-
	Di-n-butyl phthalate	mg/kg	0.5	NE	NE	-
	Di-n-octyl phthalate	mg/kg	0.5	NE	NE	-
Solvents	Methyl Ethyl Ketone	mg/kg	0.05	NE	NE	-
	4-Methyl-2-pentanone	mg/kg	0.05	NE	NE	-
	Acetone	mg/kg	0.05	NE	NE	-
	Allyl chloride	mg/kg	0.05	NE	NE	-
	Carbon disulfide	mg/kg	0.05	NE	NE	-
SVOCs	3,3-Dichlorobenzidine	mg/kg	0.5	NE	NE	-
	4-(dimethylamino) azobenzene	mg/kg	0.5	NE	NE	-
	4-bromophenyl phenyl ether	mg/kg	0.5	NE	NE	-
	4-chlorophenyl phenyl ether	mg/kg	0.5	NE	NE	-
	Bis(2-chloroethoxy) methane	mg/kg	0.5	NE	NE	-
	Bis(2-chloroisopropyl) ether	mg/kg	0.5	NE	NE	-
	Dibenz(a,j)acridine	mg/kg	0.5	NE	NE	-
	Dibenzofuran	mg/kg	0.5	NE	NE	-
	N-nitrosopiperidine	mg/kg	0.5	NE	NE	-
TPH	F2-NAPHTHALENE	mg/kg	50	NE	NE	-
	TPH C6 - C9	mg/kg	20	NE	100	<20
	TPH C10 - C14	mg/kg	20	NE	100	<50
	TPH C15 - C28	mg/kg	50	NE	1000	<100
	TPH C29 - C36	mg/kg	50	NE	1000	<100
	TPH C10 - C36 (Sum of total)	mg/kg	50	NE	NE	<100
VHC	1,1,1,2-tetrachloroethane	mg/kg	0.05	NE	NE	-
	1,1,1-trichloroethane	mg/kg	0.05	NE	NE	-
	1,1,2,2-tetrachloroethane	mg/kg	0.05	NE	NE	-
	1,1,2-trichloroethane	mg/kg	0.05	NE	NE	-
	1,1-dichloroethane	mg/kg	0.05	NE	NE	-
	1,1-dichloroethene	mg/kg	0.05	NE	NE	-

Field_ID	QC102
Sampled_Date-Time	16/03/2011
SampleCode	B11-MA60566

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)	duplicate of SB102_8.5-8.6
	1,2,3-trichlorobenzene	mg/kg	0.5	NE	NE	-
	1,2,3-trichloropropane	mg/kg	0.05	NE	NE	-
	1,2,4-trichlorobenzene	mg/kg	0.5	NE	NE	-
	1,2-dibromoethane	mg/kg	0.05	NE	NE	-
	1,2-dichlorobenzene	mg/kg	0.05	NE	NE	-
	1,2-dichloroethane	mg/kg	0.05	NE	NE	-
	1,2-dichloropropane	mg/kg	0.05	NE	NE	-
	1,3-dichlorobenzene	mg/kg	0.05	NE	NE	-
	1,3-dichloropropane	mg/kg	0.05	NE	NE	-
	1,4-dichlorobenzene	mg/kg	0.05	NE	NE	-
	4-chlorotoluene	mg/kg	0.05	NE	NE	-
	Bromobenzene	mg/kg	0.05	NE	NE	-
	Bromochloromethane	mg/kg	0.05	NE	NE	-
	Bromodichloromethane	mg/kg	0.05	NE	NE	-

Table 1
Soil Analytical Results
Former Caltex Esk 2011

Field_ID	QC102A	SB103_13.3-13.4
Sampled_Date-Time	16/03/2011	17/03/2011
SampleCode	SE86393-2	B11-MA60575

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)	triplicate of SB102_8.5-8.6	
Amino Aliphatics	N-nitrosodi-n-butylamine	mg/kg	0.5	NE	NE	-	-
	N-nitrosodi-n-propylamine	mg/kg	0.5	NE	NE	-	-
Amino Aromatics	1-naphthylamine	mg/kg	0.5	NE	NE	-	-
	2-naphthylamine	mg/kg	0.5	NE	NE	-	-
	Diphenylamine	mg/kg	0.5	NE	NE	-	-
Anilines	2-nitroaniline	mg/kg	0.5	NE	NE	-	-
	Aniline	mg/kg	0.5	NE	NE	-	-
BTEX	Benzene	mg/kg	0.05	NE	1	<0.1	0.49
	Ethylbenzene	mg/kg	0.05	NE	NE	<0.1	0.15
	Toluene	mg/kg	0.05	NE	NE	<0.1	1.5
	Xylene (m & p)	mg/kg	0.1	NE	NE	-	0.65
	Xylene (o)	mg/kg	0.05	NE	NE	-	0.21
	Xylene Total	mg/kg	0.15	NE	NE	<0.3	0.86
Chlorinated Hydrocarbons	Benzyl chloride	mg/kg	0.5	NE	NE	-	-
	Hexachlorocyclopentadiene	mg/kg	0.5	NE	NE	-	-
	Hexachloroethane	mg/kg	0.5	NE	NE	-	-
Explosives	2,4-Dinitrotoluene	mg/kg	0.5	NE	NE	-	-
	2,6-dinitrotoluene	mg/kg	0.5	NE	NE	-	-
	Nitrobenzene	mg/kg	0.5	NE	NE	-	-
Halogenated Benzenes	1,2,3,4-tetrachlorobenzene	mg/kg	0.5	NE	NE	-	-
	1,2,3,5-Tetrachlorobenzene	mg/kg	0.5	NE	NE	-	-
	1,2,4,5-tetrachlorobenzene	mg/kg	0.5	NE	NE	-	-
	1,3,5-Trichlorobenzene	mg/kg	0.5	NE	NE	-	-
	Pentachlorobenzene	mg/kg	0.5	NE	NE	-	-
Halogenated Phenols	tetrachlorophenols	mg/kg	5	NE	NE	-	-
Herbicides	Pronamide	mg/kg	0.5	NE	NE	-	-
	Trifluralin	mg/kg	0.5	NE	NE	-	-
Inorganics	Cyanide Total	mg/kg	5	500	NE	-	-
	Fluoride	mg/kg	100	NE	NE	-	-
	Moisture					15	
	Moisture Content (dried @ 103°C)	%	0.1	NE	NE	-	19
	pH (aqueous extract)	pH Units	0.1	NE	NE	-	-
MAH	1,2,4-trimethylbenzene	mg/kg	0.05	NE	NE	-	-
	1,3,5-trimethylbenzene	mg/kg	0.05	NE	NE	-	-
	Isopropylbenzene	mg/kg	0.05	NE	NE	-	-
	Styrene	mg/kg	0.05	NE	NE	-	-
Metals	Antimony	mg/kg	10	NE	NE	-	-
	Arsenic	mg/kg	2	100	NE	-	-
	Barium	mg/kg	10	NE	NE	-	-
	Beryllium	mg/kg	2	20	NE	-	-
	Boron	mg/kg	10	NE	NE	-	-
	Cadmium	mg/kg	0.5	20	NE	-	-
	Chromium (III+VI)	mg/kg	5	NE	NE	-	-

Field_ID	QC102A	SB103_13.3-13.4
Sampled_Date-Time	16/03/2011	17/03/2011
SampleCode	SE86393-2	B11-MA60575

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)	triplicate of SB102_8.5-8.6	
	Cobalt	mg/kg	5	NE	NE	-	-
	Copper	mg/kg	5	1000	NE	-	-
	Lead	mg/kg	5	300	300	7	11
	Manganese	mg/kg	5	1500	NE	-	-
	Mercury	mg/kg	0.1	15	NE	-	-
	Molybdenum	mg/kg	10	NE	NE	-	-
	Nickel	mg/kg	5	600	NE	-	-
	Selenium	mg/kg	2	NE	NE	-	-
	Silver	mg/kg	5	NE	NE	-	-
	Tin	mg/kg	10	NE	NE	-	-
	Zinc	mg/kg	5	7000	NE	-	-
Nitroaromatics	2-Picoline	mg/kg	0.5	NE	NE	-	-
	4-aminobiphenyl	mg/kg	0.5	NE	NE	-	-
	Pentachloronitrobenzene	mg/kg	0.5	NE	NE	-	-
OCP	4,4-DDE	mg/kg	0.05	NE	NE	-	-
	a-BHC	mg/kg	0.05	NE	NE	-	-
	Aldrin	mg/kg	0.05	NE	NE	-	-
	Aldrin + Dieldrin	mg/kg		10	NE	-	-
	b-BHC	mg/kg	0.05	NE	NE	-	-
	Chlordane	mg/kg	0.1	50	NE	-	-
	d-BHC	mg/kg	0.05	NE	NE	-	-
	DDD	mg/kg	0.05	NE	NE	-	-
	DDT	mg/kg	0.05	NE	NE	-	-
	DDT+DDE+DDD	mg/kg		200	NE	-	-
	Dieldrin	mg/kg	0.05	NE	NE	-	-
	Endosulfan I	mg/kg	0.05	NE	NE	-	-
	Endosulfan II	mg/kg	0.05	NE	NE	-	-
	Endosulfan sulphate	mg/kg	0.05	NE	NE	-	-
	Endrin	mg/kg	0.05	NE	NE	-	-
	Endrin aldehyde	mg/kg	0.05	NE	NE	-	-
	Endrin ketone	mg/kg	0.05	NE	NE	-	-
	g-BHC (Lindane)	mg/kg	0.05	NE	NE	-	-
	Heptachlor	mg/kg	0.05	10	NE	-	-
	Heptachlor epoxide	mg/kg	0.05	NE	NE	-	-
	Hexachlorobenzene	mg/kg	0.05	NE	NE	-	-
	Methoxychlor	mg/kg	0.05	NE	NE	-	-
	Toxaphene	mg/kg	0.1	NE	NE	-	-
OPP	Azinophos methyl	mg/kg	0.2	NE	NE	-	-
	Bolstar (Sulprofos)	mg/kg	0.2	NE	NE	-	-
	Chlorpyrifos	mg/kg	0.2	NE	NE	-	-
	Demeton-O	mg/kg	0.2	NE	NE	-	-
	Diazinon	mg/kg	0.2	NE	NE	-	-
	Dichlorvos	mg/kg	0.2	NE	NE	-	-
	Disulfoton	mg/kg	0.2	NE	NE	-	-

Table 1
Soil Analytical Results
Former Caltex Esk 2011

Field_ID	QC102A	SB103_13.3-13.4
Sampled_Date-Time	16/03/2011	17/03/2011
SampleCode	SE86393-2	B11-MA60575

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)	triplicate of SB102_8.5-8.6	
	Ethion	mg/kg	0.2	NE	NE	-	-
	Ethoprop	mg/kg	0.2	NE	NE	-	-
	Fenitrothion	mg/kg	0.2	NE	NE	-	-
	Fensulfothion	mg/kg	0.2	NE	NE	-	-
	Fenthion	mg/kg	0.2	NE	NE	-	-
	Merphos	mg/kg	0.2	NE	NE	-	-
	Methyl parathion	mg/kg	0.2	NE	NE	-	-
	Mevinphos (Phosdrin)	mg/kg	0.2	NE	NE	-	-
	Naled (Dibrom)	mg/kg	0.5	NE	NE	-	-
	Phorate	mg/kg	0.2	NE	NE	-	-
	Ronnel	mg/kg	0.2	NE	NE	-	-
	Trichloronate	mg/kg	0.2	NE	NE	-	-
	Tokuthion	mg/kg	0.2	NE	NE	-	-
PAH	1-Chloronaphthalene	mg/kg	0.5	NE	NE	-	-
	3-methylcholanthrene	mg/kg	0.5	NE	NE	-	-
	7,12-dimethylbenz(a)anthracene	mg/kg	0.5	NE	NE	-	-
	Acenaphthene	mg/kg	0.1	NE	NE	-	-
	Acenaphthylene	mg/kg	0.1	NE	NE	-	-
	Anthracene	mg/kg	0.1	NE	NE	-	-
	Benz(a)anthracene	mg/kg	0.1	NE	NE	-	-
	Benzo(a)pyrene	mg/kg	0.1	1	1	-	-
	Benzo(b)fluoranthene	mg/kg	0.1	NE	NE	-	-
	Benzo(g,h,i)perylene	mg/kg	0.1	NE	NE	-	-
	Benzo(k)fluoranthene	mg/kg	0.1	NE	NE	-	-
	Chrysene	mg/kg	0.1	NE	NE	-	-
	Dibenz(a,h)anthracene	mg/kg	0.1	NE	NE	-	-
	Fluoranthene	mg/kg	0.1	NE	NE	-	-
	Fluorene	mg/kg	0.1	NE	NE	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	NE	NE	-	-
	Naphthalene	mg/kg	0.1	NE	NE	-	-
	PAHs (Sum of total)	mg/kg	0.1	20	20	-	-
	Phenanthrene	mg/kg	0.1	NE	NE	-	-
	Pyrene	mg/kg	0.1	NE	NE	-	-
PAH/Phenols	2-chloronaphthalene	mg/kg	0.5	NE	NE	-	-
	2-methylnaphthalene	mg/kg	0.5	NE	NE	-	-
	Acetophenone	mg/kg	0.5	NE	NE	-	-
Phenol	2,3,4,6-tetrachlorophenol	mg/kg	0.5	NE	NE	-	-
	2,4,5-trichlorophenol	mg/kg	1	NE	NE	-	-
	2,4,6-trichlorophenol	mg/kg	1	NE	NE	-	-
	2,4-dichlorophenol	mg/kg	0.5	NE	NE	-	-
	2,4-dimethylphenol	mg/kg	0.5	NE	NE	-	-
	2,4-dinitrophenol	mg/kg	5	NE	NE	-	-
	2,6-dichlorophenol	mg/kg	0.5	NE	NE	-	-
	2-chlorophenol	mg/kg	0.5	NE	NE	-	-

Field_ID	QC102A	SB103_13.3-13.4
Sampled_Date-Time	16/03/2011	17/03/2011
SampleCode	SE86393-2	B11-MA60575

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)	triplicate of SB102_8.5-8.6	
	2-methylphenol	mg/kg	0.2	NE	NE	-	-
	2-nitrophenol	mg/kg	1	NE	NE	-	-
	3-&4-methylphenol	mg/kg	0.4	NE	NE	-	-
	4,6-Dinitro-2-methylphenol	mg/kg	5	NE	NE	-	-
	4,6-Dinitro-o-cyclohexyl phenol	mg/kg	20	NE	NE	-	-
	4-chloro-3-methylphenol	mg/kg	1	NE	NE	-	-
	4-nitrophenol	mg/kg	5	NE	NE	-	-
	Dinoseb	mg/kg	20	NE	NE	-	-
	Pentachlorophenol	mg/kg	1	NE	NE	-	-
	Phenol	mg/kg	0.5	NE	NE	-	-
	Phenols (Total Halogenated)	mg/kg	1	NE	NE	-	-
	Phenols (Total Non Halogenated)	mg/kg	20	NE	NE	-	-
Phthalates	Bis(2-ethylhexyl) phthalate	mg/kg	0.5	NE	NE	-	-
	Butyl benzyl phthalate	mg/kg	0.5	NE	NE	-	-
	Diethylphthalate	mg/kg	0.5	NE	NE	-	-
	Dimethyl phthalate	mg/kg	0.5	NE	NE	-	-
	Di-n-butyl phthalate	mg/kg	0.5	NE	NE	-	-
	Di-n-octyl phthalate	mg/kg	0.5	NE	NE	-	-
Solvents	Methyl Ethyl Ketone	mg/kg	0.05	NE	NE	-	-
	4-Methyl-2-pentanone	mg/kg	0.05	NE	NE	-	-
	Acetone	mg/kg	0.05	NE	NE	-	-
	Allyl chloride	mg/kg	0.05	NE	NE	-	-
	Carbon disulfide	mg/kg	0.05	NE	NE	-	-
SVOCs	3,3-Dichlorobenzidine	mg/kg	0.5	NE	NE	-	-
	4-(dimethylamino) azobenzene	mg/kg	0.5	NE	NE	-	-
	4-bromophenyl phenyl ether	mg/kg	0.5	NE	NE	-	-
	4-chlorophenyl phenyl ether	mg/kg	0.5	NE	NE	-	-
	Bis(2-chloroethoxy) methane	mg/kg	0.5	NE	NE	-	-
	Bis(2-chloroisopropyl) ether	mg/kg	0.5	NE	NE	-	-
	Dibenz(a,j)acridine	mg/kg	0.5	NE	NE	-	-
	Dibenzofuran	mg/kg	0.5	NE	NE	-	-
	N-nitrosopiperidine	mg/kg	0.5	NE	NE	-	-
TPH	F2-NAPHTHALENE	mg/kg	50	NE	NE	-	-
	TPH C6 - C9	mg/kg	20	NE	100	<20	<20
	TPH C10 - C14	mg/kg	20	NE	100	<20	<50
	TPH C15 - C28	mg/kg	50	NE	1000	<50	<100
	TPH C29 - C36	mg/kg	50	NE	1000	<50	<100
	TPH C10 - C36 (Sum of total)	mg/kg	50	NE	NE	-	<100
VHC	1,1,1,2-tetrachloroethane	mg/kg	0.05	NE	NE	-	-
	1,1,1-trichloroethane	mg/kg	0.05	NE	NE	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.05	NE	NE	-	-
	1,1,2-trichloroethane	mg/kg	0.05	NE	NE	-	-
	1,1-dichloroethane	mg/kg	0.05	NE	NE	-	-
	1,1-dichloroethene	mg/kg	0.05	NE	NE	-	-

Table 1
Soil Analytical Results
Former Caltex Esk 2011

Field_ID	QC102A	SB103_13.3-13.4
Sampled_Date-Time	16/03/2011	17/03/2011
SampleCode	SE86393-2	B11-MA60575

Chem_Group	ChemName	Units	EQL	Qld EPA 1998 HIL A (1)	QLD TPH&BTEX (2)	triplicate of SB102_8.5-8.6	
	1,2,3-trichlorobenzene	mg/kg	0.5	NE	NE	-	-
	1,2,3-trichloropropane	mg/kg	0.05	NE	NE	-	-
	1,2,4-trichlorobenzene	mg/kg	0.5	NE	NE	-	-
	1,2-dibromoethane	mg/kg	0.05	NE	NE	-	-
	1,2-dichlorobenzene	mg/kg	0.05	NE	NE	-	-
	1,2-dichloroethane	mg/kg	0.05	NE	NE	-	-
	1,2-dichloropropane	mg/kg	0.05	NE	NE	-	-
	1,3-dichlorobenzene	mg/kg	0.05	NE	NE	-	-
	1,3-dichloropropane	mg/kg	0.05	NE	NE	-	-
	1,4-dichlorobenzene	mg/kg	0.05	NE	NE	-	-
	4-chlorotoluene	mg/kg	0.05	NE	NE	-	-
	Bromobenzene	mg/kg	0.05	NE	NE	-	-
	Bromochloromethane	mg/kg	0.05	NE	NE	-	-
	Bromodichloromethane	mg/kg	0.05	NE	NE	-	-

Published on DESI Disclosure Log
RTI Act 2009

-	-	-	-	-	-	17	-	-	18
-	-	-	-	-	-	10	-	-	7.3
-	-	-	-	-	-	25	-	-	12
-	-	-	-	-	-	<5	-	-	<5
-	-	-	-	-	-	440	-	-	1100
-	-	-	-	-	-	<0.1	-	-	<0.1
-	-	-	-	-	-	<10	-	-	<10
-	-	-	-	-	-	6.7	-	-	5.7
-	-	-	-	-	-	<2	-	-	<2
-	-	-	-	-	-	<5	-	-	<5
-	-	-	-	-	-	<10	-	-	<10
-	-	-	-	-	-	53	-	-	30
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.5	-	-	<0.5
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.2	-	-	<0.2
-	-	-	-	-	-	<0.05	-	-	<0.05
-	-	-	-	-	-	<0.05	-	-	<0.05
-	-	-	-	-	-	<0.05	-	-	<0.05
-	-	-	-	-	-	<0.1	-	-	<0.1
-	-	-	-	-	-	<0.05	-	-	<0.05
-	-	-	-	-	-	<0.1	-	-	<0.1
-	-	-	-	-	-	<0.05	-	-	<0.05
-	-	-	-	-	-	<0.05	-	-	<0.05
-	-	-	-	-	-	<0.15	-	-	<0.15
-	-	-	-	-	-	<0.05	-	-	<0.05
-	-	-	-	-	-	<0.05	-	-	<0.05
-	-	-	-	-	-	<0.05	-	-	<0.05
-	-	-	-	-	-	<0.05	-	-	<0.05

Chem_Group	ChemName	Units	EQL	Draft Qld EPA 1999 TPH/BTEX	Qld EPA 1998 HIL A	Qld EPA 1998 HIL F																								
Phenol	2,4,6-trichlorophenol	mg/kg	0.2				-	-	-	-	-	-	-	<0.2	-	-	<0.2	-	<0.2	-	-	<0.2	-	-	-	-	-			
	2,4-dichlorophenol	mg/kg	0.2				-	-	-	-	-	-	-	<0.2	-	-	<0.2	-	<0.2	-	-	<0.2	-	-	-	-	-			
	2,4-dimethylphenol	mg/kg	0.2				-	-	-	-	-	-	-	<0.2	-	-	<0.2	-	<0.2	-	-	<0.2	-	-	-	-	-			
	2,6-dichlorophenol	mg/kg	0.2				-	-	-	-	-	-	-	<0.2	-	-	<0.2	-	<0.2	-	-	<0.2	-	-	-	-	-			
	2-chlorophenol	mg/kg	0.2				-	-	-	-	-	-	-	<0.2	-	-	<0.2	-	<0.2	-	-	<0.2	-	-	-	-	-			
	2-methylphenol	mg/kg	0.2				-	-	-	-	-	-	-	<0.2	-	-	<0.2	-	<0.2	-	-	<0.2	-	-	-	-	-			
	2-nitrophenol	mg/kg	0.5				-	-	-	-	-	-	-	<0.5	-	-	<0.5	-	<0.5	-	-	<0.5	-	-	-	-	-			
	3-&4-methylphenol	mg/kg	0.4				-	-	-	-	-	-	-	<0.4	-	-	<0.4	-	<0.4	-	-	<0.4	-	-	-	-	-			
	4-chloro-3-methylphenol	mg/kg	0.2				-	-	-	-	-	-	-	<0.2	-	-	<0.2	-	<0.2	-	-	<0.2	-	-	-	-	-			
	Pentachlorophenol	mg/kg	0.5				-	-	-	-	-	-	-	<0.5	-	-	<0.5	-	<0.5	-	-	<0.5	-	-	-	-	-			
Phenol	mg/kg	0.2				-	-	-	-	-	-	-	<0.2	-	-	<0.2	-	<0.2	-	-	<0.5	-	-	-	-	-				
Polychlorinated Biphenyls	Aroclor 1221	mg/kg	0.1				-	-	-	-	-	-	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	-	-	-	-	-			
	Aroclor 1016	mg/kg	0.1				-	-	-	-	-	-	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	-	-	-	-	-			
	Aroclor 1232	mg/kg	0.1				-	-	-	-	-	-	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	-	-	-	-	-			
	Aroclor 1242	mg/kg	0.1				-	-	-	-	-	-	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	-	-	-	-	-			
	Aroclor 1248	mg/kg	0.1				-	-	-	-	-	-	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	-	-	-	-	-			
	Aroclor 1254	mg/kg	0.1				-	-	-	-	-	-	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	-	-	-	-	-			
	Aroclor 1260	mg/kg	0.1				-	-	-	-	-	-	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	-	-	-	-	-			
	PCBs (Sum of total)	mg/kg	0.1		10	50	-	-	-	-	-	-	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	-	-	-	-	-			
TPH																														
TPH C6 - C9	mg/kg	20	100			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	36	<20	390	56	<20	<20	<20	<20				
TPH C10 - C14	mg/kg	20	100			<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50				
TPH C15 - C28	mg/kg	50	1000			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100				
TPH C29 - C36	mg/kg	50	1000			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100				
VHC	1,1,1,2-tetrachloroethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,1,1-trichloroethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,1,2,2-tetrachloroethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,1,2-trichloroethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	0.1	-	-	-	-	-			
	1,1-dichloroethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,1-dichloroethene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,2,3-trichloropropane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,2-dibromoethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,2-dichlorobenzene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,2-dichloroethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	0.1	-	0.1	-	-	0.1	-	-	-	-	-			
	1,2-dichloropropane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,3-dichlorobenzene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,3-dichloropropane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	1,4-dichlorobenzene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Bromodichloromethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Bromoform	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Bromomethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.1	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Carbon tetrachloride	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Chlorobenzene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Chlorodibromomethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Chloroform	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Chloromethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	cis-1,2-dichloroethene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	cis-1,3-dichloropropene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Dibromomethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Dichloromethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Iodomethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Trichloroethene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	Tetrachloroethene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
	trans-1,2-dichloroethene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-			
trans-1,3-dichloropropene	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-				
Trichlorofluoromethane	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-				
Vinyl chloride	mg/kg	0.05				-	-	-	-	-	-	-	<0.05	-	-	<0.05	-	<0.05	-	-	<0.05	-	-	-	-	-				

Field ID	MW15 2.5	MW15 7.0	MW16 2.5	MW16 7.0	QC4	QC4A
Sampled Date-Time	19/05/2010	19/05/2010	20/05/2010	19/05/2010	20/05/2010	20/05/2010
Matrix Description						

Chem_Group	ChemName	Units	EQL	Draft Qld EPA 1999 TPH/BTEX	Qld EPA 1998 HIL A	Qld EPA 1998 HIL F						
BTEX	Benzene	mg/kg	0.05	1			0.2	0.9	<0.05	<0.05	<0.05	<0.1
	Ethylbenzene	mg/kg	0.05				0.2	2	<0.05	<0.05	<0.05	<0.1
	Toluene	mg/kg	0.05				≤0.05	5	<0.05	<0.05	<0.05	<0.1
	Xylene Total	mg/kg	0.05				0.11	28	<0.2	<0.05	<0.05	<0.3
	Total BTEX			7			0.51	35.9	-	-	-	-
Inorganics	Cyanide Total	mg/kg	5		500	2500	-	-	-	-	-	-
	Fluoride	mg/kg	100				-	-	-	-	-	-
	Moisture	%	1				-	-	-	-	-	19
	Moisture Content (dried @ 103°C)	%	0.1				23	12	17	13	27	-
	pH (aqueous extract)	pH Units	0.1				-	-	-	-	-	-
Metals	Antimony	mg/kg	10				-	-	-	-	-	-
	Arsenic	mg/kg	2		100	500	-	-	-	-	-	-
	Barium	mg/kg	10				-	-	-	-	-	-
	Beryllium	mg/kg	2		20	100	-	-	-	-	-	-
	Boron	mg/kg	10				-	-	-	-	-	-
	Cadmium	mg/kg	0.5		20	100	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	5				-	-	-	-	-	-
	Cobalt	mg/kg	5				-	-	-	-	-	-
	Copper	mg/kg	5		1000	5000	-	-	-	-	-	-
	Lead	mg/kg	5	300	300	1500	-	-	-	-	-	-
	Manganese	mg/kg	5		1500	7500	-	-	-	-	-	-
	Mercury	mg/kg	0.1		15	75	-	-	-	-	-	-
	Molybdenum	mg/kg	10				-	-	-	-	-	-
	Nickel	mg/kg	5		600	3000	-	-	-	-	-	-
	Selenium	mg/kg	2				-	-	-	-	-	-
	Silver	mg/kg	5				-	-	-	-	-	-
	Tin	mg/kg	10				-	-	-	-	-	-
	Zinc	mg/kg	5		7000	35000	-	-	-	-	-	-
	OPP	Azinophos methyl	mg/kg	0.2				-	-	-	-	-
Bolstar (Sulprofos)		mg/kg	0.2				-	-	-	-	-	-
Chlorpyrifos		mg/kg	0.2				-	-	-	-	-	-
Demeton-O		mg/kg	0.2				-	-	-	-	-	-
Diazinon		mg/kg	0.2				-	-	-	-	-	-
Dichlorvos		mg/kg	0.2				-	-	-	-	-	-
Disulfoton		mg/kg	0.2				-	-	-	-	-	-
Ethion		mg/kg	0.2				-	-	-	-	-	-
Ethoprop		mg/kg	0.2				-	-	-	-	-	-
Fenitrothion		mg/kg	0.2				-	-	-	-	-	-
Fensulfothion		mg/kg	0.2				-	-	-	-	-	-
Fenthion		mg/kg	0.2				-	-	-	-	-	-
Merphos		mg/kg	0.2				-	-	-	-	-	-
Methyl parathion		mg/kg	0.2				-	-	-	-	-	-
Mevinphos (Phosdrin)		mg/kg	0.2				-	-	-	-	-	-
Naled (Dibrom)		mg/kg	0.5				-	-	-	-	-	-
Phorate		mg/kg	0.2				-	-	-	-	-	-
Ronnel		mg/kg	0.2				-	-	-	-	-	-
Trichloronate		mg/kg	0.2				-	-	-	-	-	-
Organochlorine Pesticides	4,4-DDE	mg/kg	0.05				-	-	-	-	-	-
	a-BHC	mg/kg	0.05				-	-	-	-	-	-
	Aldrin	mg/kg	0.05				-	-	-	-	-	-
	Aldrin + Dieldrin	mg/kg			10	50	-	-	-	-	-	-
	b-BHC	mg/kg	0.05				-	-	-	-	-	-
	Chlordane	mg/kg	0.1		50	250	-	-	-	-	-	-
	d-BHC	mg/kg	0.05				-	-	-	-	-	-
	DDD	mg/kg	0.05				-	-	-	-	-	-
	DDT	mg/kg	0.05				-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg			200	1000	-	-	-	-	-	-
	Dieldrin	mg/kg	0.05				-	-	-	-	-	-
	Endosulfan I	mg/kg	0.05				-	-	-	-	-	-
	Endosulfan II	mg/kg	0.05				-	-	-	-	-	-
	Endosulfan sulphate	mg/kg	0.05				-	-	-	-	-	-
	Endrin	mg/kg	0.05				-	-	-	-	-	-
	Endrin aldehyde	mg/kg	0.05				-	-	-	-	-	-
	Endrin ketone	mg/kg	0.05				-	-	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.05				-	-	-	-	-	-
	Heptachlor	mg/kg	0.05		10	50	-	-	-	-	-	-
Heptachlor epoxide	mg/kg	0.05				-	-	-	-	-	-	
Hexachlorobenzene	mg/kg	0.05				-	-	-	-	-	-	
Methoxychlor	mg/kg	0.05				-	-	-	-	-	-	
Toxaphene	mg/kg	0.1				-	-	-	-	-	-	
PAH	Acenaphthene	mg/kg	0.1				-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.1				-	-	-	-	-	-
	Anthracene	mg/kg	0.1				-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	0.1				-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	0.1	1	1	5	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	0.1				-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.1				-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	0.1				-	-	-	-	-	-
	Chrysene	mg/kg	0.1				-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.1				-	-	-	-	-	-
	Fluoranthene	mg/kg	0.1				-	-	-	-	-	-
	Fluorene	mg/kg	0.1				-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1				-	-	-	-	-	-
	Naphthalene	mg/kg	0.1				-	-	-	-	-	-
	PAHs (Sum of total)	mg/kg	0.1		20	100	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.1				-	-	-	-	-	-
	Pyrene	mg/kg	0.1				-	-	-	-	-	-

Field ID	MW15 2.5	MW15 7.0	MW16 2.5	MW16 7.0	QC4	QC4A
Sampled Date-Time	19/05/2010	19/05/2010	20/05/2010	19/05/2010	20/05/2010	20/05/2010
Matrix Description						

Chem_Group	ChemName	Units	EQL	Draft Qld EPA 1999 TPH/BTEX	Qld EPA 1998 HIL A	Qld EPA 1998 HIL F						
Phenol	2,4,6-trichlorophenol	mg/kg	0.2				-	-	-	-	-	-
	2,4-dichlorophenol	mg/kg	0.2				-	-	-	-	-	-
	2,4-dimethylphenol	mg/kg	0.2				-	-	-	-	-	-
	2,6-dichlorophenol	mg/kg	0.2				-	-	-	-	-	-
	2-chlorophenol	mg/kg	0.2				-	-	-	-	-	-
	2-methylphenol	mg/kg	0.2				-	-	-	-	-	-
	2-nitrophenol	mg/kg	0.5				-	-	-	-	-	-
	3-&4-methylphenol	mg/kg	0.4				-	-	-	-	-	-
	4-chloro-3-methylphenol	mg/kg	0.2				-	-	-	-	-	-
	Pentachlorophenol	mg/kg	0.5				-	-	-	-	-	-
	Phenol	mg/kg	0.2				-	-	-	-	-	-
Polychlorinated Biphenyls	Aroclor 1221	mg/kg	0.1				-	-	-	-	-	-
	Aroclor 1016	mg/kg	0.1				-	-	-	-	-	-
	Aroclor 1232	mg/kg	0.1				-	-	-	-	-	-
	Aroclor 1242	mg/kg	0.1				-	-	-	-	-	-
	Aroclor 1248	mg/kg	0.1				-	-	-	-	-	-
	Aroclor 1254	mg/kg	0.1				-	-	-	-	-	-
	Aroclor 1260	mg/kg	0.1				-	-	-	-	-	-
	PCBs (Sum of total)	mg/kg	0.1		10	50	-	-	-	-	-	-
TPH	TPH C6 - C9	mg/kg	20	100			<20	180	<20	<20	<20	<20
	TPH C10 - C14	mg/kg	20	100			86	130	<50	<50	<50	<20
	TPH C15 - C28	mg/kg	50	1000			<100	<100	<100	<100	<100	<50
	TPH C29 - C36	mg/kg	50	1000			<100	<100	<100	<100	<100	<50
VHC	1,1,1,2-tetrachloroethane	mg/kg	0.05				-	-	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.05				-	-	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.05				-	-	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.05				-	-	-	-	-	-
	1,1-dichloroethane	mg/kg	0.05				-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	0.05				-	-	-	-	-	-
	1,2,3-trichloropropane	mg/kg	0.05				-	-	-	-	-	-
	1,2-dibromoethane	mg/kg	0.05				-	-	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.05				-	-	-	-	-	-
	1,2-dichloroethane	mg/kg	0.05				-	-	-	-	-	-
	1,2-dichloropropane	mg/kg	0.05				-	-	-	-	-	-
	1,3-dichlorobenzene	mg/kg	0.05				-	-	-	-	-	-
	1,3-dichloropropane	mg/kg	0.05				-	-	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.05				-	-	-	-	-	-
	Bromodichloromethane	mg/kg	0.05				-	-	-	-	-	-
	Bromoform	mg/kg	0.05				-	-	-	-	-	-
	Bromomethane	mg/kg	0.05				-	-	-	-	-	-
	Carbon tetrachloride	mg/kg	0.05				-	-	-	-	-	-
	Chlorobenzene	mg/kg	0.05				-	-	-	-	-	-
	Chlorodibromomethane	mg/kg	0.05				-	-	-	-	-	-
	Chloroform	mg/kg	0.05				-	-	-	-	-	-
	Chloromethane	mg/kg	0.05				-	-	-	-	-	-
	cis-1,2-dichloroethene	mg/kg	0.05				-	-	-	-	-	-
	cis-1,3-dichloropropene	mg/kg	0.05				-	-	-	-	-	-
	Dibromomethane	mg/kg	0.05				-	-	-	-	-	-
	Dichloromethane	mg/kg	0.05				-	-	-	-	-	-
	Iodomethane	mg/kg	0.05				-	-	-	-	-	-
	Trichloroethene	mg/kg	0.05				-	-	-	-	-	-
	Tetrachloroethene	mg/kg	0.05				-	-	-	-	-	-
	trans-1,2-dichloroethene	mg/kg	0.05				-	-	-	-	-	-
	trans-1,3-dichloropropene	mg/kg	0.05				-	-	-	-	-	-
	Trichlorofluoromethane	mg/kg	0.05				-	-	-	-	-	-
	Vinyl chloride	mg/kg	0.05				-	-	-	-	-	-

Table 2
Groundwater Analytical Results
Former Caltex Esk 2011

Field ID	MW10	MW11	MW1	MW12	MW13	MW15	MW16	MW17	MW18	MW19	MW20	MW21	MW2	MW22	MW23	MW3	MW4	MW5
Sampled Date-Time	31/10/2011	31/10/2011	1/11/2011	31/10/2011	31/10/2011	1/11/2011	1/11/2011	2/11/2011	2/11/2011	3/11/2011	3/11/2011	2/11/2011	1/11/2011	2/11/2011	2/11/2011	31/10/2011	2/11/2011	2/11/2011
SampleCode	B11-No01190	B11-No01191	B11-No01181	B11-No01192	B11-No01193	B11-No01194	B11-No01195	B11-No01196	B11-No01197	B11-No01198	B11-No01199	B11-No01200	B11-No01182	B11-No01201	B11-No01202	B11-No01183	B11-No01184	B11-No01185

Chem_Group	ChemName	Units	LOR	ANZECC 2000 Freshwater 95%	NHMRC 2004 Drinking Water - Health																			
	TRH C6-C10 less BTEX (F1)	mg/L	0.02			<0.02	0.5	0.05	0.04	0.19	<0.02	<0.02	<0.02	<0.02	0.03	5.8	0.37	0.04	<0.02	0.08	<0.02	0.03	<0.02	
BTEX	Benzene	µg/L	1	950	1	5	240	8	4	11	16	<1	<1	<1	24	4200	21	6	5	160	5	220	2	
	Ethylbenzene	µg/L	1		300	<1	100	<1	4	3	<1	<1	<1	<1	8	1100	36	<1	<1	<1	2	69	<1	
	Toluene	µg/L	1		800	9	270	1	3	10	5	<1	<1	<1	4	3800	86	2	1	<1	5	2	2	
	Xylene (m & p)	µg/L	2		4	390	<2	4	4	2	<2	<2	<2	<2	<2	3900	140	<2	<2	<2	8	<2	<2	
	Xylene (o)	µg/L	1	350		2	120	<1	<1	1	<1	<1	<1	<1	<1	1400	48	<1	<1	<1	2	<1	<1	
	Xylene Total	µg/L	3		600	5 - 6	510	<3	4.5 - 5	5 - 6	2.5 - 3	<3	<3	<3	<3	5300 - 5400	188 - 190	<3	<3	<3	10	<3	<3	
Halogenated Phenols	tetrachlorophenols	µg/L	30			<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	
PAH	Acenaphthene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Acenaphthylene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Anthracene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Benz(a)anthracene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Benzo(a)pyrene	µg/L	1		0.01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Benzo(b)fluoranthene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Benzo(g,h,i)perylene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Benzo(k)fluoranthene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Chrysene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Dibenz(a,h)anthracene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Fluoranthene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Fluorene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Indeno(1,2,3-c,d)pyrene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	Naphthalene	µg/L	1	16		<1	<20 - 7	<1	<1	<1	<1	<1	<1	<1	<1	36 - 130	<1	<1	<1	<1	<1	<1	<1	
		PAHs (Sum of total)	µg/L	1			<1	7	<1	<1	<1	<1	<1	<1	<1	<1	36	<1	<1	<1	<1	<1	<1	<1
		Phenanthrene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
		Pyrene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phenol	2,4,5-trichlorophenol	µg/L	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
	2,4,6-trichlorophenol	µg/L	10	20	20	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
	2,4-dichlorophenol	µg/L	3	160	200	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	
	2,4-dimethylphenol	µg/L	3			<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	5	<3	<3	<3	<3	<3	<3	<3	
	2,4-dinitrophenol	mg/L	0.03	0.045		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	2,6-dichlorophenol	µg/L	3			<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	
	2-chlorophenol	µg/L	3	490	300	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	
	2-methylphenol	µg/L	3			<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	
	2-nitrophenol	µg/L	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
	3-&4-methylphenol	µg/L	6			<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	
	4,6-Dinitro-2-methylphenol	µg/L	30			<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	
	4,6-Dinitro-o-cyclohexyl phenol	µg/L	100			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	
	4-chloro-3-methylphenol	µg/L	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
	4-nitrophenol	µg/L	30			<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	
Dinoseb	µg/L	100			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100		
Pentachlorophenol	µg/L	10	10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		
Phenol	µg/L	3	320		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3		
	Phenols (Total Halogenated)	mg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
	Phenols (Total Non Halogenated)	mg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
TPH	F2-NAPHTHALENE	mg/L	0.05			<0.05	0.28	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.2	0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	
	TPH C6 - C9	µg/L	20			30	2100	170	140	720	70	<20	<20	<20	140	25000	1000	170	30	430	60	340	<20	
	TPH C10 - C14	µg/L	50			<50	470	<50	<50	<50	<50	<50	<50	<50	<50	2700	70	<50	<50	<50	<50	<50	<50	
	TPH C15 - C28	µg/L	100			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	
	TPH C29 - C36	µg/L	100			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	
	TPH C10 - C36 (Sum of total)	µg/L	100			<100	500 - 570	<100	<100	<100	<100	<100	<100	<100	<100	2700 - 2800	<100 - 170	<100	<100	<100	<100	<100	<100	
	TPH C10-C16	mg/L	0.05			<0.05	0.28	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.3	0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	
	TPH C16-C34	mg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	
	TPH C34-C40	mg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1												

Field ID	MW6	MW7	MW8	MW9	MWA	MWC	QC109	QC110	QC111	QC112	QC113	QC114	QC115	QC116	QC117	QC118	QC119	QC121
Sampled Date-Time	2/11/2011	2/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011	1/11/2011
SampleCode	B11-No01186	B11-No01187	B11-No01188	B11-No01189	B11-No01203	B11-No01204	B11-No01205	B11-No01206	B11-No01207	B11-No01208	B11-No01209	B11-No01210	B11-No01211	B11-No01212	B11-No01213	B11-No01214	B11-No01215	B11-No01217

Chem_Group	ChemName	Units	LOR	ANZECC 2000 Freshwater 95%	NHMRC 2004 Drinking Water - Health																		
	TRH C6-C10 less BTEX (F1)	mg/L	0.02			<0.02	<0.02	0.92	0.22	0.26	0.74	0.54	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02
BTEX	Benzene	µg/L	1	950	1	<1	<1	14000	630	1500	110	230	<1	<1	<1	<1	<1	<1	280	<1	<1	<1	<1
	Ethylbenzene	µg/L	1		300	<1	<1	600	100	170	16	100	<1	<1	<1	<1	<1	<1	73	<1	<1	<1	<1
	Toluene	µg/L	1		800	<1	<1	230	250	76	40	270	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1
	Xylene (m & p)	µg/L	2			<2	<2	890	190	150	35	400	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Xylene (o)	µg/L	1	350		<1	<1	69	46	15	5	120	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene Total	µg/L	3		600	<3	<3	959 - 980	236 - 240	165 - 170	40	520	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Halogenated Phenols	tetrachlorophenols	µg/L	30			<30	<30	<30	<30	<30	<30	<30	<30	-	<30	-	-	-	<30	<30	-	-	-
PAH	Acenaphthene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Acenaphthylene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Anthracene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Benzo(a)anthracene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Benzo(a)pyrene	µg/L	1		0.01	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Benzo(b)fluoranthene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Benzo(g,h,i)perylene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Benzo(k)fluoranthene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Chrysene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Dibenz(a,h)anthracene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Fluoranthene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Fluorene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Indeno(1,2,3-c,d)pyrene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Naphthalene	µg/L	1	16		<1	<1	28 - 30	<20 - 3	29 - 50	<1	<20 - 8	<1	<20	<1	<20	<20	<20	<1	<1	<20	<20	<20
	PAHs (Sum of total)	µg/L	1			<1	<1	28	3	29	<1	8	<1	-	<1	-	-	-	<1	<1	-	-	-
	Phenanthrene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
	Pyrene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	-	-	<1	<1	-	-	-
Phenol	2,4,5-trichlorophenol	µg/L	10			<10	<10	<10	<10	<10	<10	<10	<10	-	<10	-	-	-	<10	<10	-	-	-
	2,4,6-trichlorophenol	µg/L	10	20	20	<10	<10	<10	<10	<10	<10	<10	<10	-	<10	-	-	-	<10	<10	-	-	-
	2,4-dichlorophenol	µg/L	3	160	200	<3	<3	<3	<3	<3	<3	<3	<3	-	<3	-	-	-	<3	<3	-	-	-
	2,4-dimethylphenol	µg/L	3			<3	<3	11	<3	10	<3	<3	<3	-	<3	-	-	-	<3	<3	-	-	-
	2,4-dinitrophenol	mg/L	0.03	0.045		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	<0.03	-	-	-	<0.03	<0.03	-	-	-
	2,6-dichlorophenol	µg/L	3			<3	<3	<3	<3	<3	<3	<3	<3	-	<3	-	-	-	<3	<3	-	-	-
	2-chlorophenol	µg/L	3	490	300	<3	<3	<3	<3	<3	<3	<3	<3	-	<3	-	-	-	<3	<3	-	-	-
	2-methylphenol	µg/L	3			<3	<3	4	7	<3	<3	<3	<3	-	<3	-	-	-	<3	<3	-	-	-
	2-nitrophenol	µg/L	10			<10	<10	<10	<10	<10	<10	<10	<10	-	<10	-	-	-	<10	<10	-	-	-
	3-&4-methylphenol	µg/L	6			<6	<6	<6	7	<6	<6	<6	<6	-	<6	-	-	-	<6	<6	-	-	-
	4,6-Dinitro-2-methylphenol	µg/L	30			<30	<30	<30	<30	<30	<30	<30	<30	-	<30	-	-	-	<30	<30	-	-	-
	4,6-Dinitro-o-cyclohexyl phenol	µg/L	100			<100	<100	<100	<100	<100	<100	<100	<100	-	<100	-	-	-	<100	<100	-	-	-
	4-chloro-3-methylphenol	µg/L	10			<10	<10	<10	<10	<10	<10	<10	<10	-	<10	-	-	-	<10	<10	-	-	-
	4-nitrophenol	µg/L	30			<30	<30	<30	<30	<30	<30	<30	<30	-	<30	-	-	-	<30	<30	-	-	-
	Dinoseb	µg/L	100			<100	<100	<100	<100	<100	<100	<100	<100	-	<100	-	-	-	<100	<100	-	-	-
	Pentachlorophenol	µg/L	10	10	10	<10	<10	<10	<10	<10	<10	<10	<10	-	<10	-	-	-	<10	<10	-	-	-
	Phenol	µg/L	3	320		<3	<3	75	10	13	<3	<3	<3	-	<3	-	-	-	<3	<3	-	-	-
Phenols (Total Halogenated)	mg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	-	-	-	<0.01	<0.01	-	-	-	
Phenols (Total Non Halogenated)	mg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	-	-	<0.1	<0.1	-	-	-	
TPH	F2-NAPHTHALENE	mg/L	0.05			<0.05	<0.05	0.61	0.1	0.46	0.23	0.18	<0.05	-	<0.05	-	-	-	<0.05	0.09	-	-	-
	TPH C6 - C9	µg/L	20			<20	<20	17000	1400	2300	2100	2200	100	<20	<20	<20	<20	<20	440	<20	<20	<20	<20
	TPH C10 - C14	µg/L	50			<50	<50	1100	170	600	300	310	<50	-	<50	-	-	-	<50	<50	-	-	-
	TPH C15 - C28	µg/L	100			<100	<100	200	<100	<100	<100	<100	<100	-	<100	-	-	-	<100	<100	-	-	-
	TPH C29 - C36	µg/L	100			<100	<100	<100	<100	<100	<100	<100	<100	-	<100	-	-	-	<100	<100	-	-	-
	TPH C10 - C36 (Sum of total)	µg/L	100			<100	<100	1300 - 1350	200 - 270	600 - 700	300 - 400	300 - 410	<100	-	<100	-	-	-	<100	<100	-	-	-
	TPH C10-C16	mg/L	0.05			<0.05	<0.05	0.64	0.1	0.51	0.23	0.18	<0.05	-	<0.05	-	-	-	<0.05	0.09	-	-	-
	TPH C16-C34	mg/L	0.1			<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	-	-	0.1	<0.1	-	-	-
TPH C34-C40	mg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	-	-	<0.1	<0.1	-	-	-	
TPH C6 - C10	mg/L	0.02			<0.02	<0.02	23	2.1	3	1.1	2.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.54	<0.02	<0.02	<0.02	<0.02	

Table 2
Groundwater Analytical Results
Former Caltex Esk 2011

Field ID	QC122
Sampled Date-Time	1/11/2011
SampleCode	B11-No01218

Chem_Group	ChemName	Units	LOR	ANZECC 2000 Freshwater 95%	NHMRC 2004 Drinking Water - Health	
	TRH C6-C10 less BTEX (F1)	mg/L	0.02			<0.02
BTEX	Benzene	µg/L	1	950	1	<1
	Ethylbenzene	µg/L	1		300	<1
	Toluene	µg/L	1		800	<1
	Xylene (m & p)	µg/L	2			<2
	Xylene (o)	µg/L	1	350		<1
	Xylene Total	µg/L	3		600	<3
Halogenated Phenols	tetrachlorophenols	µg/L	30			<30
PAH	Acenaphthene	µg/L	1			<1
	Acenaphthylene	µg/L	1			<1
	Anthracene	µg/L	1			<1
	Benz(a)anthracene	µg/L	1			<1
	Benzo(a)pyrene	µg/L	1		0.01	<1
	Benzo(b)fluoranthene	µg/L	1			<1
	Benzo(g,h,i)perylene	µg/L	1			<1
	Benzo(k)fluoranthene	µg/L	1			<1
	Chrysene	µg/L	1			<1
	Dibenz(a,h)anthracene	µg/L	1			<1
	Fluoranthene	µg/L	1			<1
	Fluorene	µg/L	1			<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1			<1
	Naphthalene	µg/L	1	16		<1
	PAHs (Sum of total)	µg/L	1			<1
	Phenanthrene	µg/L	1			<1
	Pyrene	µg/L	1			<1
Phenol	2,4,5-trichlorophenol	µg/L	10			<10
	2,4,6-trichlorophenol	µg/L	10	20	20	<10
	2,4-dichlorophenol	µg/L	3	160	200	<3
	2,4-dimethylphenol	µg/L	3			<3
	2,4-dinitrophenol	mg/L	0.03	0.045		<0.03
	2,6-dichlorophenol	µg/L	3			<3
	2-chlorophenol	µg/L	3	490	300	<3
	2-methylphenol	µg/L	3			<3
	2-nitrophenol	µg/L	10			<10
	3-&4-methylphenol	µg/L	6			<6
	4,6-Dinitro-2-methylphenol	µg/L	30			<30
	4,6-Dinitro-o-cyclohexyl phenol	µg/L	100			<100
	4-chloro-3-methylphenol	µg/L	10			<10
	4-nitrophenol	µg/L	30			<30
	Dinoseb	µg/L	100			<100
	Pentachlorophenol	µg/L	10	10	10	<10
	Phenol	µg/L	3	320		<3
	Phenols (Total Halogenated)	mg/L	0.01			<0.01
	Phenols (Total Non Halogenated)	mg/L	0.1			<0.1
TPH	F2-NAPHTHALENE	mg/L	0.05			0.09
	TPH C6 - C9	µg/L	20			<20
	TPH C10 - C14	µg/L	50			<50
	TPH C15 - C28	µg/L	100			<100
	TPH C29 - C36	µg/L	100			<100
	TPH C10 - C36 (Sum of total)	µg/L	100			<100
	TPH C10-C16	mg/L	0.05			0.09
	TPH C16-C34	mg/L	0.1			<0.1
	TPH C34-C40	mg/L	0.1			<0.1
	TPH C6 - C10	mg/L	0.02			<0.02

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RTI Act 2009

Appendix E

Post 2008 Bore Logs



Soil Boring SB1

Page: 1 of 1

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 7.4 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube/Solid Stem Auger
 Driller sch4p4(6) Log By sch4p4(6) Date 26/3/08 Permit # NA
 Checked By sch4p4(6) P License No. 3210

COMMENTS
 Hand Auger to 1.0m. Push Tube to 6.8m. Solid Stem Auger to 7.4m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.3 0.0 0.0	SB1-0.0-0.2 SB1-0.4-0.6 SB1-0.9-1.1			CL	Gravelly CLAY - low plasticity, brown, medium to coarse grained gravel, dry.
2	0.0 0.5	SB1-1.9-2.1 SB1-2.9-3.1			CH	Sandy CLAY - high plasticity, light brown, dry to moist, stiff. Some black mottling.
4	0.4 27.2	SB1-3.9-4.1 SB1-4.9-5.1				Hydrocarbon odour. 10cm lense of fine to medium grained white gravel, hydrocarbon odour.
6	39.6 87.1	SB1-5.9-6.1 SB1-6.9-7.1			SP	10cm lense of fine to medium grained white gravel, hydrocarbon odour. Gravelly SAND - orange/brown, medium to coarse grained gravel, hydrocarbon odour.
8						End of hole at 7.4m - Refusal.
10						
12						
14						
16						

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 15.0 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 15.0 m. Static ▽ 9.7 m. Diameter 125 mm.
 Screen: Dia 50 mm. Length NA Type/Size CLASS 18 UPVC
 Casing: Dia 50 mm. Length NA Type CLASS 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube/Air Hammer
 Driller sch4p4(6) Log By sch4p4(6) Date 26/3/08 Permit # NA
 Checked By sch4p4(6) License No. 3210

COMMENTS
 Hand Auger to 1.0m. Push Tube to 7.3m. Air Hammer to 15.0m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.</small>
0		1.3	SB2-0.0-0.2			CL	Gravelly CLAY - low plasticity, brown, medium to coarse grained gravel, dry.
		0.0	SB2-0.4-0.6			CL	Becoming moist.
		0.0	SB2-0.9-1.1				Sandy CLAY - high plasticity, light brown, moist with trace medium to coarse grained gravel pieces.
2		2.5	SB2-1.9-2.1				Hydrocarbon odour.
		287	SB2-2.9-3.1 (QC1/QC1A)			CH	Strong hydrocarbon odour.
4		104	SB2-3.9-4.1				Colour change to orange/brown with black mottling. Strong hydrocarbon odour.
		31.4	SB2-4.9-5.1			CH	CLAY - high plasticity, light grey, mottled brown, stiff.
6		101.3	SB2-5.9-6.1			SC	Hydrocarbon odour.
		921	SB2-6.9-7.1			SP	5cm lense of white, fine medium to grained gravel.
8		72.7	SB2-7.9-8.1			GP	5cm lense of white, fine to medium grained gravel.
		52.1	SB2-8.9-9.1				Clayey SAND - orange/brown, fine to medium grained sand, dry to moist.
10		31.7	SB2-9.9-10.1				5cm lense of white, fine to medium grained gravel.
		30.0	SB2-10.9-11.1			CL	5cm lense of white, fine to medium grained gravel.
12		7.2	SB2-11.9-12.1				SAND - orange/brown, medium to coarse grained.
		3.5	SB2-12.9-13.1				5cm lense of gravel.
14						SP	Sandy GRAVEL - light brown, medium to coarse grained sand and fine to medium grained gravel.
		0.3	SB2-14.8-15.0				CLAY - low plasticity, light brown, dry to moist.
16							Gravelly SAND - light grey, fine to medium grained, dry to moist.
22-383							End of hole at 15.0m - Limit of investigation.

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 15.0 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 15.0 m. Static ▽ 10.0 m. Diameter 125 mm.
 Screen: Dia 50 mm. Length NA Type/Size CLASS 18 UPVC
 Casing: Dia 50 mm. Length NA Type CLASS 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube/Air Hammer
 Driller sch4p4(6) Log By sch4p4(6) Date 27/3/08 Permit # NA
 Checked By sch4p4(6) P License No. 3210

COMMENTS
 Hand Auger to 1.0m. Push Tube to 7.3m. Air Hammer to 15.0m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.</small>
0		0.0	SB3-0.0-0.2			CL	Gravelly CLAY - low plasticity, brown, medium to coarse grained gravel, moist.
		0.0	SB3-0.4-0.6				
		0.0	SB3-0.9-1.1				CLAY - high plasticity, light grey, moist, stiff.
2		0.0	SB3-1.9-2.1			CH	
		0.6	SB3-2.9-3.1				
4		176	SB3-3.9-4.1				Clayey SAND - orange, fine to medium grained.
		104	SB3-4.9-5.1			SC	5cm lense of white medium to coarse grained gravel.
6		159	SB3-5.9-6.1				5cm lense of white medium to coarse grained gravel.
		2822	SB3-6.9-7.1			SP	Gravelly SAND - orange, medium to coarse grained sand with medium to coarse grained gravel.
8		178	SB3-7.9-8.1				10cm lense of white medium to coarse grained gravel.
		172	SB3-8.9-9.1				
10		121	SB3-9.9-10.1				CLAY - light orange/brown.
		6.9	SB3-10.9-11.1				
12		4.2	SB3-11.9-12.1			CL	
		2.6	SB3-12.9-13.1				Colour change to light grey.
14		2.7	SB3-13.9-14.1				
		3.0	SB3-14.8-15.0				
16							End of hole at 15.0m - Limit of investigation.

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 15.0 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 15.0 m. Static ▽ 9.7 m. Diameter 125 mm.
 Screen: Dia 50 mm. Length NA Type/Size CLASS 18 UPVC
 Casing: Dia 50 mm. Length NA Type CLASS 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube/Air Hammer
 Driller sch4p4(6) Log By sch4p4(6) Date 27/3/08 Permit # NA
 Checked By sch4p4(6) License No. 3210

COMMENTS
 Hand Auger to 1.0m. Push Tube to 7.1m. Air Hammer to 15.0m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.</small>
0		0.0	SB4-0.0-0.2				
		0.0	SB4-0.4-0.6				
		0.0	SB4-0.9-1.1				
2		0.4	SB4-1.9-2.1			CH	Sandy, Clayey FILL - high plasticity, some medium to coarse grained gravel, wet.
		2.9	SB4-2.9-3.1			CH	CLAY - high plasticity, grey, soft, moist.
4		142	SB4-3.9-4.1				Clayey SAND - orange/brown, fine to medium grained, hydrocarbon odour.
		4727	SB4-4.9-5.1			SC	
6		5247	SB4-5.9-6.1 (QC3/QC3A)				Colour change to white. 5cm lense of white medium to coarse grained gravel.
		1341	SB4-6.9-7.1				5cm lense of white medium to coarse grained gravel. Colour change to white mottled orange.
8		73.1	SB4-7.9-8.1			GP	Sandy GRAVEL - orange/brown, medium to coarse grained, dry.
		36.5					
10		35.2	SB4-9.9-10.1				CLAY - low plasticity, light orange/brown, dry.
		4.5					
12		32	SB4-11.9-12.1			CL	
		1.7					
14		1.1					
		1.6	SB4-14.9-15.1				10cm layer of black material. End of hole at 15.0m - Limit of investigation.
16							

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 15.0 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 15.0 m. Static ▼ 9.3 m. Diameter 125 mm.
 Screen: Dia 50 mm. Length NA Type/Size CLASS 18 UPVC
 Casing: Dia 50 mm. Length NA Type CLASS 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube/Air Hammer
 Driller sch4p4(6) Log By sch4p4(6) Date 28/3/08 Permit # NA
 Checked By sch4p4(6) License No. 3210

COMMENTS
 Hand Auger to 1.0m. Push Tube to 7.3m. Air Hammer to 15.0m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	SB5-0.0-0.2				CLAY - low plasticity, brown, some grass roots in top 30cm, moist.
		0.0	SB5-0.4-0.6				Colour change to light grey.
		0.0	SB5-0.9-1.1				
2		0.0	SB5-1.9-2.1			CL	
		0.0	SB5-2.9-3.1				
4		34.5	SB5-3.9-4.1			CL	Sandy CLAY - low plasticity, brown mottled orange, fine to medium grained sand, dry to moist.
		378	SB5-4.9-5.1				Some black staining and hydrocarbon odour.
		110	SB5-5.9-6.1			SP	SAND - orange mottled brown, fine to medium grained.
6							Some medium to coarse grained gravel.
		8040	SB5-6.9-7.1				
8		485				GP	Sandy GRAVEL - orange/brown, medium to coarse grained gravel with medium to coarse grained sand.
		471					Colour change to cream.
10		4.6	SB5-9.9-10.1				CLAY - low plasticity, beige, dry.
		1.0					Colour change to light orange/brown.
12		0.2	SB5-11.9-12.1			CL	
		0.2					Colour change to light grey/blue.
14		0.0					
		0.0	SB5-14.8-15.0				Becoming moist.
16							Wet.

Soil Boring SB6

Page: 1 of 1

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 6.8 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p4(6) Log By sch4p4(6) Date 28/3/08 Permit # NA
 Checked By sch4p4(6) P License No. 3210

COMMENTS
 Hand Auger to 1.0m. Push Tube to 6.8m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB6-0.0-0.2 SB6-0.4-0.6 SB6-0.9-1.1			CL	Gravelly CLAY - low plasticity, brown, moist with fine to medium grained sand.
2	0.0 0.0	SB6-1.9-2.1 SB6-2.9-3.1			CL	CLAY - low plasticity, grey, moist with some fine to medium grained rounded gravel.
4	1.5 0.6	SB6-3.9-4.1 SB6-4.9-5.1			SC	5cm lense of white medium to coarse grained gravel. Clayey SAND - orange, fine to medium grained, dry to moist.
6	0.5 4.2	SB6-5.9-6.1 SB6-6.7-6.8			SP	Some black mottling, hydrocarbon impact. Gravelly SAND - orange, medium to coarse grained gravel, medium to coarse grained sand.
8						End of hole at 6.8m - Refusal on rock.
10						
12						
14						
16						

Soil Boring SB7

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Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 6.3 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p4(6) Log By sch4p4(6) Date 28/3/08 Permit # NA
 Checked By sch4p4(6) License No. 3210

COMMENTS
 Hand Auger to 1.0m. Push Tube to 6.3m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB7-0.0-0.2 SB7-0.4-0.6 SB7-0.9-1.1			CL	Sandy CLAY - low plasticity, brown, dry to moist with fine to medium grained sand. Becoming dry and hard. 10cm lense of medium to coarse grained pink gravel. Becoming moist.
2	0.0 0.0	SB7-1.9-2.1 SB7-2.9-3.1				
4	0.0 0.0	SB7-3.9-4.1 SB7-4.9-5.1			SC	Clayey SAND - orange mottled brown, fine to medium grained. Some black mottling and faint hydrocarbon odour. Black mottling, faint hydrocarbon odour.
6	0.0	SB7-5.9-6.1			SP	Gravelly SAND - medium to coarse grained sand with medium to coarse grained gravel. End of hole at 6.3m - Refusal.
8						
10						
12						
14						
16						

Soil Boring SB8

Page: 1 of 1

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 5.1 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p4(6) Log By sch4p4(6) Date 28/3/08 Permit # NA
 Checked By sch4p4(6) License No. 3210

COMMENTS
 Hand Auger to 1.0m. Push Tube to 5.1m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB8-0.0-0.2 SB8-0.4-0.6 SB8-0.9-1.1			CL	Sandy CLAY - light brown with some fine to medium grained gravel, dry. 5cm band of pink gravel pieces.
2	0.0 0.0	SB8-1.9-2.1 SB8-2.9-3.1			CL	Becoming dry to moist. CLAY - low plasticity, light grey, dry to moist.
4	0.0 0.0	SB8-3.9-4.1 SB8-4.9-5.1			SC SP	Clayey SAND - orange mottled light grey, fine to medium grained. Gravelly SAND - light orange/brown, medium to coarse grained sand with medium to coarse grained gravel. Some black mottling.
6						End of hole at 5.1m - Refusal on rock.
8						
10						
12						
14						
16						

Soil Boring SB9

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Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 7.5 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p4(6) Log By sch4p4(6) Date 28/3/08 Permit # NA
 Checked By sch4p4(6) License No. 3210

COMMENTS
 Hand Auger to 1.0m. Push Tube to 7.5m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB9-0.0-0.2 SB9-0.4-0.6 SB9-0.9-1.1			CL	Sandy CLAY - light brown with some fine to medium grained gravel, moist. Becoming dry. CLAY - light grey, dry.
2	0.0 0.0	SB9-1.9-2.1 SB9-2.9-3.1			CL	
4	0.0	SB9-3.9-4.1				Becoming orange mottled grey.
	0.0	SB9-4.9-5.1			SC	Clayey SAND - orange with black mottles, fine to medium grained, dry.
					SP	SAND - orange, fine to medium grained, dry to moist.
6	0.0	SB9-5.9-6.1			SP	Gravelly SAND - orange, medium to coarse grained sand with fine to medium grained gravel.
					CL	CLAY - low plasticity, light grey, stiff. 10cm lense of white medium to coarse grained gravel. 10cm lense of white medium to coarse grained gravel. 10cm band of red medium to coarse grained gravel.
8	0.0	SB9-7.4-7.5				End of hole at 7.5m - Refusal on rock.
10						
12						
14						
16						

Soil Boring SB10

Page: 1 of 1

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 6.8 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p4(6) Log By sch4p4(6) Date 29/3/08 Permit # NA
 Checked By sch4p4(6) License No. 3210

COMMENTS
 Hand Auger to 1.0m. Push Tube to 6.8m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	SB10-0.0-0.2				
	0.0	SB10-0.4-0.6			CL	CLAY - low plasticity, brown, some medium to coarse grained gravel, moist, soft.
	0.0	SB10-0.9-1.1				
						CLAY - low plasticity, light grey/brown, stiff, dry to moist.
2	0.0	SB10-1.9-2.1			CL	
	0.6	SB10-2.9-3.1 (QC6/QC6A)			CL	5cm lense of white fine to medium grained gravel.
						Sandy CLAY - orange mottled brown with some black staining.
						Clayey SAND - orange/grey/black mottling, fine to medium grained.
4	0.7	SB10-3.9-4.1				
	0.2	SB10-4.9-5.1			SC	
						10cm lense of white medium to coarse grained gravel.
6	0.0	SB10-5.9-6.1				
	0.0	SB10-6.6-6.8			GC	Clayey GRAVEL - medium to coarse grained red gravel. Becoming white clay and gravel.
						End of hole at 6.8m - Refusal on rock.
8						
10						
12						
14						
16						

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 15.0 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 15.0 m. Static ▼ 13.6 m. Diameter 125 mm.
 Screen: Dia 50 mm. Length NA Type/Size CLASS 18 UPVC
 Casing: Dia 50 mm. Length NA Type CLASS 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube/Air Hammer/Air Blade
 Driller sch4p4(6) Log By sch4p4(6) Date 29/3/08 Permit # NA
 Checked By sch4p4(6) License No. 3210

COMMENTS

Hand Auger to 1.0m. Push Tube to 6.2m. Air Hammer to 8.0m. Air Blade to 10.0m. Air Hammer to 15.0m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	SB11-0.0-0.2			CL	CLAY - brown, moist, soft with black organic material.
		0.0	SB11-0.4-0.6				CLAY - low plasticity, light brown, stiff, dry to moist.
		0.0	SB11-0.9-1.1				
2		0.0	SB11-1.9-2.1			CL	
		0.0	SB11-2.9-3.1				Gravelly SAND - orange/brown with some black mottling, fine to medium grained, dry to moist.
4		0.0	SB11-3.9-4.1			SP	
		0.0	SB11-4.9-5.1			GP SP	GRAVEL - orange/red, medium to coarse grained.
		0.0	SB11-5.9-6.1				SAND - orange, fine to medium grained.
6		0.0	SB11-6.9-7.1			CL	Gravelly CLAY - low plasticity, light grey with white medium to coarse grained gravel.
		0.0	SB11-7.9-8.1				Black mottling.
8		0.0	SB11-7.9-8.1				
		0.0	SB11-9.9-10.1			CL	Sandy CLAY - light brown, moist.
10		0.0	SB11-9.9-10.1				ROCK.
		0.0	SB11-11.9-12.1			CL	CLAY - low plasticity, light brown.
12		0.0	SB11-11.9-12.1				CLAYSTONE - light grey/blue, dry.
		0.0	SB11-14.8-15.0				10cm lense of shiny black material (coal).
14		0.0	SB11-14.8-15.0				Colour change back to light grey/blue, dry.
16		0.0	SB11-14.8-15.0				End of hole at 15.0m - Limit of investigation.

Soil Boring **SB12**

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Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 1.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger
 Driller sch4p4(6) Log By sch4p4(6) Date 29/3/08 Permit # NA
 Checked By sch4p4(6) License No. 3210

COMMENTS
 Hand Auger to 1.0m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB12-0.0-0.2 SB12-0.4-0.6 SB12-0.9-1.1			CL	CLAY - low plasticity, brown, dry with some medium to coarse grained gravel. End of hole at 1.0m - Limit of investigation.
2						
4						
6						
8						
10						
12						
14						
16						

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 15.0 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 15.0 m. Static ▼ 7.9 m. Diameter 125 mm.
 Screen: Dia 50 mm. Length NA Type/Size CLASS 18 UPVC
 Casing: Dia 50 mm. Length NA Type CLASS 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube/Air Blade/Air Hammer
 Driller sch4p4 Log By sch4p4(6) Date 29/3/08 Permit # NA
 Checked By sch4p4(6) License No. 3210

COMMENTS

Hand Auger to 1.0m. Push Tube to 7.5m. Air Blade to 10.0m. Air Hammer to 15.0m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	SB13-0.0-0.2			CL	Sandy CLAY - low plasticity, brown with fine to medium grained sand, dry.
		0.0	SB13-0.4-0.6			CL	CLAY - low plasticity, light grey, stiff, dry to moist.
2		0.0	SB13-1.9-2.1			SP	SAND - orange/brown, fine to medium grained, dry to moist.
		0.0	SB13-2.9-3.1			GP	Sandy GRAVEL - orange/red, fine to medium grained with medium to coarse grained sand, dry to moist.
4		0.0	SB13-3.9-4.1			SC	Clayey SAND - orange mottled white, fine to medium grained, dry to moist.
6		0.0	SB13-5.9-6.1			GP	Becoming coarser grained.
8		0.0	SB13-7.9-8.1			CL	Sandy GRAVEL - white/orange medium to coarse grained gravel, medium to coarse grained red sand. ROCK layer.
10		1.5	SB13-9.9-10.1			CL	CLAY - low plasticity, light orange/brown, dry.
12		0.0	SB13-11.9-12.1				30cm band of black fine to medium grained shiny material (coal). CLAYSTONE - light grey/blue, fine to medium grained, dry.
14			SB13-14.8-15.1				End of hole at 15.0m - Limit of investigation.
16							

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 12.2 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 11.0 m. Static ▼ 7.9 m. Diameter 125 mm.
 Screen: Dia 50 mm. Length NA Type/Size CLASS 18 UPVC
 Casing: Dia 50 mm. Length NA Type CLASS 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube/Solid Stem Auger
 Driller sch4p4 Log By sch4p4(6) Date 21/4/08 Permit # NA
 Checked By sch4p4(6) License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 4.9m. Solid Stem Auger to 12.2m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.</small>
0		0.0	SB14-0.0-0.2				
		0.0	SB14-0.4-0.6				
		0.0	SB14-0.9-1.1				
2		0.0	SB14-1.9-2.1			CL	CLAY - low plasticity, brown, dry, trace fine to medium grained sand. Becoming slightly moist. With some fine to medium grained gravel.
		0.0	SB14-2.9-3.1				
4		0.0	SB14-3.9-4.1			SP	SAND - light grey, orange mottled, fine to medium grained, dry. Some black staining. With some medium to coarse grained red gravel.
		0.0	SB14-4.9-5.1				
6		0.0	SB14-5.9-6.1			GC	Clayey GRAVEL - fine to medium grained white gravel, light brown clay, dry to moist.
		0.0	SB14-6.9-7.1				
8		0.0	SB14-8.9-9.1			GP	Sandy GRAVEL - light orange/brown, fine to medium grained sand, dry, fine to medium grained gravel, moist. Sand becoming medium to coarse grained, dry.
10							
12						CL	Sandy CLAY - low plasticity, light orange/brown, fine to medium grained sand. Wet.
14							End of hole at 12.2m - Refusal.
16							

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 11.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia 50 mm. Length NA Type/Size CLASS 18 UPVC
 Casing: Dia 50 mm. Length NA Type CLASS 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Solid Stem Auger
 Driller sch4p4 Log By sch4p4(6) Date 21/4/08 Permit # NA
 Checked By sch4p4(6) License No. 3247

COMMENTS
 Work took place on 21 &
 22/4/08. Hand Auger to 1.0m.
 Solid Stem Auger to 11.0m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.</small>
0		0.0	SB15-0.0-0.2				CLAY - low plasticity, grey/brown, soft, moist.
		0.0	SB15-0.4-0.6				
		0.0	SB15-0.9-1.1				
2		0.0	SB15-1.9-2.1			CL	Becoming stiffer and then soft with depth.
		0.0	SB15-2.9-3.1				
4		6191	SB15-3.9-4.1				Strong hydrocarbon odour. Strong hydrocarbon odour.
		4364	SB15-4.9-5.1			CL	Sandy CLAY - low plasticity, brown, soft, fine to medium grained sand, moist. Strong hydrocarbon odour.
6		5918	SB15-5.9-6.1			SC	Clayey SAND - red/brown, medium coarse grained sand, moist. Strong hydrocarbon odour.
		4947	SB15-6.9-7.1				
8		9110	SB15-7.9-8.1			CL	CLAY - light brown, moist, stiff with some fine medium grained sand and trace fine to medium grained gravel.
		3619	SB15-8.9-9.1				
10		1344	SB15-9.9-10.1			CL	CLAY - light orange/brown, moist.
		0.0	SB15-10.9-11.0				
							End of hole at 11.0m - Limit of investigation.
12							
14							
16							

Soil Boring SB16

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Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 4.5 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p4 Log By sch4p4(6) Date 22/4/08 Permit # NA
 Checked By sch4p4(6) License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 4.5m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB16-0.0-0.2 SB16-0.4-0.6 SB16-0.9-1.1 (QC14/QC14A)				CLAY - light grey/brown, dry, hard. Becoming slightly moist with trace fine to medium grained gravel, stiff.
2	0.0 0.0	SB16-1.9-2.1 SB16-2.9-3.1			CL	
4	0.0 0.0	SB16-3.9-4.1 SB16-4.2-4.5			SC	Clayey SAND - light grey, orange mottling, fine to medium grained, dry to moist. With some black sand. End of hole at 4.5m - Refusal.
6						
8						
10						
12						
14						
16						

Soil Boring SB17

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Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 4.5 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p Log By sch4p4(6) Date 22/4/08 Permit # NA
 Checked By sch4p4(6) License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 4.5m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB17-0.0-0.2 SB17-0.4-0.6 SB17-0.9-1.1				CLAY - low plasticity, brown, dry, hard with some medium to coarse grained gravel. Becoming slightly moist, stiff.
2	0.0 0.0	SB17-1.9-2.1 SB17-2.9-3.1			CL	
4	0.0 0.0	SB17-3.9-4.1 SB17-4.3-4.5			SC GP	Clayey SAND - light grey with orange mottling, fine to medium grained, dry to moist. Some black mottling. GRAVEL - medium to coarse grained. End of hole at 4.5m - Refusal.
6						
8						
10						
12						
14						
16						

Soil Boring SB18

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Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 6.3 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p Log By sch4p4(6) Date 22/4/08 Permit # NA
 Checked By sch4p4(6) License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 6.3m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB18-0.0-0.2 SB18-0.4-0.6 SB18-0.9-1.1			CL	Sandy CLAY - brown, dry, loose, some grass roots in first 15cm. With some medium to coarse grained gravel.
2	0.0	SB18-1.9-2.1				
	0.0	SB18-2.9-3.1			CL	CLAY - low plasticity, light grey with orange mottling, dry to moist, stiff.
					SC	Clayey SAND - light grey/black with orange mottling, fine to medium grained.
4	0.0	SB18-3.9-4.1				
	0.0	SB18-4.9-5.1			CL	CLAY - low plasticity, light grey, orange mottling, dry to moist.
					GP	GRAVEL - 30 cm lense, white, medium to coarse grained gravel.
6	0.0	SB18-6.1-6.3			GP	GRAVEL - 20 cm lense, white, medium to coarse grained gravel.
					SP	SAND - light grey with orange mottling, fine to medium grained.
						End of hole at 6.3m - Refusal.
8						
10						
12						
14						
16						

Soil Boring SB19

Page: 1 of 1

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 6.3 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p4 Log By sch4p4(6) Date 22/4/08 Permit # NA
 Checked By sch4p4(6) License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 6.3m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	SB19-0.0-0.2			SP	SAND - orange, fine to medium grained, dry to moist.
	0.0	SB19-0.4-0.6 (QC15/QC15A)				
	0.0	SB19-0.9-1.1				CLAY - high plasticity, light grey, moist, soft.
2	0.0	SB19-1.9-2.1			CH	
	0.0	SB19-2.9-3.1			GP	GRAVEL - 20cm lense, white, fine to medium coarse grained.
					SC	Clayey SAND - orange, grey and black mottling, fine to medium grained.
4	0.0	SB19-3.9-4.1				SAND - orange with black and grey mottling, fine to medium grained, moist.
	0.0	SB19-4.9-5.1			SP	
	0.0	SB19-5.4-5.6				With some fine to medium grained gravel.
6	0.0	SB19-6.2-6.3			GP	GRAVEL - white, medium to coarse grained, dry.
						End of hole at 6.3m - Refusal.
8						
10						
12						
14						
16						

Soil Boring SB20

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Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 5.1 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p4(6) Log By sch4p4(6) Date 22/4/08 Permit # NA
 Checked By sch4p4(6) License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 5.1m.

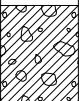
Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	SB20-0.0-0.2			CL	Silty CLAY - low plasticity, brown, dry.
	0.0	SB20-0.4-0.6			CL	CLAY - grey/brown, stiff, moist.
	0.0	SB20-0.9-1.1			CL	CLAY - orange with grey/black mottling, stiff, moist.
2	0.0	SB20-1.9-2.1			CL	CLAY - orange with grey/black mottling, stiff, moist.
	0.0	SB20-2.9-3.1			SC	Clayey SAND - orange with grey/black mottling, fine to medium grained, moist.
4	0.0	SB20-3.9-4.1			GP	CLAY - low plasticity, grey, stiff.
	0.0	SB20-4.9-5.1			CL	10cm gravel lense.
					GP	30cm gravel lense.
6						End of hole at 5.1m - Refusal.
8						
10						
12						
14						
16						

Soil Boring SB21

Page: 1 of 1

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 6.3 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p Log By sch4p4(6) Date 22/4/08 Permit # NA
 Checked By sch4p4(6) License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 6.3m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB21-0.0-0.2 SB21-0.4-0.6 SB21-0.9-1.1			CL	Gravelly CLAY - low plasticity, brown, dry, medium to coarse grained gravel. Becoming dry to moist.
2	0.0 0.0	SB21-1.9-2.1 SB21-2.9-3.1			CL	CLAY - low plasticity, grey, stiff, moist.
4	0.0 0.0	SB21-3.9-4.1 SB21-4.9-5.1		 	SC SP CL GP	Clayey SAND - orange with grey and black mottling, fine to medium grained, moist. Gravelly SAND - medium to coarse grained orange/red sand, medium to coarse grained gravel. CLAY - light grey, orange mottling, dry to moist, stiff. GRAVEL - 10cm lense, medium to coarse grained.
6	0.0	SB21-6.2-6.3			SC	Clayey SAND - orange with grey mottling, fine to medium grained.
8						End of hole at 6.3m - Refusal.
10						
12						
14						
16						

Soil Boring SB22

Page: 1 of 1

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 6.3 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p4(6) Log By sch4p4(6) Date 22/4/08 Permit # NA
 Checked By sch4p4(6) F License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 6.3m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	SB22-0.0-0.2			CL	Sandy CLAY - low plasticity, brown, dry.
	0.0	SB22-0.4-0.6				With some fine to medium grained gravel.
	0.0	SB22-0.9-1.1			CL	CLAY - low plasticity, grey, stiff, moist.
2	0.0	SB22-1.9-2.1			CL	
	0.0	SB22-2.9-3.1			CL	Gravelly CLAY - low plasticity, fine to medium grained white gravel.
4	0.0	SB22-3.9-4.1			SC	Clayey SAND - orange with grey and black mottling, fine to medium grained.
	0.0	SB22-4.9-5.1			SC	Clayey SAND - orange with grey and black mottling, medium to coarse grained with some fine to medium grained gravel.
6	0.0	SB22-6.1-6.3			GP	GRAVEL - 20cm lense, white, medium to coarse grained.
					GP	GRAVEL - 20cm lense, white, medium to coarse grained.
					SC	Clayey SAND - orange with grey and black mottling, fine to medium grained.
						End of hole at 6.3m - Refusal.
8						
10						
12						
14						
16						

Soil Boring SB23

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Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 4.5 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p4(Log By sch4p4(6) Date 22/4/08 Permit # NA
 Checked By sch4p4(6) P License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 4.5m.

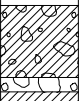
Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	SB23-0.0-0.2			GM	Silty GRAVEL - large river stones, brown silt, dry.
	0.0	SB23-0.4-0.6			CL	Silty CLAY - brown, dry, loose.
	0.0	SB23-0.9-1.1				CLAY - low plasticity, grey/brown, stiff, moist.
2	0.0	SB23-1.9-2.1			CL	
	0.0	SB23-2.9-3.1				Clayey SAND - orange with black and grey mottling, fine to medium grained.
4	0.0	SB23-3.9-4.1			SC	Becoming medium to coarse grained sand.
						End of hole at 4.5m - Refusal.
6						
8						
10						
12						
14						
16						

Soil Boring SB24

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Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 3.9 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p Log By sch4p4(6) Date 22/4/08 Permit # NA
 Checked By sch4p4(6) License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 3.9m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB24-0.0-0.2 SB24-0.4-0.6 SB24-0.9-1.1			CL GP	Gravelly CLAY - brown, dry, fine to medium grained gravel. Becoming grey with depth. GRAVEL - 20cm lense, red, medium to coarse grained. CLAY - low plasticity, grey/brown, stiff, moist.
2	0.0 0.0	SB24-1.9-2.1 SB24-2.9-3.1			CL	
4	0.0	SB24-3.8-3.9			SP	SAND - orange/brown, fine to medium grained. End of hole at 3.9m - Refusal.
6						
8						
10						
12						
14						
16						

Soil Boring SB25

Page: 1 of 1

Project Caltex Esk ESA Owner Caltex Petroleum Australia Pty Ltd
 Location Ipswich Street, Esk Proj. No. ENVINEWS08580AA
 Surface Elev. NA Total Hole Depth 4.8 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 125 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. NUMAC Method Hand Auger/Push Tube
 Driller sch4p Log By sch4p4(6) F Date 22/4/08 Permit # NA
 Checked By sch4p4(6) F License No. 3247

COMMENTS
 Hand Auger to 1.0m. Push Tube to 4.8m.

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0 0.0 0.0	SB25-0.0-0.2 SB25-0.4-0.6 SB25-0.9-1.1			CL	CLAY - dry, hard with some fine to medium grained gravel. Becoming moist.
2	0.0	SB25-1.9-2.1				
	0.0	SB25-2.9-3.1			SC	Clayey SAND - orange/grey, fine to medium grained. 10cm lense, white, medium to coarse grained gravel.
4	0.0	SB25-3.9-4.1			SC	Clayey SAND - orange/grey with fine to medium grained sand and fine to medium grained white gravel.
	0.0	SB25-4.8 (QC16/QC16A)				End of hole at 4.8m - Refusal.
6						
8						
10						
12						
14						
16						

Monitoring Well MW9

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Project Former Ampol Esk Depot (118006) Owner Caltex Petroleum Australia
 Location 225 - 259 Ipswich Street, Esk 4312 Proj. No. ENVINEWS08580AC
 Surface Elev. NA Total Hole Depth 14.5 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 11.0 m. Static NA Diameter 100 mm.
 Screen: Dia 50 mm. Length 4.0 m. Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length 10.5 m. Type Class 18 UPVC
 Fill Material Sand, Bentonite, Grout. Rig/Core Hydropower Scout 5
 Drill Co. Macquarie Drilling Method Hand Auger/Solid Stem
 Driller sch4p4(6) Person Log By sch4p4(6) P Date 17/5/10 Permit # NA
 Checked By _____ License No. _____

COMMENTS
 Hand Auger to 0.3m. Solid
 Stem/Solid Push Tube to 14.5m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) <small>Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.</small>
0		0.0	MW9-0.2				GRASS.
		0.0	MW9-0.5			CL	CLAY - medium plasticity, light brown, dry, very stiff, well graded, coarse graded sand.
		0.0	MW9-1.0				CLAY - high plasticity, light brown, damp, very stiff.
2		0.0	MW9-2.5			CH	
4		66.0	MW9-4.0				Sandy CLAY - low plasticity, brown with orange and black mottling, fine grained sand, dry, friable.
6		1935	MW9-5.5			CL	
		2040	MW9-7.0				
8		717	MW9-8.5			CH	CLAY - high plasticity, light brown, dry, hard.
10		463	MW9-10.0			CH	
12						CH	Sandy CLAY - high plasticity, white, soft, coarse grained angular poorly graded sand, saturated.
14							End of hole at 14.5m - Limit of investigation.
16							

Monitoring Well MW10

Page: 1 of 1

Project Former Ampol Esk Depot (118006) Owner Caltex Petroleum Australia
 Location 225 - 259 Ipswich Street, Esk 4312 Proj. No. ENVINEWS08580AC
 Surface Elev. NA Total Hole Depth 14.5 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 12.0 m. Static NA Diameter 100 mm.
 Screen: Dia 50 mm. Length 3.0 m. Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length 11.5 m. Type Class 18 UPVC
 Fill Material Sand, Bentonite, Grout. Rig/Core Hydropower Scout 5
 Drill Co. Macquarie Drilling Method Hand Auger/Solid Stem
 Driller sch4p4(6) Person Log By sch4p4(6) Date 17/5/10 Permit # NA
 Checked By _____ License No. _____

COMMENTS
 Hand Auger to 1.0m. Solid Stem/Solid Push Tube to 14.5m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	MW10-0.2				GRASS.
		0.0	QC1/QC1A			CH	CLAY - high plasticity, brown, soft, moist.
		0.0	MW10-0.5				
		0.0	MW10-1.0				CLAY - high plasticity, brown, stiff, damp.
2		0.0	MW10-2.8			CH	
4		118	MW10-4.0			CL	Sandy CLAY - low plasticity, brown with orange and black mottling, fine grained sand, dry, friable.
6		196	MW10-5.5			SP	SAND - brown, coarse grained, loose, angular, damp, poorly graded.
		487	MW10-7.0			CL	Sandy CLAY - low plasticity, brown with orange and black mottling, fine grained sand, dry, friable.
8		4228	MW10-8.5				CLAY - high plasticity, light brown, dry, hard.
10		401	MW10-10.0			CH	
12		395	MW10-11.5				
14						CH	Sandy CLAY - high plasticity, grey, soft, coarse grained angular poorly graded sand, saturated.
16							End of hole at 14.5m - Limit of investigation.

Monitoring Well MW11

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Project Former Ampol Esk Depot (118006) Owner Caltex Petroleum Australia
 Location 225 - 259 Ipswich Street, Esk 4312 Proj. No. ENVINEWS08580AC
 Surface Elev. NA Total Hole Depth 14.5 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 11.7 m. Static NA Diameter 100 mm.
 Screen: Dia 50 mm. Length 4.0 m. Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length 11.7 m. Type Class 18 UPVC
 Fill Material Sand, Bentonite, Grout. Rig/Core Hydropower Scout 5
 Drill Co. Macquarie Drilling Method Hand Auger/Solid Stem
 Driller sch4p4(6) Person Log By sch4p4(6) P Date 18/5/10 Permit # NA
 Checked By _____ License No. _____

COMMENTS
 Hand Auger to 1.0m. Solid
 Stem/Solid Push Tube to 14.5m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	MW11-0.2				GRASS.
		0.0	MW11-0.5			CH	CLAY - high plasticity, brown, soft, moist.
		0.0	MW11-1.0				CLAY - high plasticity, brown, stiff, damp.
2		0.0	MW11-2.5			CH	
4		99.9	MW11-4.0				Sandy CLAY - low plasticity, brown with orange and black mottling, fine grained sand, dry, friable.
		18.0	MW11-5.5			CL	
6		2130	MW11-7.0				
8		3099	MW11-8.5			CH	CLAY - high plasticity, light brown with white mottling, firm, dry, friable.
10		3767	MW11-10.0			CH	
		3195	MW11-11.5				
12						CH	Sandy CLAY - high plasticity, grey, soft, coarse grained angular poorly graded sand, saturated.
14							End of hole at 14.5m - Limit of investigation.
16							

Monitoring Well MW12

Page: 1 of 1

Project Former Ampol Esk Depot (118006) Owner Caltex Petroleum Australia
 Location 225 - 259 Ipswich Street, Esk 4312 Proj. No. ENVINEWS08580AC
 Surface Elev. NA Total Hole Depth 14.5 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 10.5 m. Static NA Diameter 100 mm.
 Screen: Dia 50 mm. Length 4.5 m. Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length 10.0 m. Type Class 18 UPVC
 Fill Material Sand, Bentonite, Grout. Rig/Core Hydropower Scout 5
 Drill Co. Macquarie Drilling Method Hand Auger/Solid Stem
 Driller sch4p4(6) Persona Log By sch4p4(6) Date 18/5/10 Permit # NA
 Checked By _____ License No. _____

COMMENTS
 Hand Auger to 0.5m refusal.
 Solid Stem/Solid Push Tube to 14.5m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		15.9	MW12-0.2				GRASS.
		0.0	MW12-0.5				CLAY - medium plasticity, brown, hard, ironstone sanding, damp, trace coarse grained sand.
		3.0	MW12-1.0			CL	
2		0.3	MW12-2.5				
4		3.8	MW12-4.0			CL	Sandy CLAY - low plasticity, brown with orange and black mottling, fine grained sand, dry, friable.
6		1282	MW12-5.5				
		2257	MW12-7.0			CL	CLAY - low plasticity, white/grey, hard, dry.
8		1680	MW12-8.5			CL	Sandy CLAY - low plasticity, brown with orange and black mottling, fine grained sand, dry, friable.
10		621	MW12-10.0			CH	CLAY - high plasticity, brown, hard, dry.
12						CH	Sandy CLAY - high plasticity, white/grey, soft, coarse grained angular poorly graded sand, saturated.
14							End of hole at 14.5m - Limit of investigation.
16							

Monitoring Well MW13

Page: 1 of 1

Project Former Ampol Esk Depot (118006) Owner Caltex Petroleum Australia
 Location 225 - 259 Ipswich Street, Esk 4312 Proj. No. ENVINEWS08580AC
 Surface Elev. NA Total Hole Depth 14.5 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 12.5 m. Static NA Diameter 100 mm.
 Screen: Dia 50 mm. Length 3.0 m. Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length 11.5 m. Type Class 18 UPVC
 Fill Material Sand, Bentonite, Grout. Rig/Core Hydropower Scout 5
 Drill Co. Macquarie Drilling Method Hand Auger/Solid Stem
 Driller sch4p4(6) Persona Log By sch4p4(6) Date 18/5/10 Permit # NA
 Checked By _____ License No. _____

COMMENTS
 Hand Auger to 1.0m. Solid Stem/Solid Push Tube to 14.5m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	MW13-0.2				GRASS.
		0.0	MW13-0.5				CLAY - high plasticity, brown, wet, soft.
		0.0	MW13-1.0			CH	
2							CLAY - high plasticity, light brown, stiff.
		0.0	MW13-2.5			CH	
4		23.1	MW13-4.0				Sandy CLAY - low plasticity, brown with orange and black mottling, fine grained sand, dry.
		286	MW13-5.5			CL	
6		1986	MW13-7.0				
		2105	MW13-8.5				
8							
10		1613	MW13-10.0			CH	CLAY - high plasticity, brown, stiff, dry.
		1094	MW13-11.5				
12							
14						CH	Sandy CLAY - high plasticity, grey, soft, coarse grained angular poorly graded sand, saturated.
16							End of hole at 14.5m - Limit of investigation.

Monitoring Well MW14

Page: 1 of 1

Project Former Ampol Esk Depot (118006) Owner Caltex Petroleum Australia
 Location 225 - 259 Ipswich Street, Esk 4312 Proj. No. ENVINEWS08580AC
 Surface Elev. NA Total Hole Depth 14.5 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 12.0 m. Static NA Diameter 100 mm.
 Screen: Dia 50 mm. Length 4.0 m. Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length 10.5 m. Type Class 18 UPVC
 Fill Material Sand, Bentonite, Grout. Rig/Core Hydropower Scout 5
 Drill Co. Macquarie Drilling Method Hand Auger/Solid Stem
 Driller sch4p4(6) Person Log By sch4p4(6) Date 18/5/10 Permit # NA
 Checked By _____ License No. _____

COMMENTS
 Hand Auger to 1.0m. Solid Stem/Solid Push Tube to 14.5m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.8 0.0 0.0	MW14-0.2 MW14-0.5 MW14-1.0			CH	GRASS. CLAY - high plasticity, brown, firm, damp, trace fine grained rounded sand.
2		0.0	MW14-2.5			CH	CLAY - high plasticity, brown, very stiff, damp.
4		215	MW14-4.0				Sandy CLAY - low plasticity, brown with orange and black mottling, fine grained sand, dry, friable.
6		91.7	MW14-5.5			CL	
8		88.8	MW14-7.0				
10		517	MW14-8.5				CLAY - high plasticity, grey, stiff, dry.
12		323	MW14-10.0			CH	
14		83.3	MW14-11.5			CH	Sandy CLAY - high plasticity, grey, soft, coarse grained, poorly graded angular sand, saturated.
16							End of hole at 14.5m - Limit of investigation.

Monitoring Well MW15

Page: 1 of 1

Project Former Ampol Esk Depot (118006) Owner Caltex Petroleum Australia
 Location 225 - 259 Ipswich Street, Esk 4312 Proj. No. ENVINEWS08580AC
 Surface Elev. NA Total Hole Depth 14.5 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 11.0 m. Static NA Diameter 100 mm.
 Screen: Dia 50 mm. Length 4.0 m. Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length 10.5 m. Type Class 18 UPVC
 Fill Material Sand, Bentonite, Grout. Rig/Core Hydropower Scout 5
 Drill Co. Macquarie Drilling Method Hand Auger/Solid Stem
 Driller sch4p4(6) Person Log By sch4p4(6) Date 19/5/10 Permit # NA
 Checked By _____ License No. _____

COMMENTS
 Hand Auger to 1.0m. Solid
 Stem/Solid Push Tube to 14.5m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	MW15-0.2				GRASS.
		0.0	MW15-0.5				CLAY - high plasticity, brown, soft, moist.
		0.0	MW15-1.0				
2		474	MW15-2.5			CH	
4		1133	MW15-4.0				
6		1528	MW15-5.5				Sandy CLAY - low plasticity, brown with orange and black mottling, medium grained rounded sand, damp.
		1788	MW15-7.0			CL	
8		1703	MW15-8.5				
10		367	MW15-10.0			CH	CLAY - high plasticity, light brown with some white mottling, hard, dry.
12						CH	Sandy CLAY - high plasticity, white, soft, coarse grained angular poorly graded sand, saturated.
14							End of hole at 14.5m - Limit of investigation.
16							

Monitoring Well MW16

Page: 1 of 1

Project Former Ampol Esk Depot (118006) Owner Caltex Petroleum Australia
 Location 225 - 259 Ipswich Street, Esk 4312 Proj. No. ENVINEWS08580AC
 Surface Elev. NA Total Hole Depth 14.5 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 11.0 m. Static NA Diameter 100 mm.
 Screen: Dia 50 mm. Length 4.0 m. Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length 10.5 m. Type Class 18 UPVC
 Fill Material Sand, Bentonite, Grout. Rig/Core Hydropower Scout 5
 Drill Co. Macquarie Drilling Method Hand Auger/Solid Stem
 Driller sch4p4(6) Persona Log By sch4p4(6) F Date 20/5/10 Permit # NA
 Checked By _____ License No. _____

COMMENTS
 Hand Auger to 1.0m. Solid Stem/Solid Push Tube to 14.5m.

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	MW16-0.2				GRASS.
		0.6	MW16-0.5			CH	Sandy CLAY - high plasticity, very stiff, damp, coarse grained poorly graded angular sand.
		0.0	MW16-1.0				
2		0.0	MW16-2.5			CH	CLAY - high plasticity, brown with black mottling, hard, damp.
4		0.0	MW16-4.0				
6		0.0	MW16-5.5			CL	Sandy CLAY - low plasticity, brown with orange and black mottling, fine grained sand, stiff.
8		0.0	MW16-7.0 QC4/QC4A				
		0.0	MW16-8.5			CH	CLAY - high plasticity, orange, hard, dry.
10		0.8	MW16-10.0				
12						CH	Sandy CLAY - high plasticity, grey/black, soft, coarse grained, angular, poorly graded sand, saturated.
14							End of hole at 14.5m - Limit of investigation.
16							

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 14.5 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 150 mm.
 Screen: Dia 50 mm. Length NA Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length NA Type Class 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Push Tube/Hand Auger
 Driller sch4p4(6) Pers Log By sch4p4(6) Pe Date 16/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	SB101-0.0-0.1			CH	TOPSOIL: Silty CLAY - high plasticity, black, soft.
		0.0	SB101-0.3-0.4			CH	CLAY - high plasticity, light brown, firm, dry.
		0.0	SB101-0.9-1.0			CH	
2		0.0	SB101-2.1-2.2			CL	Sandy CLAY - brown, dry, stiff.
							ROCK.
4		0.0	SB101-3.8-3.9			CL	Sandy CLAY - brown, hard friable.
6						CL	
8						CL	CLAY - grey, very stiff, friable.
10						CL	Sandy CLAY - medium plasticity, brown, stiff. Refusal on rock.
12						CL	
14							End of hole at 14.5m - Limit of investigation.
16							

COFFEY ENVIRONMENTS Rev. 12/5/11 ENAUBRIS08580AD.GPJ IT_CORP.GDT 18/1/12

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 13.5 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 11.8 m. Static NA Diameter 150 mm.
 Screen: Dia 50 mm. Length NA Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length NA Type Class 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Push Tube/Solid Stem
 Driller sch4p4(6) Pe Log By sch4p4(6) Per Date 16/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.1	SB102-0.0-0.1			CH	Silty CLAY - high plasticity, black, dry.
		0.0	SB102-0.5-0.6			CH	CLAY - high plasticity, black with orange mottling, dry.
		0.4	SB102-0.9-1.0			CH	CLAY - high plasticity, brown, dry.
2		1.9	SB102-2.6-2.7			CH	
4						CL	Sandy CLAY - medium plasticity, brown, very stiff, dry.
6		0.7	SB102-6.0-6.1			CL	CLAY - non plastic, grey, hard.
8							ROCK.
		255	SB102-8.5-8.6			CL	Gravelly CLAY - medium plasticity, red/brown, strong hydrocarbon odour.
		563	QC102/QC102A SB102-9.1-9.2			CL	Sandy CLAY - low plasticity, yellow/brown, dry.
10						CL	
		192	SB102-11.0-11.1			CH	Gravelly CLAY - high plasticity, yellow/brown, moist.
12		54.8	SB102-12.0-12.1			CH	Gravelly CLAY - high plasticity, yellow/brown, wet.
14							End of hole at 13.5m - Limit of investigation.
16							

COFFEY ENVIRONMENTS Rev. 12/5/11 ENAUBRIS08580AD.GPJ IT_CORP.GDT 18/1/12

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 13.5 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 150 mm.
 Screen: Dia 50 mm. Length NA Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length NA Type Class 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Push Tube/Solid Stem/ Hand Auger
 Driller sch4p4(6) Per Log By sch4p4(6) Per Date 16/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	SB103-0.0-0.1			CL	Silty CLAY - medium plasticity, brown, topsoil, dry.
		0.7	SB103-1.2-1.3				ROCK.
2		0.4	SB103-1.9-2.0			CL	Silty, Sandy CLAY - hard, dry.
		1.1	SB103-3.6-3.7				
4		1.7	SB103-4.1-4.2			CL	Sandy CLAY - red/brown with black and grey mottling, hard, dry, friable.
		34.3	SB103-4.9-5.0				
6						SC	Clayey SAND - hard, dense, fine grained. Refusal on rock.
		2500	No Sample				
8		647	SB103-7.9-8.0			CL	CLAY - red/brown, gravel, fractured rock, white/grey with orange lenses.
		159	SB103-9.1-9.2				
10						CH	CLAY - high plasticity, white/grey, gravel, stiff.
12							
		21.4	SB103-13.3-13.4			CL	CLAY - grey/black, rock, dry.
14							End of hole at 13.5m - Limit of investigation.
16							

COFFEY ENVIRONMENTS Rev: 12/5/11 ENAUBRIS08580AD.GPJ IT_CORP.GDT 18/1/12

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 13.5 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 11.0 m. Static NA Diameter 150 mm.
 Screen: Dia 50 mm. Length NA Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length NA Type Class 18 UPVC
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Push Tube/Solid Stem/ Hand Auger
 Driller sch4p4(6) Per Log By sch4p4(6) Per Date 16/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.0	SB104-0.0-0.1			CL	Silty CLAY - black, topsoil.
		0.1	SB104-0.5-0.6				CLAY - grey/light brown.
		0.0	SB104-0.9-1.0			CL	
2		0.0	SB104-2.0-2.1			CL	Sandy CLAY - hard, friable.
						CL	CLAY - brown, hard.
4						CL	Sandy CLAY - brown, hard.
		24.2	SB104-4.5-4.6			CL	
6		269	SB104-6.0-6.1			SC	Clayey SAND - brown, coarse, firm, strong hydrocarbon odour.
		OVER 999	SB104-7.0-7.1			SC	Clayey SAND - white/grey, very strong odour.
8		1251	SB104-8.0-8.1 QC103/QC103A			CH	CLAY - high plasticity, brown, very strong odour, firm.
10						CH	CLAY - high plasticity, yellow/brown, strong odour.
12						CH	CLAY - high plasticity, blue/grey, soft, wet.
14		581	SB104-13.2-13.3			CH	End of hole at 13.5m - Limit of investigation.
16							

COFFEY ENVIRONMENTS Rev. 12/5/11 ENAUBRIS08580AD.GPJ IT_CORP.GDT 18/1/12

Project Caltex Esk Owner Caltex Petroleum Australia

Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD

Surface Elev. NA Total Hole Depth 13.0 m. North NA East NA

Top of Casing NA Water Level Initial ▽ 11.8 m. Static NA Diameter 150 mm.

Screen: Dia 50 mm. Length NA Type/Size Class 18 UPVC

Casing: Dia 50 mm. Length NA Type Class 18 UPVC

Fill Material _____ Rig/Core _____

Drill Co. Proactive Drilling Method Push Tube

Driller sch4p4(6) P Log By sch4p4(6) P Date 18/3/11 Permit # NA

Checked By _____ License No. _____

COMMENTS

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.1	SB105-0.0-0.1			CL	Silty CLAY - black/grey, dry, loose topsoil.
		0.0	SB105-0.5-0.6				CLAY - grey, firm.
		0.2	SB105-0.9-1.0			CL	
2		0.0	SB105-2.1-2.2			CL	Sandy CLAY - brown, friable, fine.
		0.6	SB105-3.1-3.2			CH	ROCK. CLAY - high plasticity, grey, dense.
4		6.7	SB105-3.8-3.9			CL	Sandy CLAY - brown/red/white/black lenses, friable.
		8.1	SB105-4.9-5.0			SP	SAND - grey, very dense, well rounded, medium.
6		0.2	SB105-5.7-5.8				Sandy CLAY - friable, very dense.
						CL	Auger refusal on hard rock.
8		8.7	SB105-7.9-8.0				
10						CL	Sandy CLAY - hard.
12							
14							End of hole at 13.0m - Limit of investigation.

COFFEY ENVIRONMENTS Rev. 12/5/11 ENAUBRIS08580AD.GPJ IT_CORP.GDT 18/1/12

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 15.6 m. North NA East NA
 Top of Casing NA Water Level Initial ▽ 13.1 m. Static NA Diameter 150 mm.
 Screen: Dia 50 mm. Length NA Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length NA Type Class 18 UPVC
 Fill Material _____ Rig/Core Geoprobe 7720DT
 Drill Co. Proactive Drilling Method Push Tube/Solid Stem/ Hand Auger
 Driller sch4p4(6) Per Log By sch4p4(6) Date 19/10/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.5	SB106-0.2				
		0.4	SB106-0.5			CL	Sandy CLAY - low plasticity, brown, dry, stiff.
		0.6	SB106-1.0				CLAY - medium plasticity, brown, moist, stiff.
2		0.7	SB106-2.0				
		0.5	SB106-3.0			CL	
4		0.5	SB106-4.5				
6		2.3	SB106-6.0			CL	Gravelly CLAY - low plasticity, gap graded, mottled brown/yellow, moist, stiff, cobbles, old creek bed.
8		1.5	SB106-7.5				SILTSTONE - brown/orange, uniform, dry, very dense.
						CL	CLAY - low plasticity, brown/orange, moist, hard. SILTSTONE - orange/brown, uniform, dry, very dense.
10							
12							
14							STONE - blue stone layer, dry, hard.
16							End of hole at 15.6m - Limit of investigation.

COFFEY ENVIRONMENTS Rev. 12/5/11 ENAUBRIS08580AD.GPJ IT_CORP.GDT 18/1/12

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 10.1 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 150 mm.
 Screen: Dia 50 mm. Length NA Type/Size Class 18 UPVC
 Casing: Dia 50 mm. Length NA Type Class 18 UPVC
 Fill Material _____ Rig/Core Geoprobe 7720DT
 Drill Co. Proactive Drilling Method Push Tube/Solid Stem/ Hand Auger
 Driller sch4p4(6) Per Log By sch4p4(6) P Date 19/10/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	Well Completion	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0		0.8	SB107-0.2			CL	Sandy CLAY - low plasticity, brown, dry, stiff.
		0.8	SB107-0.5				
		1.0	SB107-1.0				CLAY - medium plasticity, brown, moist, stiff.
2		1.2	SB107-2.0				
		0.3	SB107-3.0			CL	
4		0.3	SB107-4.0				
		0.2	SB107-5.0				
6		0.4	SB107-6.0			CL	CLAY - medium plasticity, brown, moist, stiff, some gravel.
		0.5	SB107-7.0			CL	Gravelly CLAY - low plasticity, brown/orange, moist, stiff, some cobbles.
8		0.7	SB107-8.0			CL	Sandy CLAY - low plasticity, brown/green, moist, stiff, some cobbles.
10							SILTSTONE - brown, very dense. End of hole at 10.1 - Saturated soil.
12							

COFFEY ENVIRONMENTS Rev: 12/5/11 ENAUBRIS08580AD.GPJ IT_CORP.GDT 18/1/12

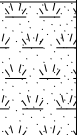
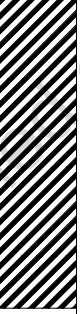
Drilling Log

Hand Auger Hole **HA1**

Page: 1 of 1

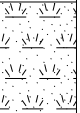
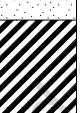
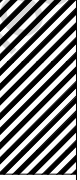
Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 2.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 100 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Hand Auger/Push Tube
 Driller sch4p4(6) Perso Log By sch4p4(6) Perso Date 15/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	HA1-0.0-0.1			CL	TOPSOIL: Silty CLAY - medium plasticity, black, dry, stiff.
	1.1	HA1-0.5-0.6			CL	Sandy CLAY - medium plasticity, firm, moist.
	1.3	HA1-0.75-0.85			SP	SAND - non plastic, soft, loose, wet.
1	0.4	HA1-0.9-1.0			CH	Sandy CLAY - high plasticity, brown, stiff, dry.
2	0.4	HA1-1.9-2.0				End of hole at 2.0m - Limit of investigation.
3						
4						

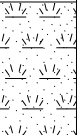
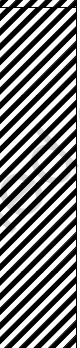
Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 2.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 100 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Hand Auger/Push Tube
 Driller sch4p4(6) Perso Log By sch4p4(6) Pd Date 15/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	1.2	HA2-0.0			CL	TOPSOIL: Silty CLAY - medium plasticity, black/brown, dry.
	0.9	HA2-0.4-0.5			CL	Sandy CLAY - medium plasticity, firm, moist.
	1.1	HA2-0.8-0.9			SP	SAND - non plastic, wet, soft/loose.
1					CH	CLAY - high plasticity, brown, stiff, dry.
2	1.0	HA2-1.9-2.0				End of hole at 2.0m - Limit of investigation.
3						
4						

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 2.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 100 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Hand Auger/Push Tube
 Driller sch4p4(6) Per Log By sch4p4(6) Per Date 15/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	HA3-0.0-0.1			CH	TOPSOIL: Silty CLAY - high plasticity, black, soft, dry.
	0.6	HA3-0.5-0.6			CH	CLAY - high plasticity, grey/brown, dry, soft.
1	0.7	HA3-0.8-0.9			CH	CLAY - high plasticity, brown, stiff, dry.
2	0.7	HA3-1.9-2.0				End of hole at 2.0m - Limit of investigation.
3						
4						

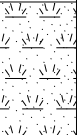
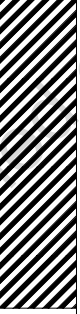
Drilling Log

Hand Auger Hole **HA4**

Page: 1 of 1

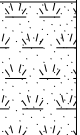
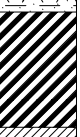
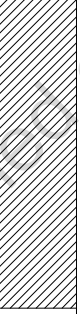
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 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 2.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 100 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Hand Auger
 Driller sch4p4(6) Pers Log By sch4p4(6) Pe Date 15/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	HA4-0.0-0.1			CL	TOPSOIL: Silty CLAY - medium plasticity, black, organic matter.
	0.0	HA4-0.5-0.6			CL	Sandy CLAY - medium plasticity, grey/brown, dry, soft.
1	0.3	HA4-0.9-1.0			CH	CLAY - high plasticity, brown, stiff, dry.
2	0.3	HA-1.9-2.0				End of hole at 2.0m - Limit of investigation.
3						
4						

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 2.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 100 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Hand Auger
 Driller sch4p4(6) Pe Log By sch4p4(6) Pers Date 14/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	HA5-0.0-0.1			CL	TOPSOIL: Silty CLAY - medium plasticity, organic matter, dry.
	0.0	HA5-0.5-0.6			CH	CLAY - high plasticity, brown, dry.
1	0.8	HA5-0.9-1.0			CL	CLAY - grey/brown, stiff, dry.
2	1.7	HA5-1.9-2.0				End of hole at 2.0m - Limit of investigation.
3						
4						

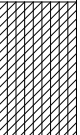
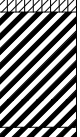
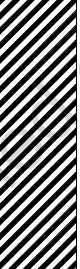
Drilling Log

Hand Auger Hole **HA6**

Page: 1 of 1

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 2.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 100 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Hand Auger
 Driller sch4p4(6) Pe Log By sch4p4(6) Pe Date 14/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	HA6-0.0-0.1			CL	Silty CLAY - medium plasticity, black, brown topsoil, organic matter, dry.
	0.0	HA6-0.5-0.6			CH	CLAY - high plasticity, dark brown, roots, organic matter.
1	0.3	HA6-0.9-1.0			CH	CLAY - high plasticity, grey/brown, stiff, dry.
2	0.3	HA6-1.9-2.0			CL	CLAY - brown/black, hard, stiff, dry, friable. End of hole at 2.0m - Limit of investigation.
3						
4						

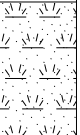
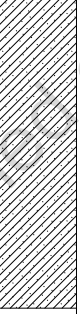
Drilling Log

Hand Auger Hole **HA7**

Page: 1 of 1

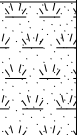
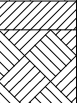
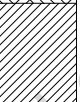
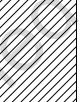
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 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 2.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 100 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Hand Auger
 Driller sch4p4(6) Pd Log By sch4p4(6) Pd Date 14/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.0	HA7-0.0			CL	TOPSOIL: Silty CLAY - medium plasticity, black/brown, dry.
	0.2	HA7-0.5-0.6			CL	Sandy CLAY - non plastic, red, very stiff, friable, dry.
1	0.7	HA7-0.9-1.0			CL	Sandy CLAY - medium plasticity, friable, stiff, dry.
2	1.0	HA7-1.9-2.0				End of hole at 2.0m - Limit of investigation.
3						
4						

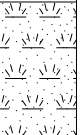
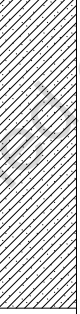
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 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 2.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 100 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Hand Auger
 Driller sch4p4(6) Pe Log By sch4p4(6) Per Date 15/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.7	HA8-0.0-0.1			CH	TOPSOIL; Silty CLAY - high plasticity, black, dry.
	0.0	HA8-0.5-0.6 QC101/QC101A			CL	CLAY - grey/brown, dry, stiff.
	0.0	HA8-0.9-1.0				ROCK - red, friable.
1					CL	CLAY - brown/red, dry, very stiff.
2	0.1	HA8-2.0			CH	CLAY - high plasticity, grey/brown, dry, firm.
						End of hole at 2.0m - Limit of investigation.
3						
4						

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 2.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 100 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Hand Auger
 Driller sch4p4(6) Per Log By sch4p4(6) P Date 15/3/11 Permit # NA
 Checked By _____ License No. _____

COMMENTS

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.2	HA9-0.0-0.1			CH	TOPSOIL: Silty CLAY - high plasticity, black, dry.
	0.0	HA9-0.5-0.6				Sandy CLAY - grey/brown, dry, stiff, friable.
1	0.5	HA9-0.9-1.0			CL	
2	0.0	HA9-1.9-2.0				End of hole at 2.0m - Limit of investigation.
3						
4						

Project Caltex Esk Owner Caltex Petroleum Australia
 Location 255-259 Ipswich Street, Esk Proj. No. ENAUBRIS08580AD
 Surface Elev. NA Total Hole Depth 2.0 m. North NA East NA
 Top of Casing NA Water Level Initial NA Static NA Diameter 100 mm.
 Screen: Dia NA Length NA Type/Size NA
 Casing: Dia NA Length NA Type NA
 Fill Material _____ Rig/Core _____
 Drill Co. Proactive Drilling Method Hand Auger
 Driller sch4p4(6) P Log By sch4p4(6) Perso Date 14/3/11 Permit # NA
 Checked By _____ License No. _____

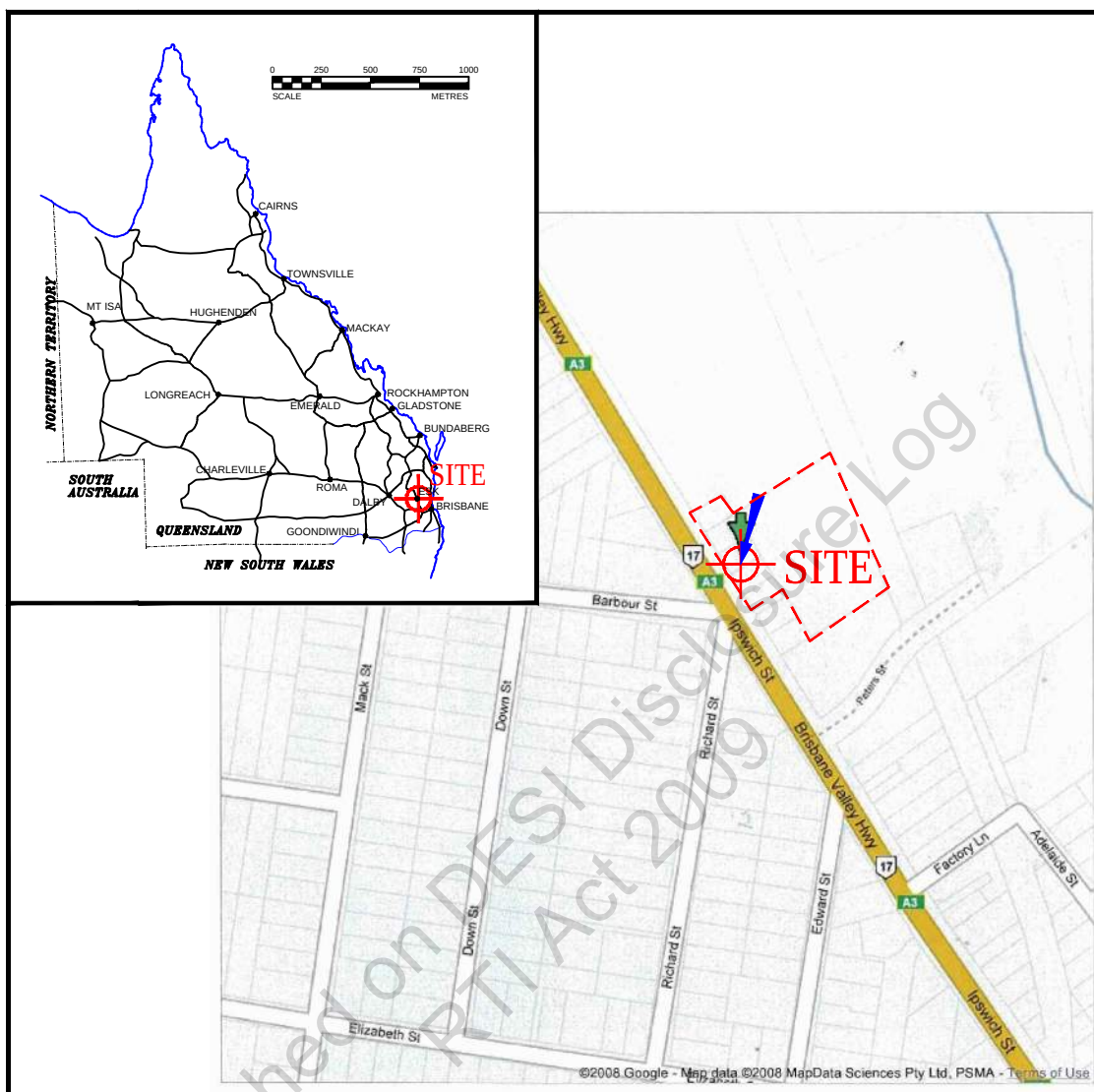
COMMENTS

Depth (m.)	PID (ppm)	Sample ID % Recovery	Blow Count Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic descriptions are based on ASTM Standard D 2487-93 and the USCS.
0	0.9	HA10-0.0			CL	Silty CLAY - black/brown, topsoil, organic matter, dry.
	0.5	HA10-0.3-0.4				CLAY - stiff, friable, dry, hard.
1	0.4	HA10-0.9-1.0			CL	
2	0.7	HA10-1.9-2.0				End of hole at 2.0m - Limit of investigation.
3						
4						

Appendix F

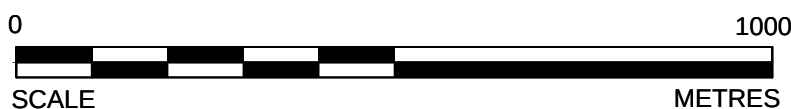
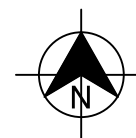
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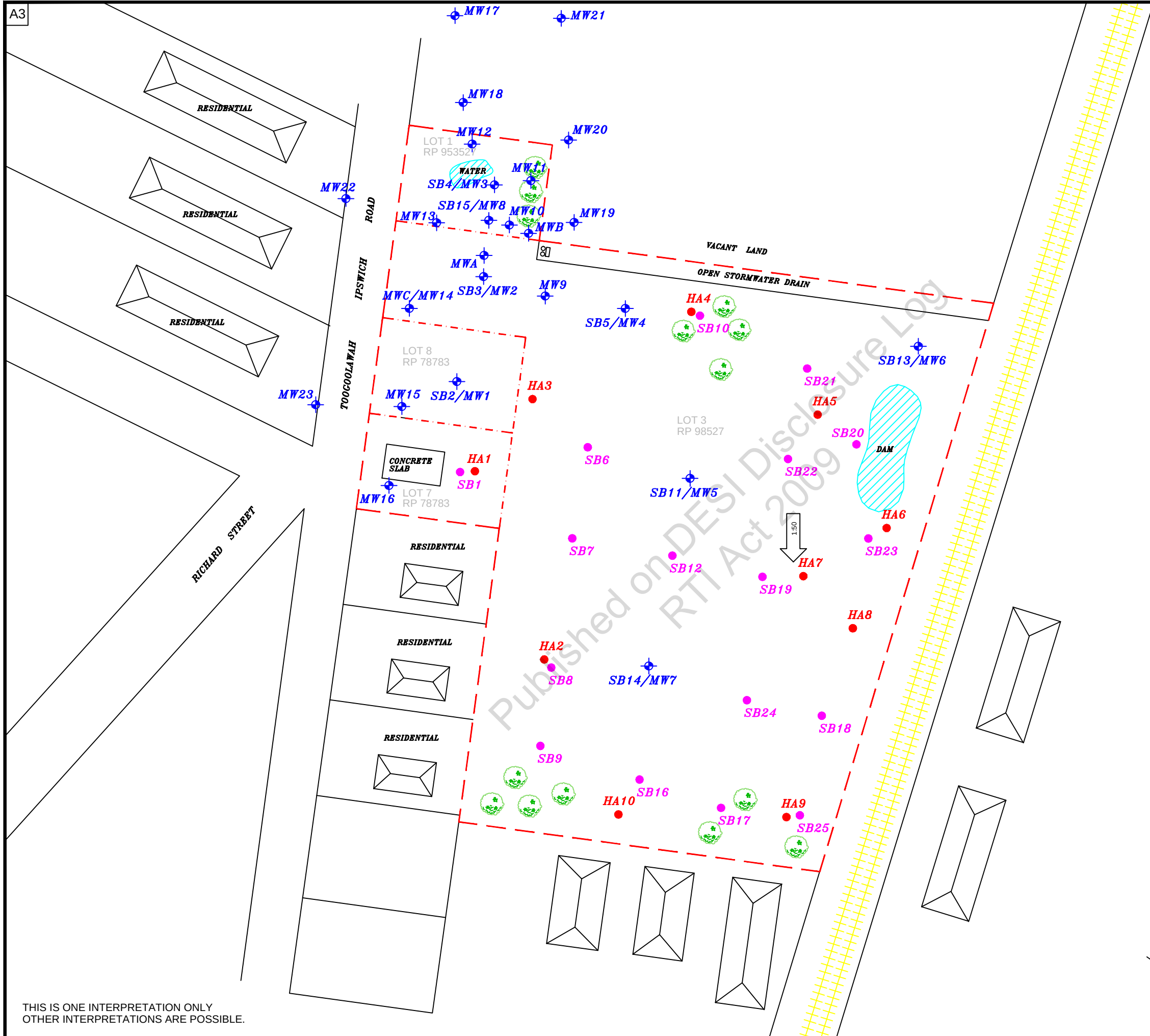


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 255 IPSWISH ST
 ESK QLD 4312

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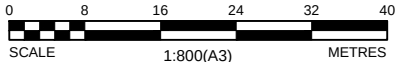


 SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE	Level 2, 12 Creek St Brisbane QLD 4000 Ph: (07) 3002 4000 Fax: (07) 3002 0444	Drawn:	Client: CALTEX OIL AUSTRALIA PTY LTD			
		Date:	Project: CALTEX ESK ESA			
		Checked:	Location:	255-259 IPSWICH STREET ESK		Project - Drawing No
		Date:	Drawing Title:	LOCAL AREA MAP		Figure No. 1
					ENVINWS08580DA-D01	



LEGEND

- WATER - PONDED SURFACE WATER
- SITE BOUNDARY
- REGISTERED PLAN LOTS
- TREE
- GROUNDWATER MONITORING WELL LOCATIONS
- SOIL BORE LOCATIONS
- HAND AUGER LOCATIONS
- RAILWAY



NOTE:
ALL LOCATIONS ARE APPROXIMATE.
DIMENSIONS IN METRES.

Coffey Environments Pty Ltd © DRAFT

Rev	Date	Revision Details	Drm
B	19.01.12	GME ISSUE	NC
A	01.06.08	GME ISSUE	AL

coffey environments
SPECIALISTS IN ENVIRONMENTAL,
SOCIAL AND SAFETY PERFORMANCE

Level 2, 12 Creek St
Brisbane QLD 4000
Ph: (07) 3002 4000
Fax: (07) 3002 0444

Client:

CALTEX OIL AUSTRALIA PTY LTD

Project:

CALTEX ESK ESA

Location:

255- 259 IPSWICH STREET, ESK

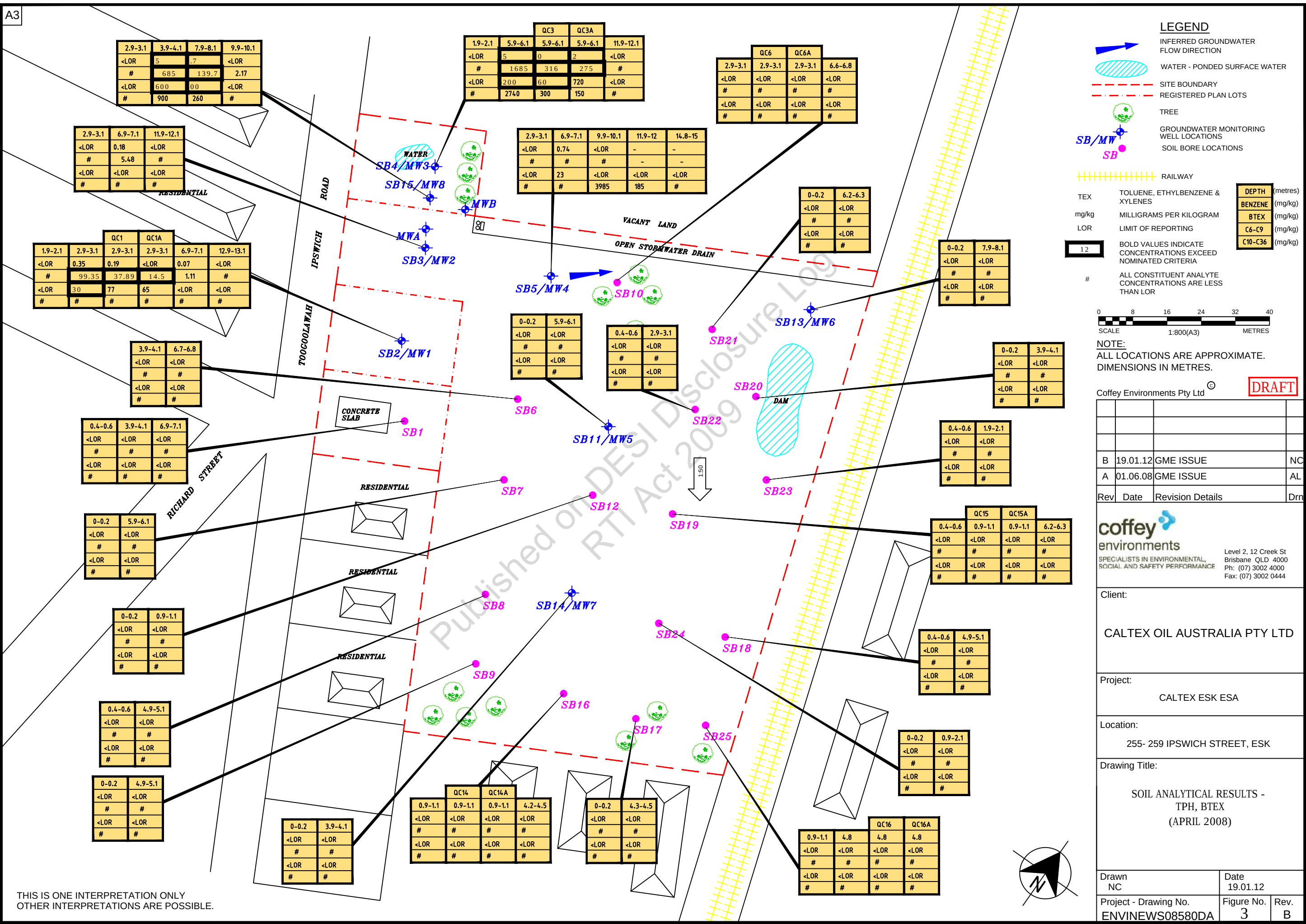
Drawing Title:

DETAILED SITE LAYOUT PLAN
(NOV 2011)

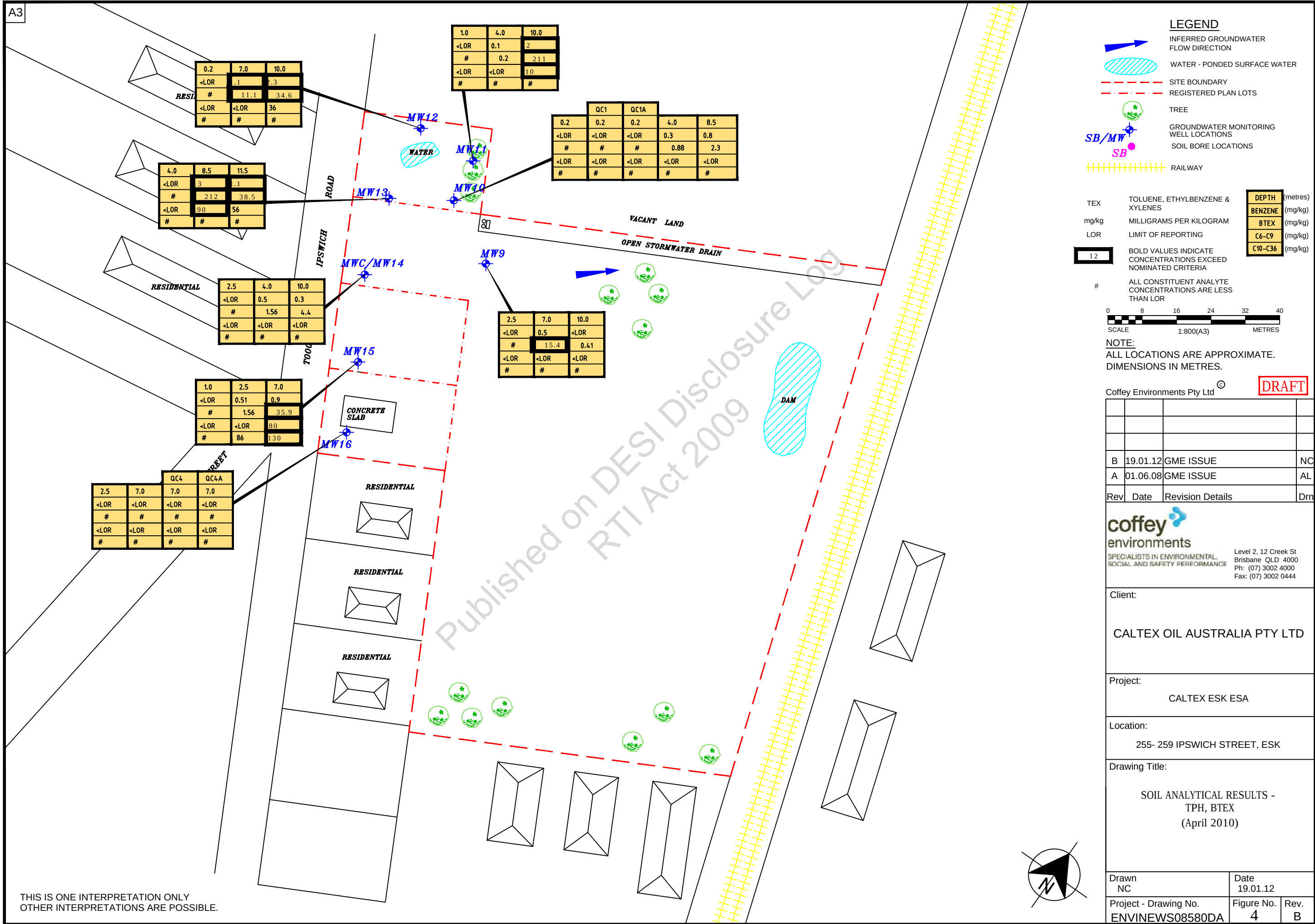
Drawn NC	Date 19.01.12
Project - Drawing No. ENVINEWS08580DA	Figure No. 2
	Rev. B

THIS IS ONE INTERPRETATION ONLY
OTHER INTERPRETATIONS ARE POSSIBLE.

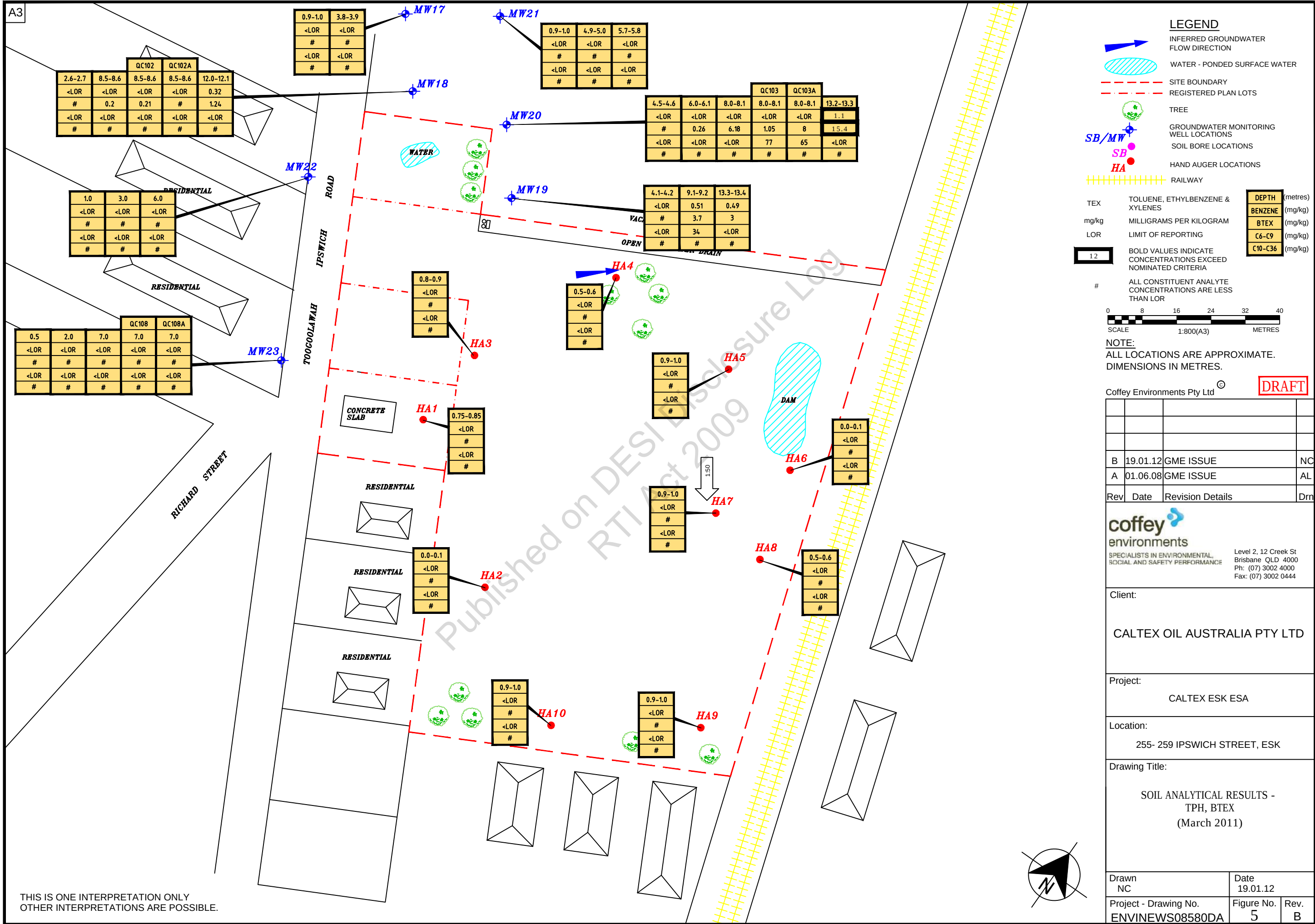


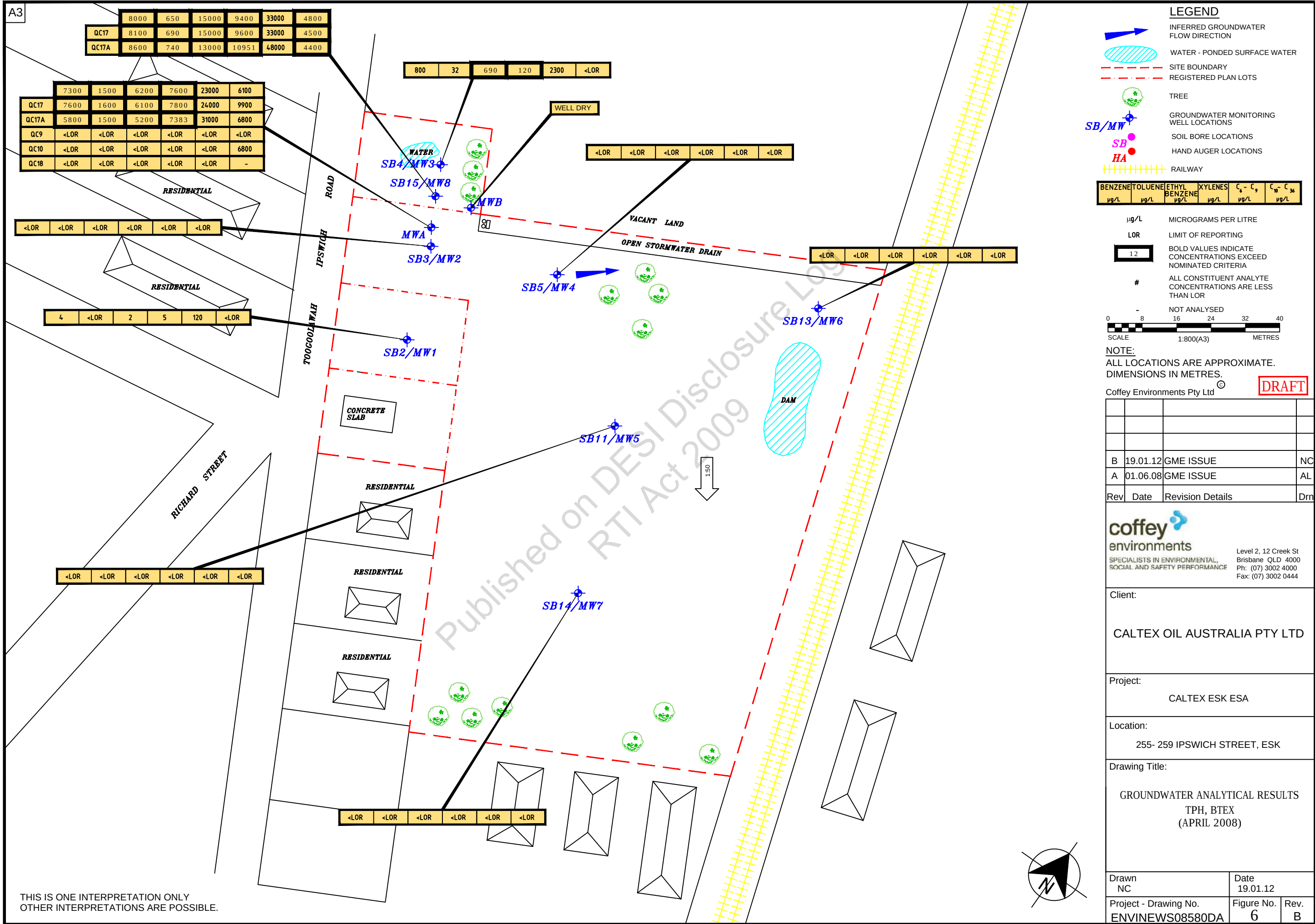


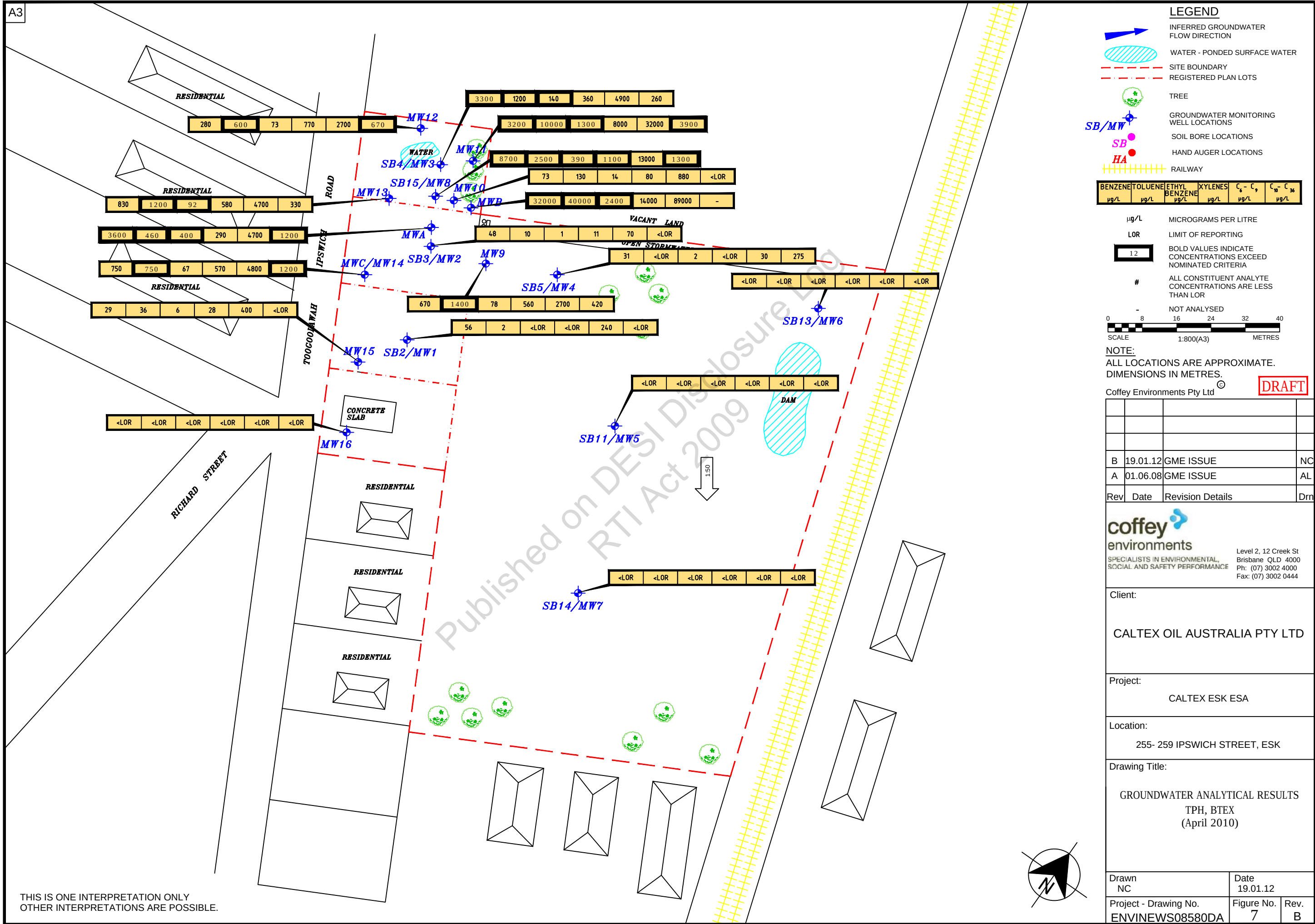
THIS IS ONE INTERPRETATION ONLY
OTHER INTERPRETATIONS ARE POSSIBLE.

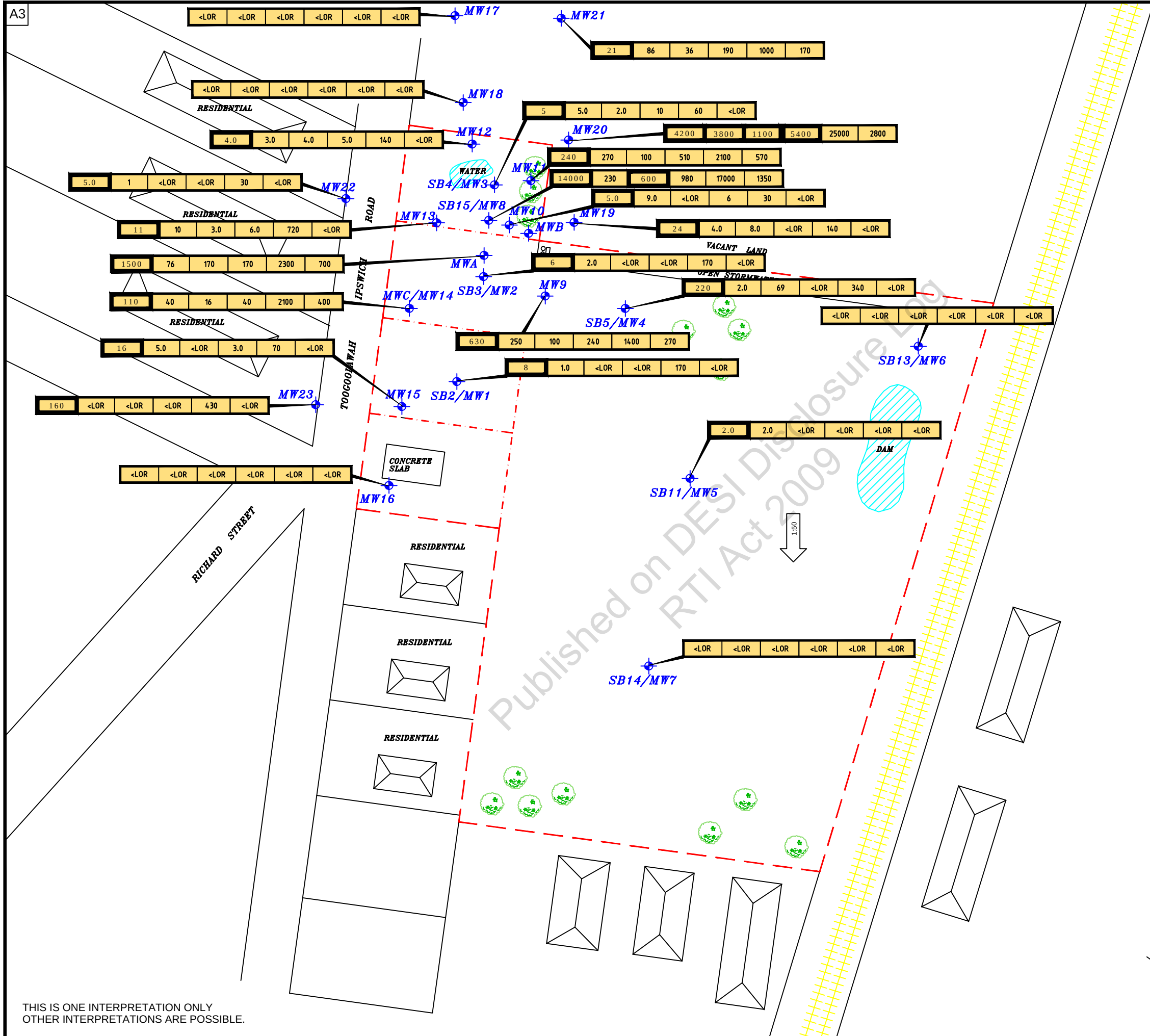


THIS IS ONE INTERPRETATION ONLY
OTHER INTERPRETATIONS ARE POSSIBLE.









LEGEND

INFERRED GROUNDWATER FLOW DIRECTION

WATER - PONDED SURFACE WATER

SITE BOUNDARY

REGISTERED PLAN LOTS

TREE

GROUNDWATER MONITORING WELL LOCATIONS

SOIL BORE LOCATIONS

HAND AUGER LOCATIONS

RAILWAY

BENZENE	TOLUENE	ETHYL BENZENE	XYLENES	C ₆ -C ₈	C ₁₀ -C ₁₆
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

µg/L MICROGRAMS PER LITRE

LOR LIMIT OF REPORTING

12 BOLD VALUES INDICATE CONCENTRATIONS EXCEED NOMINATED CRITERIA

ALL CONSTITUENT ANALYTE CONCENTRATIONS ARE LESS THAN LOR

NOT ANALYSED

SCALE 0 8 16 24 32 40 METRES

1:800(A3)

NOTE: ALL LOCATIONS ARE APPROXIMATE. DIMENSIONS IN METRES.

Coffey Environments Pty Ltd

DRAFT

Rev	Date	Revision Details	Drm
B	19.01.12	GME ISSUE	NC
A	01.06.08	GME ISSUE	AL

coffey environments

SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Level 2, 12 Creek St
Brisbane QLD 4000
Ph: (07) 3002 4000
Fax: (07) 3002 0444

Client:

CALTEX OIL AUSTRALIA PTY LTD

Project:

CALTEX ESK ESA

Location:

255- 259 IPSWICH STREET, ESK

Drawing Title:

GROUNDWATER ANALYTICAL RESULTS
TPH, BTEX
(November 2011)

Drawn NC	Date 19.01.12
Project - Drawing No. ENVINEWS08580DA	Figure No. 8
	Rev. B

THIS IS ONE INTERPRETATION ONLY
OTHER INTERPRETATIONS ARE POSSIBLE.

Appendix G

Bore logs



BOREHOLE ENVIRONMENTAL LOG

SB30/MW30

SHEET 1 OF 1

Client:	Caltex	PB Borehole No.:	Date Commenced:	17.09.2015
Project:	11800 Esk Remediation		Date Completed:	24.09.2015
Borehole Location:	255-259 Ipswich Street, Esk, Queensland		Recorded By:	JT
Project Number:	2201681A		Log Checked By:	JT/MP
Drill Model/Mounting:		Driller:	PDS	Surface RL:
Borehole Diameter:		Driller Lic No:		Co-ords:
		TOC (RL):		Local Co-ords:

Borehole Information							Field Material Description					
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	25mm CASING 50mm CASING WELL CONSTRUCTION	RL(m)	DEPTH(m)	FIELD TEST	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY /CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS
NDD					0.20				SILTY CLAY: medium plasticity, dark grey SILTY CLAY/CLAY: high plasticity, dark grey with orange mottling			
PT					1.70							
					2	PID=71.2 ppm	J		SANDY CLAY: pale grey/orange/brown, fine grained sand			
					3.60				GRAVEL: red, medium to coarse grained			
					4.00				SANDY CLAY: pale grey with orange, brown and black mottling, fine grained sand			
					5.75							
					5.95	PID=66.3 ppm	J		CLAY: pale grey with orange brown mottling, with lense of fine grained sand and trace medium grained gravel, with patches of hydrocarbon staining GRAVEL: white, fine to medium grained with clay GRAVEL: red, fine to coarse grained			
					6.65							
					7.50				CLAYEY GRAVEL: red brown, fine to medium grained round gravel with medium grained sand, hydrocarbon odour			
					8	PID=22.7 ppm	J					
					9.00				SANDY CLAY: pale brown, slight hydrocarbon odour			Hole collapsed
					9.50				END OF BOREHOLE AT 9.50 m			
					10							

BOREHOLE ENVIRONMENTAL LOG

SB31/MW31

SHEET 1 OF 1

Client:	Caltex	PB Borehole No.:	Date Commenced:	17.09.2015
Project:	11800 Esk Remediation		Date Completed:	24.09.2015
Borehole Location:	255-259 Ipswich Street, Esk, Queensland		Recorded By:	JT
Project Number:	2201681A		Log Checked By:	JT/MP
Drill Model/Mounting:		Driller:	PDS	Surface RL:
Borehole Diameter:		Driller Lic No:		Co-ords:
		TOC (RL):		Local Co-ords:

Borehole Information							Field Material Description								
1	2	3	4		5	6	7	8	9	10	11	12	13		
METHOD	SUPPORT	WATER	25mm CASING	50mm CASING	WELL CONSTRUCTION	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY /CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS
NDD															
PT															

BOREHOLE ENVIRONMENTAL LOG

SB32/MW32

SHEET 1 OF 1

Client: **Caltex** PB Borehole No.: Date Commenced: **17.09.2015**
 Project: **11800 Esk Remediation** Date Completed: **24.09.2015**
 Borehole Location: **255-259 Ipswich Street, Esk, Queensland** Recorded By: **JT**
 Project Number: **2201681A** Log Checked By: **JT/MP**

Drill Model/Mounting: Driller: **PDS** Surface RL:
 Borehole Diameter: Driller Lic No: Co-ords:
 TOC (RL): Local Co-ords:

Borehole Information							Field Material Description								
1	2	3	4		5	6	7	8	9	10		11	12	13	
METHOD	SUPPORT	WATER	25mm CASING	50mm CASING	WELL CONSTRUCTION	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY /CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS
NDD												SILTY CLAY: grey pale brown			
							0.70					SILTY CLAY: grey pale brown with some sand, lenses of fine gravel from 2.6m depth			
PT							2	PID=6.4 ppm	J						
							3.30					CLAYEY SAND: pale grey with orange/brown, fine grained sand, lense of fine gravel from 3.8m to 4.2m depth			
							4					SANDY CLAY: pale brown and orange/brown, fine grained sand			
							4.20					CLAYEY SAND: orange/brown fine grained with bands of coarse sand and thin layers of gravel, hydrocarbon odour			
							4.70								
							6	PID=590.6 ppm	J			CLAYEY SAND: pale brown and red, lenses of clayey gravel from 6.8m to 6.9m, moist from 7.2m to 7.3m depth			
							6.70								
							7.50	PID=343.8 ppm	J			SANDY CLAY: red/brown			
SSA							8								
							8.50					CLAY: grey and white with gravel and sand			
							9.00					END OF BOREHOLE AT 9.00 m			

BOREHOLE ENVIRONMENTAL LOG

SB33/MW33

SHEET 1 OF 1

Client: **Caltex** PB Borehole No.: Date Commenced: **17.09.2015**
 Project: **11800 Esk Remediation** Date Completed: **23.09.2015**
 Borehole Location: **255-259 Ipswich Street, Esk, Queensland** Recorded By: **JT**
 Project Number: **2201681A** Log Checked By: **JT/MP**

Drill Model/Mounting: Driller: **PDS** Surface RL:
 Borehole Diameter: Driller Lic No: Co-ords:
 TOC (RL): Local Co-ords:

Borehole Information							Field Material Description					
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	25mm CASING 50mm CASING WELL CONSTRUCTION	RL(m)	DEPTH(m)	FIELD TEST SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY /CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS
NDD						PID=0 ppm			FILL: grey, brown silty clay with some sand			
PT					1.00				FILL: pale brown/brown, medium to coarse grained sand			
					2.00							
					2.50				SILTY CLAY: grey/brown with some sand			
					3.00				SILTY CLAY: grey brown and orange/brown with sand and trace of gravel			
					3.95							
					4.00				CLAYEY SAND: pale grey and orange/brown with patches of black, fine grained sand			
					5.40	PID=24.7 ppm			Lenses of red brown and brown coarse grained sand at 5.3m depth			
					6.00				SILTY CLAY: pale grey and orange brown with sand			
					6.15							
					6.60	PID=369.2 ppm			CLAYEY SAND: pale grey with orange brown mottles with black patches, hydrocarbon staining and odour from 6.6m to 6.7m depth, lenses of fine grained gravel from 6.7m depth			
					6.70	PID=792.6 ppm						
					7.30	PID=154.6 ppm			GRAVEL: fine to medium grained with sand			
SSA					8.00				CLAYEY SAND: orange/brown			
					10.00							
					11.50				SANDY CLAY: orange/brown			
					12.00	PID=390.6 ppm			END OF BOREHOLE AT 12.10 m			
					12.10							

BOREHOLE ENVIRONMENTAL LOG

SB34/MW34

SHEET 1 OF 1

Client: **Caltex** PB Borehole No.: Date Commenced: **17.09.2015**
 Project: **11800 Esk Remediation** Date Completed: **23.09.2015**
 Borehole Location: **255-259 Ipswich Street, Esk, Queensland** Recorded By: **JT**
 Project Number: **2201681A** Log Checked By: **JT/MP**

Drill Model/Mounting: Driller: **PDS** Surface RL: Co-ords: Local Co-ords:
 Borehole Diameter: Driller Lic No: TOC (RL):

Borehole Information							Field Material Description					
1	2	3	4	5	6	7	8	9	10	11	12	13
METHOD	SUPPORT	WATER	25mm CASING 50mm CASING WELL CONSTRUCTION	RL(m)	DEPTH(m)	FIELD TEST SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE VS FL ST T	RELATIVE DENSITY /CONSISTENCY FB VL LD VD	STRUCTURE AND ADDITIONAL OBSERVATIONS
NDD					0.30	PID=0 ppm J			FILL: grey/brown silty clay with concrete rubble			
									SILTY CLAY: grey/pale brown with trace of sand and gravel, staining and hydrocarbon odour from 2.3m to 3.5m depth			
PT					2	PID=0 ppm J						
						PID=95.4 ppm J						
						PID=130.7 ppm J						
						PID=98.1 ppm J						
					4							
					4.40				SANDY CLAY: pale grey and orange/brown, fine grained sand			
					4.60				SILTY CLAY: pale grey and orange/brown with some fine grained sand			
					4.70				SANDY CLAY: pale brown with orange and red and fine grained sand			
					5.00				GRAVEL: white medium to fine grained with bands of grey/brown silty clay			
					5.40				SANDY SILT: red brown and pale grey with fine grained gravel, dry			
					6							
					6.30				CLAYEY SAND: orange/brown and red brown with gravel bands, moist from 7.1m, staining and hydrocarbon odour from 7.1m			
						PID=180.2 ppm J						QA3 & QA4
SSA					8.00				SILTY CLAY: grey/brown with some gravel			
					8.50				END OF BOREHOLE AT 8.50 m			

BOREHOLE ENVIRONMENTAL LOG

SB35/MW35

SHEET 1 OF 1

Client: **Caltex** PB Borehole No.: Date Commenced: **22.09.2015**
 Project: **11800 Esk Remediation** Date Completed: **22.09.2015**
 Borehole Location: **255-259 Ipswich Street, Esk, Queensland** Recorded By: **JT**
 Project Number: **2201681A** Log Checked By: **JT/MP**

Drill Model/Mounting: Driller: **PDS** Surface RL:
 Borehole Diameter: Driller Lic No: Co-ords:
 TOC (RL): Local Co-ords:

Borehole Information							Field Material Description								
1	2	3	4		5	6	7	8	9	10	11	12	13		
METHOD	SUPPORT	WATER	25mm CASING	50mm CASING	WELL CONSTRUCTION	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY /CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS
NDD								PID=0 ppm	J			SILTY CLAY: grey/pale brown with a trace of sand			
PPT								PID=0 ppm	J						
							2	PID=0 ppm	J						
							3.10								
							3.20					SAND: grey/brown, medium to fine grained, moist			
							4.00					CLAY: grey/pale brown, very stiff			
							4					Sandy CLAY: brown with orange mottling with medium to coarse grained sand			
							5.10					Sandy CLAY: brown/grey with grey mottling and lenses of coarse sand / gravel, dry			
							6								
							6.80					CLAYEY SAND: yellow and red mottled with lenses / bands of gravel, dry			
SSA							8								
							9.00					CLAY: grey/brown			
							9.50					SILTY CLAY: grey/grey brown with some fine grained sand			
							10								
								PID=0.8 ppm	J						
							12.00	PID=0.1 ppm	J			END OF BOREHOLE AT 12.00 m			

**SB36B/MW36B
BOREHOLE ENVIRONMENTAL LOG**

SHEET 1 OF 1

Client: **Caltex** PB Borehole No.: Date Commenced: **17.09.2015**
Project: **11800 Esk Remediation** Date Completed: **23.09.2015**
Borehole Location: **255-259 Ipswich Street, Esk, Queensland** Recorded By: **JT**
Project Number: **2201681A** Log Checked By: **JT/MP**

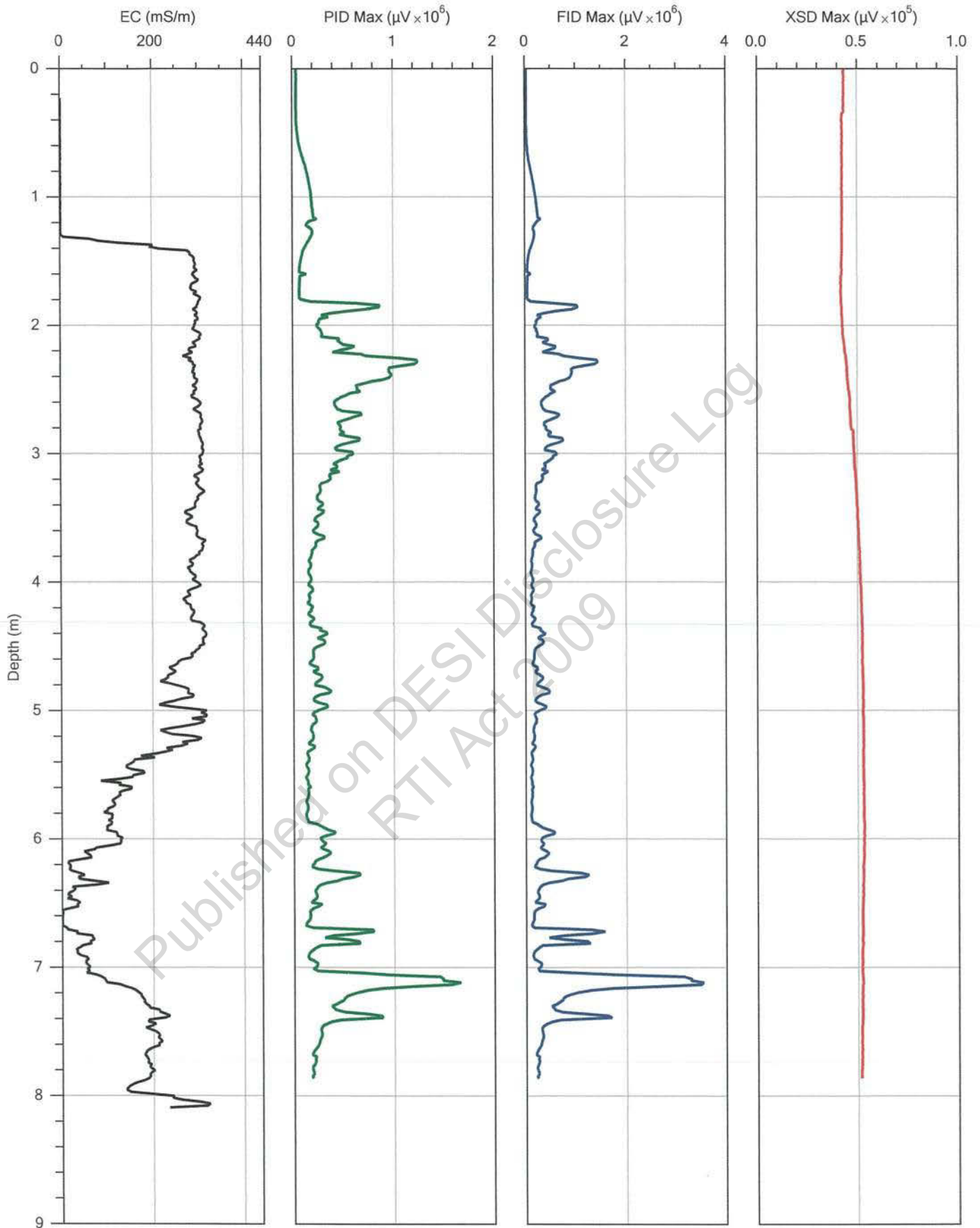
Drill Model/Mounting: Driller: **PDS** Surface RL:
Borehole Diameter: Driller Lic No: Co-ords:
TOC (RL): Local Co-ords:

Borehole Information							Field Material Description								
1	2	3	4		5	6	7	8	9	10		11	12	13	
METHOD	SUPPORT	WATER	25mm CASING	50mm CASING	WELL CONSTRUCTION	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY /CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS
													VS	FB	
													VL	MD	
													SL	ST	
													VD	VD	
NDD						0.15		PID=0 ppm	J			SILTY CLAY: dark grey/ brown with organics SILTY CLAY: grey/ pale brown with a trace of sand			
PT						1.70						SILTY CLAY: brown/ dark grey with sand and trace of gravel			
						2									
						2.95						CLAYEY SAND: light grey/ dark grey and pale brown mottled fine grained sand			
						4									
						4.60						SAND: brown with red coarse grained with traces of clay			
						5.10						SANDY CLAY: pale brown with white, red and yellow mottles, fine to coarse grained sand			
						5.95		PID=57.7 ppm	J			SILTY CLAY: pale brown and white with lenses of fine gravel and coarse sand, hydrocarbon staining at 5.95m			
						6.30		PID=311.0 ppm	J			CLAYEY SILT: white with pale brown and yellow with sand with lenses of coarse grained sand / fine gravel, hydrocarbon staining and odour at 6.65m depth			
SSA						8									
						9.50		PID=240 ppm	J			END OF BOREHOLE AT 9.50 m			
						10									

Appendix H

MIP

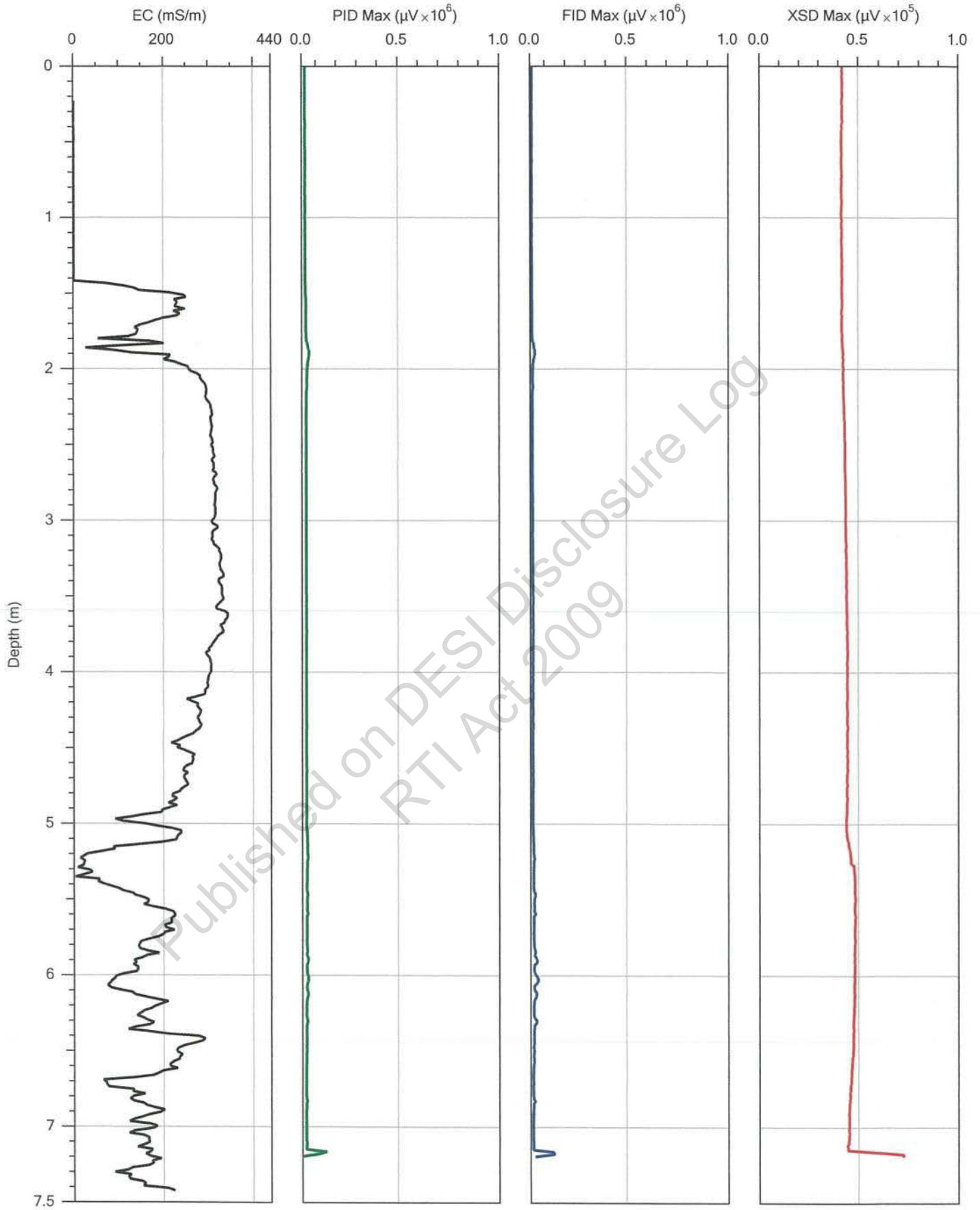




Company: NUMAC
Project ID: CALTEX ESK

Operator: sch4p4(6) Per
Client: PARSONS BRINCKERHOFF

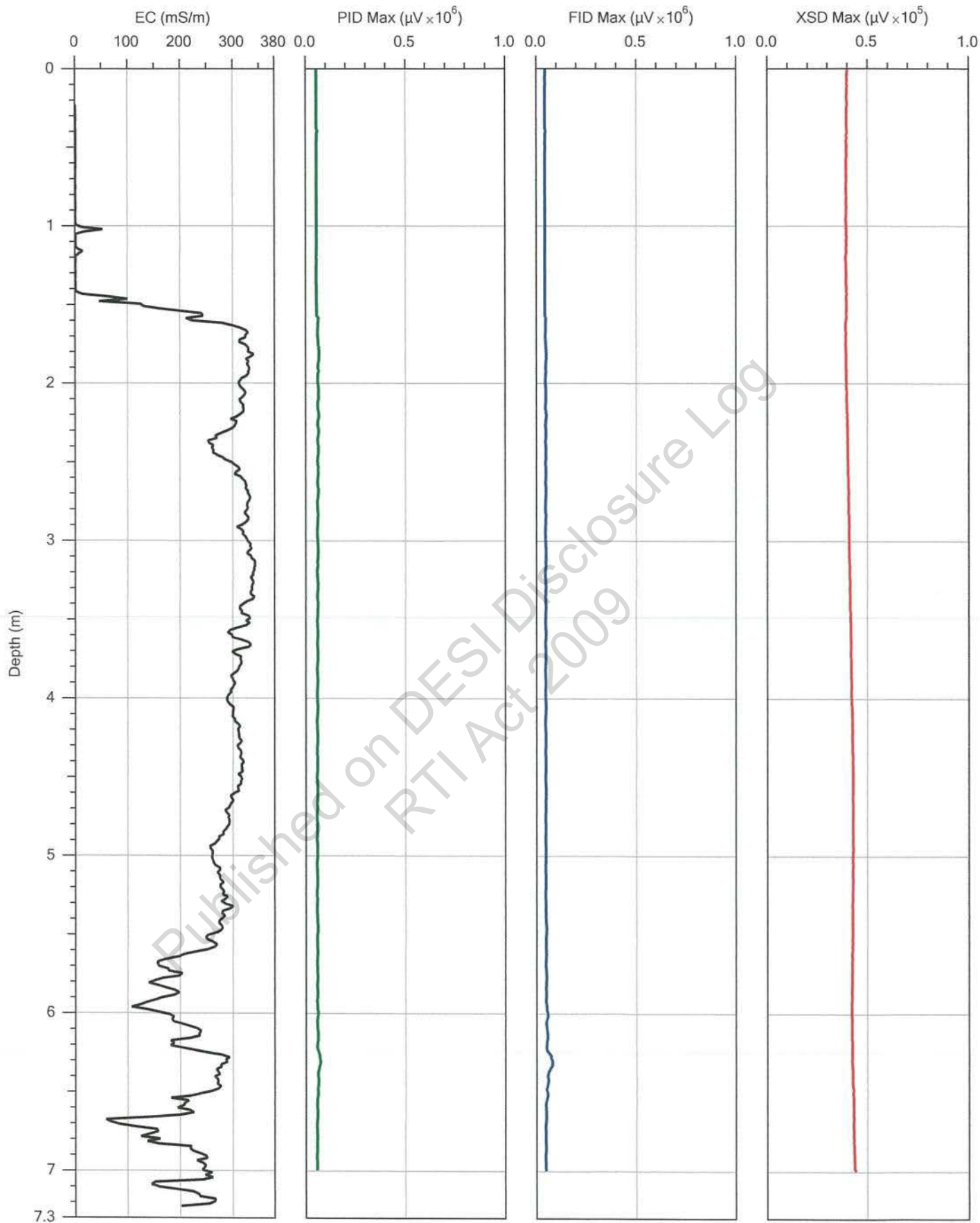
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Date:	9/22/2015
Location:	



Company: NUMAC
Project ID: CALTEX ESK

Operator: sch4p4(6) Pe
Client: PARSONS BRINCKERHOFF

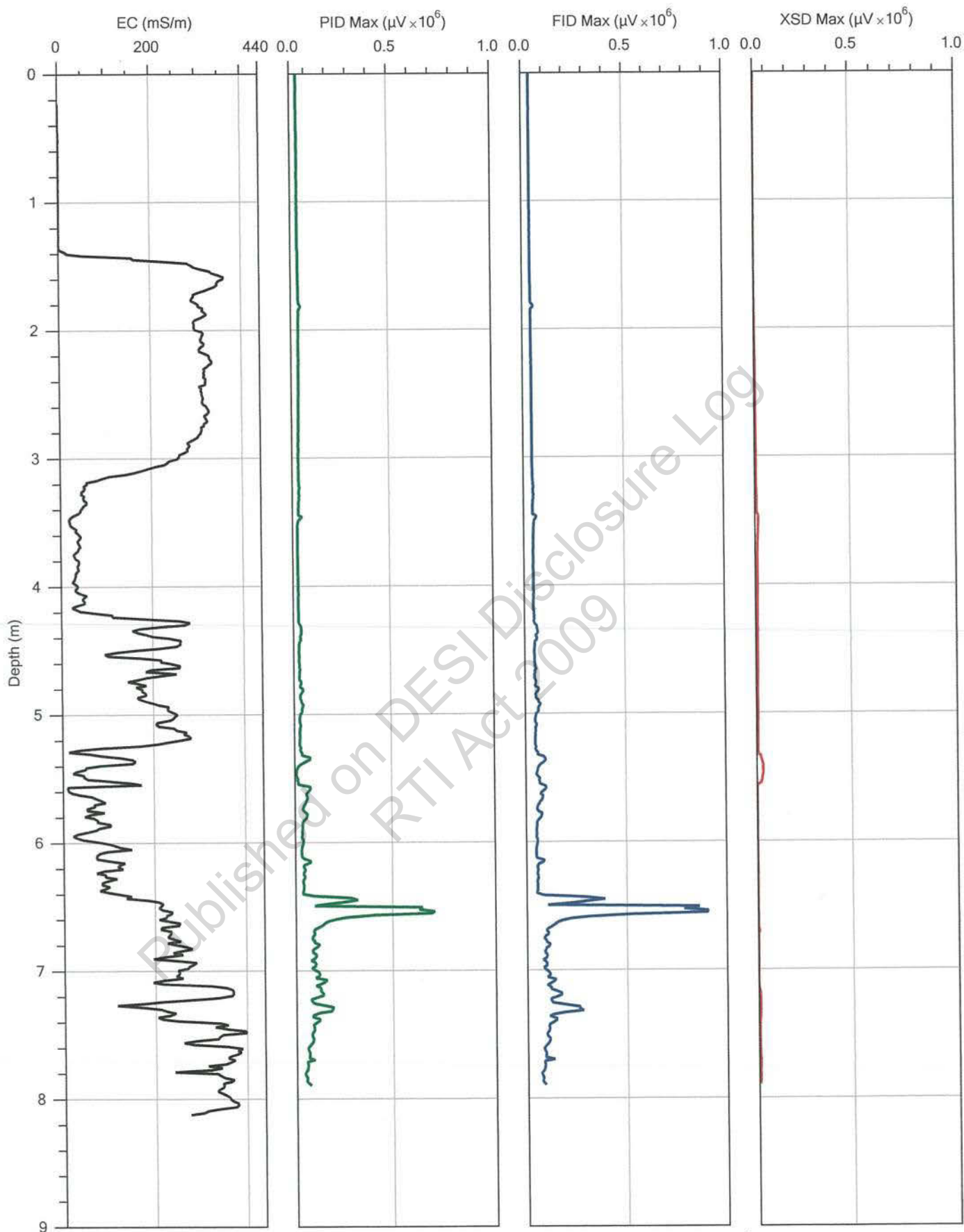
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Location:	



Company: NUMAC
Project ID: CALTEX ESK

Operator: sch4p4(6) Per
Client: PARSONS BRINCKERHOFF

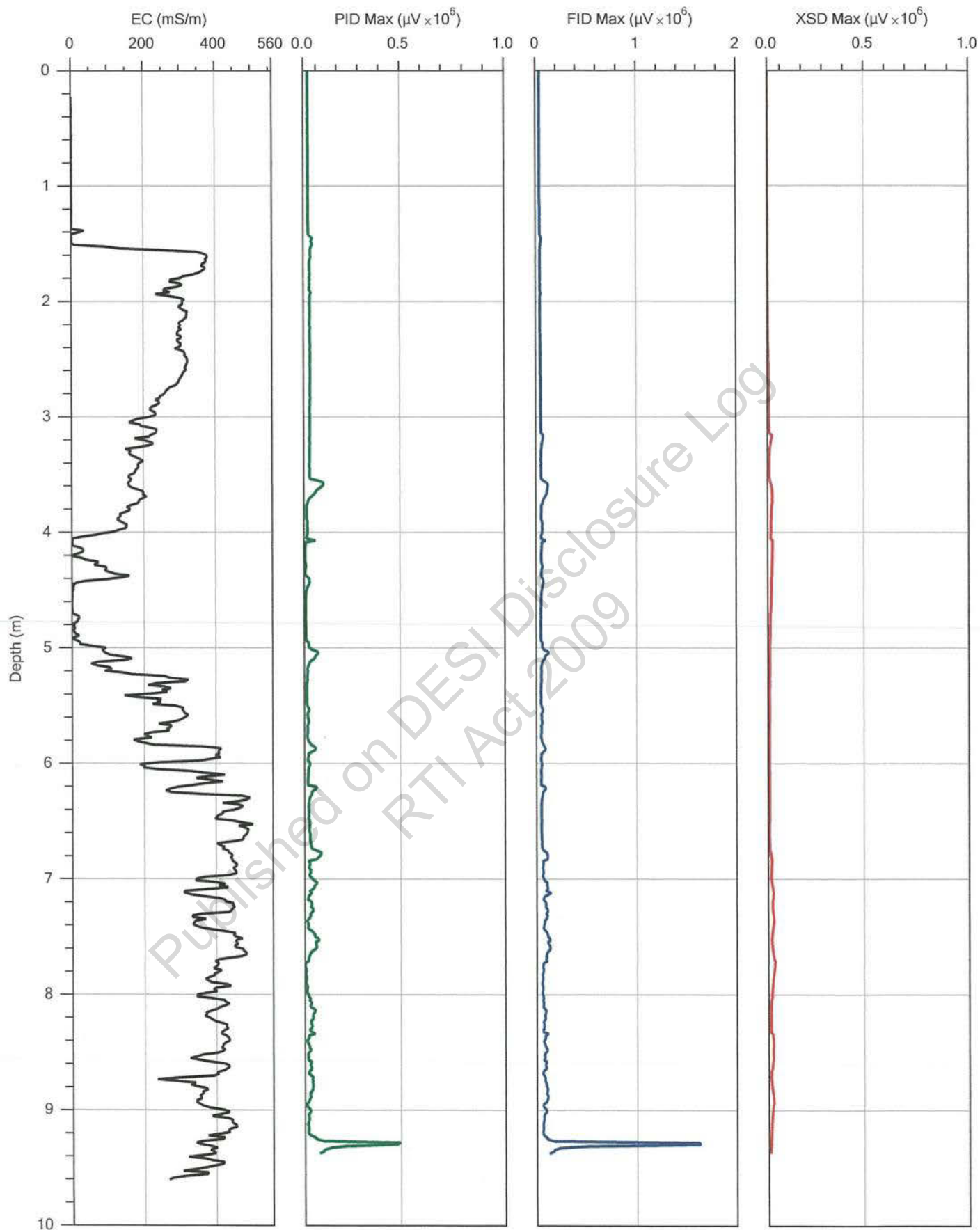
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Date: 9/22/2015
Location:



Company: NUMAC
Project ID: CALTEX ESK

Operator: sch4p4(6) Pers
Client: PARSONS BRINCKERHOFF

File: MIP-SB36A.MIP
Date: 9/21/2015
Location:



Company: NUMAC
Project ID: CALTEX ESK

Operator: sch4p4(6) Pers
Client: PARSONS BRINCKERHOFF

File: MIP-SB36B.MIP
Date: 9/21/2015
Location:

Appendix I

Calibration Sheets



RENTALS

Equipment Report - MiniRAE 3000 PID

This Gas Meter has been performance checked and calibrated as follows:

Lamp	Compound	Concentration	Zero	Span	Traceability Lot #	Pass?
10.6 eV	Isobutylene	100 ppm	0.0 ppm	1000 ppm	1666 700	☒

Alarm Limits

High	100 ppm
Low	50 ppm

Bump Test

Date	Target Gas	Reading	Pass?
18/9/15	100 ppm	100.0 ppm	☒

- ☒ Battery Status charged
☒ 10 minutes test complete
☒ Spare battery status (Min 5.5 volts)
☒ Electrical Safety Tag attached (AS/NZS 3760)

- ☒ Performance check (pump, lamp, sensor)
☒ Data cleared
☒ Filters checked

 Tag No: TFN009

 Valid to: 13/10/15

 Date: 18/9/15

Signed:

sch4p4(6) Personal information

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum \$30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
☒	☐	MiniRAE 2000 PID / Operational Check / Battery Status <u>charged</u>
☒	☐	Lamp <u>10.6</u> eV, Compound Set to: <u>isobutylene</u> C/factor: <u>1.0</u>
☒	☐	Protective yellow rubber boot
☒	☐	Inlet probe (attached to PID)
☒	☐	Spare water trap filter(s) Qty <u>2</u>
☒	☐	Charger 240V to 12V1250mA
☒	☐	Cradle and Travel Charger
☒	☐	Instruction Manual behind foam on the lid of case "
☒	☐	Quick Guide Sheet behind foam on the lid of case "
☒	☐	Spare Alkaline Battery Compartment with batteries
☒	☐	Inline Moisture trap Filter Guide Laminated
☒	☐	Calibration regulator & tubing (optional)
☒	☐	Data cable and Software CD (optional)
☒	☐	Carry Case
☒	☐	Check to confirm electrical safety (tag must be valid)

Date:

Signed:

TFS Reference	<u>CB001361</u>	Return Date:	/ /
Customer Reference		Return Time:	
Equipment ID	<u>PID3000BC</u>	Condition on return:	
Equipment Serial No.	<u>592-909219</u>		

"We do more than give you great equipment... We give you great solutions!"

Phone: (Free Call) 1300 735 295	Fax: (Free Call) 1800 675 123	Email: RentalsAU@ThermoFisher.com
Melbourne Branch 5 Caribbean Drive, Scoresby 3179	Sydney Branch Level 1, 4 Talavera Road, North Ryde 2113	Adelaide Branch 27 Beulah Road, Norwood, South Australia 5067
	Brisbane Branch Unit 2/5 Ross St Newstead 4006	Perth Branch 121 Beringarra Ave Malaga WA 6090

RENTALS

Equipment Report – Solinst Model 122 Interface Meter

This Meter has been performance checked / calibrated* as follows:

Cleaned/Tested

Pass?

Probe



Tape/Reel



☒ Performance Test & Battery Voltage Check (9.1 v) 8.0v minimum

Date:

5/8/15

Checked by:

sch4p4(6) Personal inf

Signed:

sch4p4(6) Personal inf

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum \$30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Received	Returned	Item
☒	☐	☐	Operations check OK
☒	☐	☐	Plastic Box / Bag
☒	☐	☐	Spare 9V Battery Qty 1
☒	☐	☐	Probe Cleaning Brush
☐	☐	☐	Decon
☒	☐	☐	Instruction leaflet
☒	☐	☐	Tape Guide
☐	☐	☐	
Processors Signature/ Initials			

TFS Quote Reference		Condition on return
Customer Ref		
Equipment ID	SOL122-12	
Equipment serial no.	236571	
Return Date	/ /	
Return Time		

"We do more than give you great equipment... We give you great solutions!"

Phone: (Free Call) 1300 735 295		Environmental Assessment Technologies		Fax: (Free Call) 1800 675 123	
Melbourne Branch 5 Canberran Drive, Scoresby 3179 Email: RentalsEnviroVIC@thermofisher.com	Sydney Branch Level 1, 4 Talavera Road, North Ryde 2113 Email: RentalsEnviroNSW@thermofisher.com	Adelaide Branch 27 Beulah Road, Norwood, South Australia 5067 Email: RentalsEnviroSA@thermofisher.com	Brisbane Branch Unit 2/5 Ross St Newstead 4006 Email: RentalsEnviroQLD@thermofisher.com	Perth Branch 121 Beringarra Ave Malaga WA 6090 Email: RentalsEnviroWA@thermofisher.com	



EnvironHire Pty Ltd

ABN: 89 161 488 240

07 3135 9601

Unit 3, 49 Butterfield Street, Herston 4006

Water Quality Meter – Calibration Certificate

Instrument: YSI 556

Serial No: 13H100516

Items			
Items	Id No.	Sent	Returned
WQM	13H100516	X	
Manual	N/A	X	
Probe Cluster	N/A	X	
In situ monitoring cage	N/A	X	
Storage cup	N/A	X	
Flow through Cell	N/A	-	
Spare Batteries / Screwdriver	N/A	X	

Calibration Results			
Parameter	Standard		Result
Temperature	Factory Calibrated (°C)		22.5 (°C)
pH	7.00 Units		7.00 Units
pH span	4.00 Units		3.99 Units
Conductivity	12,880 µS/cm		12,880 µS/cm
DO	0 %	100 %	0.0 % 100 %
Redox	235.80 mV @ 22.4 deg C		235.8 mV

Date: 30/09/2015

Calibrated by

sch4p4(6) Personal information

Job #: _____

Customer Purchase Order: _____



EnvironHire Pty Ltd

ABN: 89 161 488 240

07 3135 9601

Unit 3, 49 Butterfield Street, Herston 4006

Calibration Sheet - PID

Instrument: MiniRae 3000

Serial No: 592-911618

Items			
Items	Id No.	Sent	Returned
MiniRae 3000	592-911618	X	
Manual	N/A	X	
Inlet Probe	N/A	X	
Water Trap Filter (x2)	N/A	X	
Charger	N/A	X	
Carry Case	N/A	X	

Calibration Results		
Parameter	Standard	Result
Fresh Air	0 ppm	0.0 ppm
Isobutylene	100 ppm	99.7 ppm

Alarm Settings				
Parameter	Low	High	TWA	STEL
Isobutylene	25 ppm	100 ppm	n/a	n/a
Exp: July 2015				

Date: 30/09/2017 sch4p4(6) Personal information

Calibrated by:

Job #:

Customer Purchase Order:



EnvironHire Pty Ltd

ABN: 89 161 488 240

07 3135 9601

Unit 3, 49 Butterfield Street, Herston 4006

Interface Probe – Calibration Certificate

Instrument: Solinst Interface Probe – 100m
Serial No: 222958

Items			
Items	Id No.	Sent	Returned
Interface Meter	222954	X	
Manual	N/A	X	
Tape Guide	N/A	X	
Spare Batteries	N/A	X	
Carry Case	N/A	X	

Calibration Results		
Parameter	Standard	Result
Water	Tap Water	Pass
Oil	Kerosene	Pass
Battery	9 Volts	8.5 Volts

Date: 30/09/2015

Calibrated by: _____

sch4p4(6) Personal information

Job #: _____

Customer Purchase Order: _____

Appendix J

Field Sheets and Gauging Sheets



Job number:	2201681A
Client:	Caltex Australia Pty Ltd
Site location:	Caltex Depot Esk
Date:	1 October 2015
Person onsite:	sch4p4(6) Person

[illegible]

Version: A	Reviewer: M. Hannan	Date:	Approver: C. Faull	Date: 8/12/14
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Contaminated Land Management
**Standard Form 3.2.1:
Groundwater Gauging Record**

Field scientist:			Project manager:		

Published on DESI Disclosure Log
RTI Act 2009

Contaminated Land Management Standard Form 3.2.1: Groundwater Gauging Record

Job number:	2201681A
Client:	Caltex Australia Pty Ltd
Site location:	Caltex Depot Esk
Date:	21 April 2015
Person onsite:	sch4p4(6) Persona

Well ID	Well Depth (mBTC)	Depth to Water (mBTC)	Depth to LNAPL (mBTC)	LNAPL Thickness (m)	Comments
MWA	14.50	8.025	-	-	Very strong hydrocarbon odour, seal on plug okay, PVC cap, good condition.
MWB	10.22	7.958	-	-	Strong hydrocarbon odour, PVC cap, good condition, covered in dense vegetation.
MW1	Could not locate				
MW2	14.85	7.531	-	-	Poor seal on plug, plug replaced with new one. Location on Coffey map slightly off (should be more to the south east)
MW3	15.00	7.169	-	-	Slight hydrocarbon odour. Poor seal on plug, gatic found adjacent to well needs low profile plug and new bolts
MW4	14.94	6.864	-	-	Slight hydrocarbon odour, good seal on plug, water in gatic, 1 screw has stripped head
MW5	14.85	6.141	-	-	Concrete base cracked, poor seal on plug – replaced with new pone, 1 screw has stripped head
MW6	Could not locate				
MW7	12.08	6.049	-	-	Concrete base cracked, concrete seal beneath surface has sunk/failed, 1 screw has stripped head, poor seal on plug – replaced plug with new one
MW8	Found location, however this is a soil vapour well. Surveyed location to allow comparison with Coffey map.				
MW9	14.49	6.805	-	-	Slight hydrocarbon odour, damaged by slasher (former monument well), PVC broken at surface. Removed additional PVC to allow sampling.
MW10	14.95	7.666	-	-	Poor seal on plug – replaced with new one, otherwise good condition.
MW11	15.06	7.575	-	-	Slight hydrocarbon odour, poor seal on plug – replaced with new one, otherwise good condition.
MW12	15.10	7.920	-	-	Seal on plug okay, good condition.
MW13	14.40	7.410	-	-	Probably damaged by slasher (former monument well), PVC broken at surface. Removed additional PVC to allow sampling.
MW14	-	-	-	-	Probably damaged by slasher (former monument well), PVC broken at surface and cannot be accessed/blocked.
MW15	-	-	-	-	As per MW14
MW16	Could not be located in area where drums and other debris have been left on site, slasher has avoided this area and it has become overgrown (greater than 2 m in height)				

Version: A	Reviewer: sch4p4(6) Per	Date:	Approver: sch4p4(6)	Date: 8/12/14
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**Contaminated Land Management
Standard Form 3.2.1:
Groundwater Gauging Record**

MW17	Could not locate due to dense shoulder height vegetation, very likely destroyed given it was a monument well				
MW18	Could not locate due to dense shoulder height vegetation, very likely destroyed given it was a monument well				
MW19	Destroyed, found remnants of sturdy concrete base in general area around well footprint				
MW20	Destroyed, found remnants of sturdy concrete base in general area around well footprint, also found PVC casing which was blocked at the surface				
MW21	Destroyed, found remnants of sturdy concrete base in general area around well footprint				
MW22	7.836	-	-	-	Well blocked, sediment in gatic cover, cracked concrete base, missing screws, loose seal on plug
MW23	10.03	8.383	-	-	Poor seal on plug, replaced plug with new one, cracked concrete base.
Field scientist		sch4p4(6) Personal info		Project manager	
				sch4p4(6) Personal info	

Published on DESI Disclosure
RTI Act 2009

Version: A	Reviewer: sch4p4(6) Pers	Date:	Approver: sch4p4(6) P	Date: 8/12/14
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Appendix K

Monitoring Well Survey



255 - 259 Ipswich Street, Esk - Monitoring Well Coordinates - Surveyed 21/04/15 & 01/10/15

Well Number	Easting (MGA)	Northing (MGA)	AHD Elevation
MW2	442337.50	6987492.26	110.629
MW3	442329.48	6987518.12	110.222
MW4	442358.00	6987505.59	109.923
MW5	442390.15	6987497.27	109.059
MW7	442420.85	6987455.47	109.278
MW8	442331.00	6987514.28	110.265 (Lid level)
MW9	442351.94	6987511.06	109.863
MW10	442338.01	6987515.54	110.657
MW11	442335.01	6987525.60	110.499
MW12	442321.22	6987524.01	110.950
MW13	442323.81	6987504.89	110.494
MW22	442290.10	6987491.90	111.307
MW23	442315.45	6987452.69	111.593
MW30	442312.98	6987531.45	110.815
MW31	442336.78	6987537.65	110.028
MW32	442342.73	6987528.34	110.114
MW33	442339.68	6987510.27	110.625
MW34	442344.27	6987473.91	111.149
MW35	442365.69	6987480.92	110.805
MW36	442370.16	6987520.15	109.604
MWA	442333.99	6987504.00	111.083
MWB	442341.46	6987516.97	110.833
RWELL	442319.31	6987505.61	-

Notes :-

1/ All coordinates shown are MGA - Zone 56 (Meridian GDA94), derived from PM32716 (Easting 443001.393 - Northing 6986210.765)

Located on the corner of Mary Street and Middle Street, Esk

2/ All levels are to AHD, derived from PM32716 - RL116.077, Located on the corner of Mary Street and Middle Street, Esk

3/ All levels are shown to top of Casing (PVC monitoring pipe).

Appendix L

Zoning Map

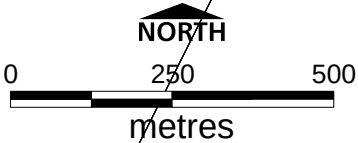
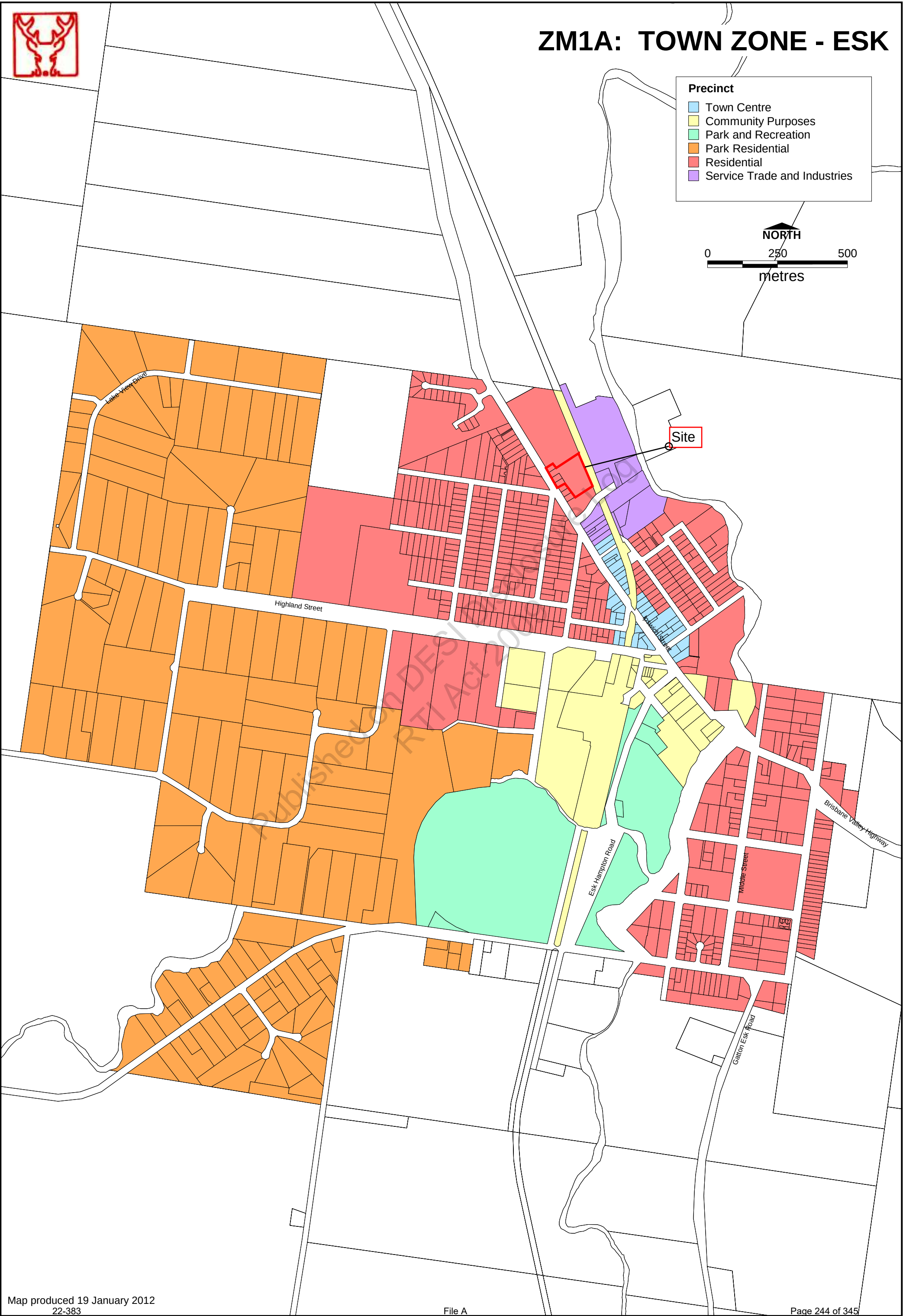




ZM1A: TOWN ZONE - ESK

Precinct

- Town Centre
- Community Purposes
- Park and Recreation
- Park Residential
- Residential
- Service Trade and Industries



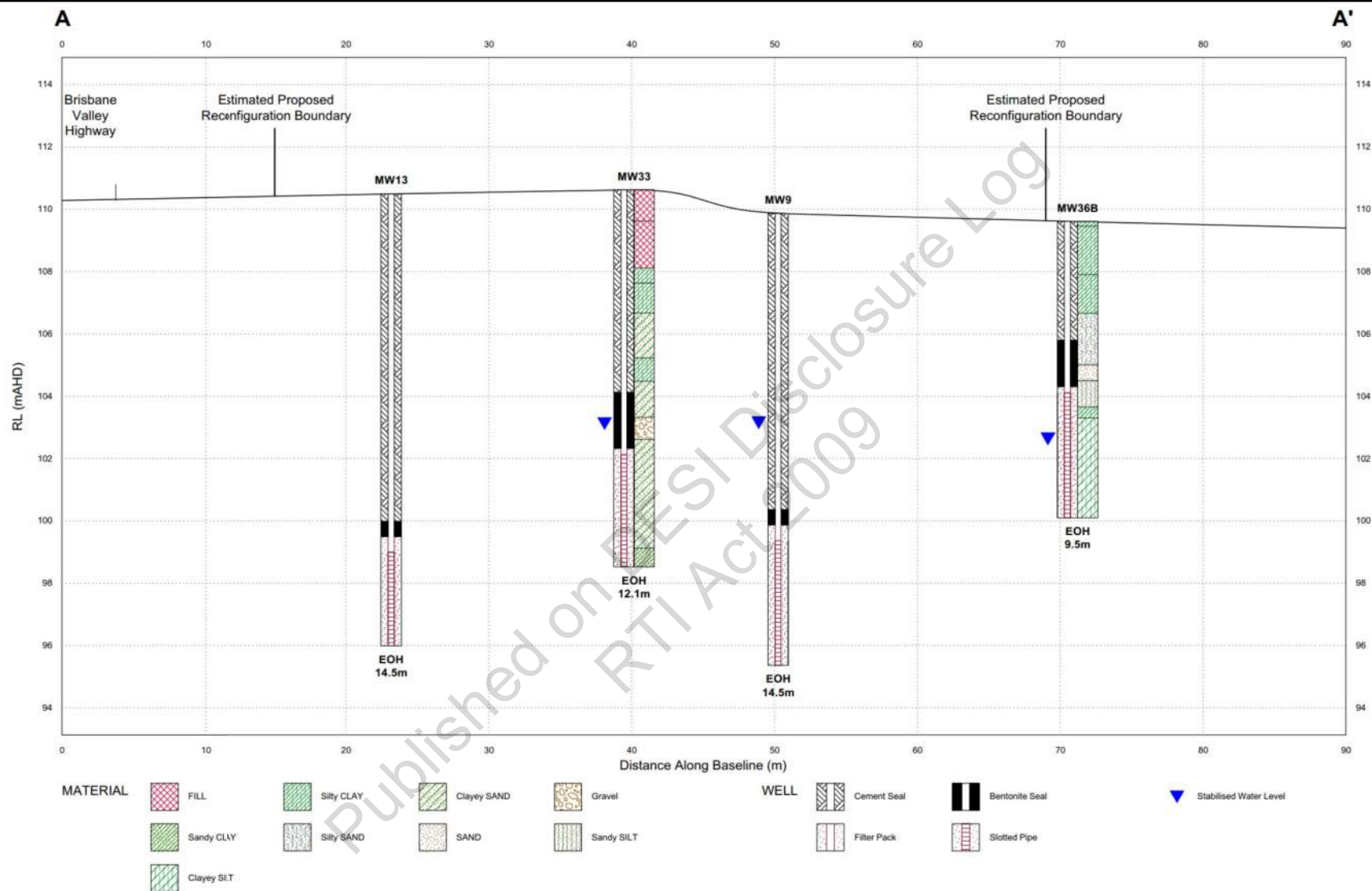
Appendix M

Groundwater Levels and Screen Levels



Summary of Static Groundwater Depth and Monitoring Well Screen Intervals

Date Established	Well ID	Static Depth to Water (mBTOC)	Screen Interval (mBTOC)	Sand Pack Interval (mBTOC)	Suitability
2008	MW3	NM	13.5-15.0	13.0-15.0	No
2008	MW4	6.937	1.5-15.0	13.0-15.0	No
2008	MW5	6.295	13.5-15.0	13.0-15.0	No
2010	MW9	6.90	10.5-14.0	10.0-14.5	No
2010	MW10	7.780	11.5-14.0	11.0-14.5	No
2010	MW11	7.735	10.5-14.0	10.0-14.5	No
2010	MW12	8.045	10.0-14.0	9.5-14.5	No
2010	MW13	8.49	11.5-14.0	11.0-14.5	No
Unknown	MWA	8.10	Unknown	Unknown	Unknown
Unknown	MWB	7.94	Unknown	Unknown	Unknown
2015	MW30	7.855	6.61-9.61	6.11-9.81	Yes
2015	MW31	7.350	5.97-9.17	5.67-9.67	Yes
2015	MW32	7.440	5.12-9.62	5.02-9.62	Yes
2015	MW33	7.690	9.08-12.68	8.88-12.68	Yes
2015	MW34	7.995	7.1-9.1	7.0-9.1	No
2015	MW35	7.747	10.59-12.59	10.09-12.59	No
2015	MW36	7.160	6.08-10.08	5.88-10.08	Yes



Data source: Client supplied

Map no: 2201681A_GIS_012_A

Author: MB

Approved by: JT

Date: 30/10/2015

Site ID: 11800, Caltex Esk - Investigation and Remediation Strategy
255-259 Ipswich Street, Esk, QLD

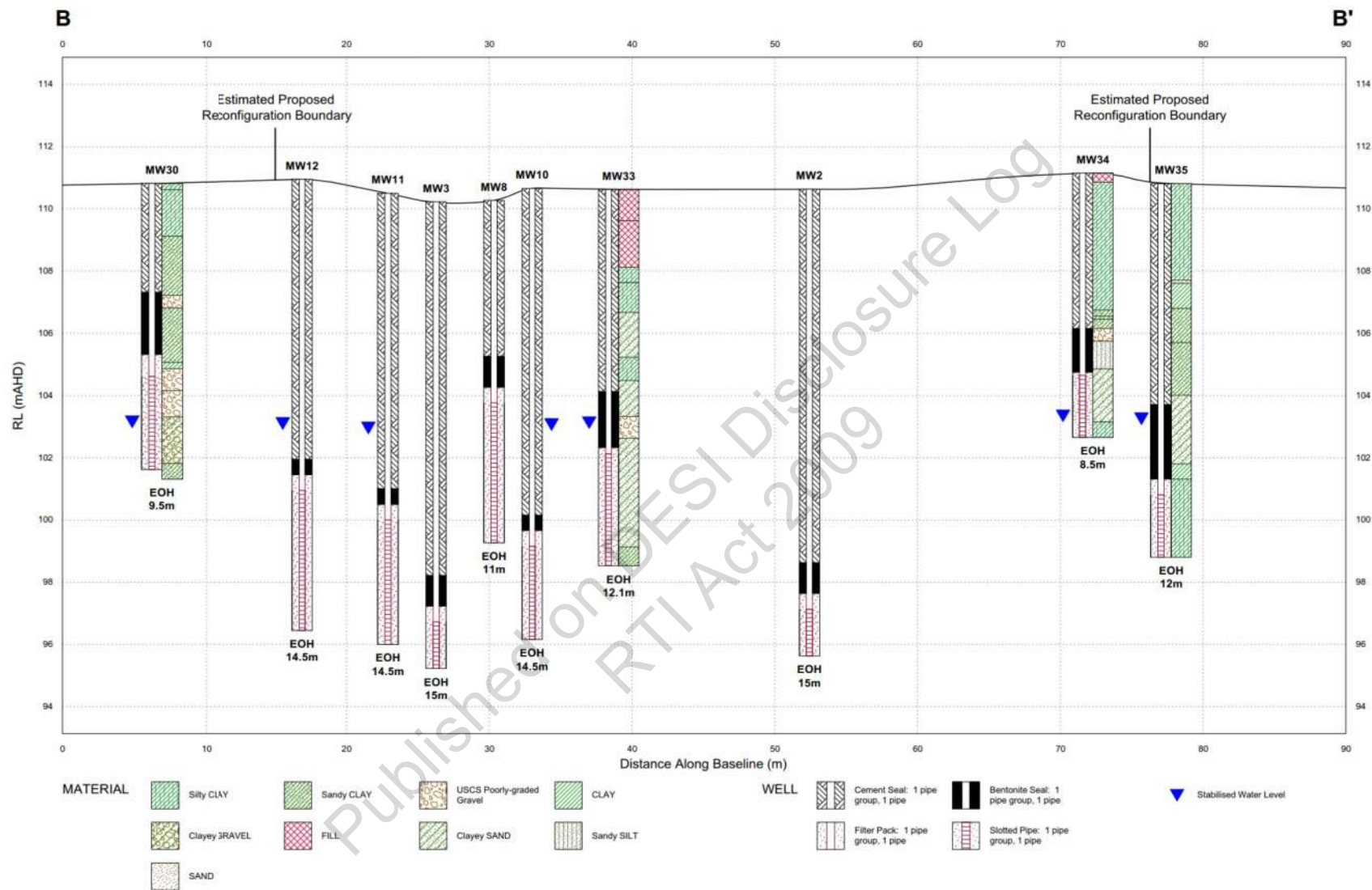
Cross Section AA'



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Data source: Client supplied

Map no: 2201681A_GIS_013_A

Author: MB

Approved by: JT

Date: 30/10/2015

Site ID: 11800, Caltex Esk - Investigation and Remediation Strategy
255-259 Ipswich Street, Esk, QLD

Cross Section BB'



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Appendix N

Laboratory Certificates



CERTIFICATE OF ANALYSIS

Work Order : EB1517239 Client : sch4p4(6) Personal info OFF AUST P/L (QLD) Contact : Address : GPO BOX 2907 BRISBANE QLD, AUSTRALIA 4000 E-mail : sch4p4(6) pb.com.au Telephone : +61 07 38546222 Facsimile : +61 07 3854 6323 Project : 2201681A Caltex Esk Remediation Strategy Order number : 82251 C-O-C number : 82251 <-> 82252 Sampler : ---- Site : Esk Quote number : ----	Page : 1 of 10 Laboratory : Environmental Division Brisbane Contact : sch4p4(6) Perso Address : 2 Byth Street Stafford QLD Australia 4053 E-mail : sch4p4(6) Perso alsglobal.com Telephone : +61 7 3552 8658 Facsimile : +61-7-3243 7218 QC Level : NEPM 2013 Schedule B(3) and ALS QCS3 requirement Date Samples Received : 22-Apr-2015 15:15 Date Analysis Commenced : 23-Apr-2015 Issue Date : 05-May-2015 11:07 No. of samples received : 19 No. of samples analysed : 19
--	--

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

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

sch4p4(6) Personal informati

Position

Senior Inorganic Chemist
 Senior Inorganic Chemist
 Senior Organic Chemist
 Laboratory Manager - Organics
 2IC Organic Instrument Chemist

Accreditation Category

Brisbane Inorganics
 Brisbane Inorganics
 Sydney Organics
 Sydney Organics
 Brisbane Organics



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 insufficient 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
ø = ALS is not NATA accredited for these tests.

- **EK057 (Nitrite); LOR's have been raised due to sample matrix interference.**
- ED041G (Sulfate as SO₄ 2-): Samples EB1517239-008, 014 and 016 were diluted due to matrix interference. LOR adjusted accordingly.
- EK058G (Nitrate as N): Sample EB1517239-008 was diluted due to matrix interference. LOR adjusted accordingly.
- EP080: Particular samples required dilution due to the presence of high level contaminants. LOR values have been adjusted accordingly.

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RB	RB	TB	QC1	MW2
Client sampling date / time					21-Apr-2015 11:00	22-Apr-2015 11:00	21-Apr-2015 11:00	22-Apr-2015 11:00	22-Apr-2015 07:59
Compound	CAS Number	LOR	Unit		EB1517239-001	EB1517239-002	EB1517239-003	EB1517239-004	EB1517239-005
					Result	Result	Result	Result	Result
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	----	----	----	----
EG051G: Ferrous Iron by Discrete Analyser									
Ferrous Iron	----	0.05	mg/L		----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8	0.01	mg/L		----	----	----	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	47300	<20
C10 - C14 Fraction	----	50	µg/L		----	----	----	4370	<50
C15 - C28 Fraction	----	100	µg/L		----	----	----	290	<100
C29 - C36 Fraction	----	50	µg/L		----	----	----	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		----	----	----	4660	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	50600	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	7760	<20
>C10 - C16 Fraction	>C10_C16	100	µg/L		----	----	----	2570	<100
>C16 - C34 Fraction	----	100	µg/L		----	----	----	210	<100
>C34 - C40 Fraction	----	100	µg/L		----	----	----	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	----	2780	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	----	----	2570	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	25300	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	6400	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	1530	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	7010	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	2600	<2
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	<2	9610	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	42800	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<250	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		109	102	109	102	98.0
Toluene-D8	2037-26-5	2	%		92.0	103	96.2	94.3	103



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RB	RB	TB	QC1	MW2
Client sampling date / time					21-Apr-2015 11:00	22-Apr-2015 11:00	21-Apr-2015 11:00	22-Apr-2015 11:00	22-Apr-2015 07:59
Compound	CAS Number	LOR	Unit		EB1517239-001	EB1517239-002	EB1517239-003	EB1517239-004	EB1517239-005
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	2	%		91.0	91.8	98.6	94.3	101

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW3	MW4	MW5	MW7	MW9
Client sampling date / time					22-Apr-2015 09:10	21-Apr-2015 16:54	21-Apr-2015 16:25	21-Apr-2015 15:54	22-Apr-2015 07:37
Compound	CAS Number	LOR	Unit		EB1517239-006	EB1517239-007	EB1517239-008	EB1517239-009	EB1517239-010
					Result	Result	Result	Result	Result
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	----	<25	----	----
EG051G: Ferrous Iron by Discrete Analyser									
Ferrous Iron	----	0.05	mg/L		----	0.94	0.60	----	----
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8	0.01	mg/L		----	----	<0.05	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		----	27	<10	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	1120	<20	<20	90
C10 - C14 Fraction	----	50	µg/L		<50	120	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	110	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	120	<50	110	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	1190	<20	<20	100
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<1000	<20	<20	30
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	100	<100	120	100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	100	<100	120	100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	554	<1	<1	29
Toluene	108-88-3	2	µg/L		<2	56	<2	<2	12
Ethylbenzene	100-41-4	2	µg/L		<2	<50	<2	<2	5
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	148	<2	<2	18
ortho-Xylene	95-47-6	2	µg/L		<2	81	<2	<2	9
^ Total Xylenes	1330-20-7	2	µg/L		<2	229	<2	<2	27
^ Sum of BTEX	----	1	µg/L		<1	839	<1	<1	73
Naphthalene	91-20-3	5	µg/L		<5	<50	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		103	114	97.1	108	104
Toluene-D8	2037-26-5	2	%		103	109	95.8	104	99.9



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW3	MW4	MW5	MW7	MW9
Client sampling date / time					22-Apr-2015 09:10	21-Apr-2015 16:54	21-Apr-2015 16:25	21-Apr-2015 15:54	22-Apr-2015 07:37
Compound	CAS Number	LOR	Unit		EB1517239-006	EB1517239-007	EB1517239-008	EB1517239-009	EB1517239-010
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	2	%		100	104	91.7	102	98.7

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW10	MW11	MW12	MW13	MWA
Client sampling date / time					22-Apr-2015 09:19	22-Apr-2015 08:55	22-Apr-2015 08:43	22-Apr-2015 08:23	22-Apr-2015 09:39
Compound	CAS Number	LOR	Unit		EB1517239-011	EB1517239-012	EB1517239-013	EB1517239-014	EB1517239-015
					Result	Result	Result	Result	Result
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	----	----	<25	<1
EG051G: Ferrous Iron by Discrete Analyser									
Ferrous Iron	----	0.05	mg/L		----	----	----	1.17	0.07
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8	0.01	mg/L		----	----	----	<0.10	<0.01
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		----	----	----	480	9710
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	320	20	20300
C10 - C14 Fraction	----	50	µg/L		100	100	300	150	1340
C15 - C28 Fraction	----	100	µg/L		170	210	520	320	280
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	70	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		270	310	820	540	1620
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	350	20	20900
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	50	<20	<5000
>C10 - C16 Fraction	>C10_C16	100	µg/L		210	170	560	200	1280
>C16 - C34 Fraction	----	100	µg/L		<100	160	260	320	200
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		210	330	820	520	1480
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		210	170	560	200	1280
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	300	10	18600
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<250
Ethylbenzene	100-41-4	2	µg/L		<2	<2	4	<2	1000
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<500
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<250
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	<2	<2	<250
^ Sum of BTEX	----	1	µg/L		<1	<1	304	10	19600
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<250
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		105	117	96.9	106	110
Toluene-D8	2037-26-5	2	%		95.1	111	92.4	98.1	102



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW10	MW11	MW12	MW13	MWA
Client sampling date / time					22-Apr-2015 09:19	22-Apr-2015 08:55	22-Apr-2015 08:43	22-Apr-2015 08:23	22-Apr-2015 09:39
Compound	CAS Number	LOR	Unit		EB1517239-011	EB1517239-012	EB1517239-013	EB1517239-014	EB1517239-015
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	2	%		93.4	106	93.4	93.2	97.8

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MWB	MW23	TRIP SPIKE	ALS CONTROL SPIKE	----
Client sampling date / time					22-Apr-2015 09:57	21-Apr-2015 15:30	[17-Apr-2015]	[17-Apr-2015]	----
Compound	CAS Number	LOR	Unit		EB1517239-016	EB1517239-017	EB1517239-018	EB1517239-019	-----
					Result	Result	Result	Result	Result
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<25	30	----	----	----
EG051G: Ferrous Iron by Discrete Analyser									
Ferrous Iron	----	0.05	mg/L		0.37	<0.05	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
^ Nitrate as N	14797-55-8	0.01	mg/L		0.08	0.04	----	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		9080	<10	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		47500	<20	160	180	----
C10 - C14 Fraction	----	50	µg/L		4500	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L		320	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	180	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		4820	180	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		50700	<20	170	210	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		7370	<20	70	100	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		2680	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L		240	210	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		2920	210	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		2680	<100	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		25400	4	18	21	----
Toluene	108-88-3	2	µg/L		6700	<2	18	18	----
Ethylbenzene	100-41-4	2	µg/L		1560	<2	16	17	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		7170	<2	32	33	----
ortho-Xylene	95-47-6	2	µg/L		2500	<2	18	19	----
^ Total Xylenes	1330-20-7	2	µg/L		9670	<2	50	52	----
^ Sum of BTEX	----	1	µg/L		43300	4	102	108	----
Naphthalene	91-20-3	5	µg/L		<250	<5	19	20	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		102	91.6	89.0	92.5	----
Toluene-D8	2037-26-5	2	%		94.2	101	107	109	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MWB	MW23	TRIP SPIKE	ALS CONTROL SPIKE	----
Client sampling date / time					22-Apr-2015 09:57	21-Apr-2015 15:30	[17-Apr-2015]	[17-Apr-2015]	----
Compound	CAS Number	LOR	Unit		EB1517239-016	EB1517239-017	EB1517239-018	EB1517239-019	-----
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	2	%		95.1	108	113	118	----

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QUALITY CONTROL REPORT

Work Order	: EB1517239	Page	: 1 of 5
Client	: PARSONS BRINCKERHOFF AUST P/L (QLD)	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal in	Contact	: sch4p4(6) Perso
Address	: GPO BOX 2907 BRISBANE QLD, AUSTRALIA 4000	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: sch4p4(6) @pb.com.au	E-mail	: sch4p4(6) Per alsglobal.com
Telephone	: +61 07 38546222	Telephone	: +61 7 3552 8658
Facsimile	: +61 07 3854 6323	Facsimile	: +61-7-3243 7218
Project	: 2201681A Caltex Esk Remediation Strategy	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 82251	Date Samples Received	: 22-Apr-2015
C-O-C number	: 82251 <-> 82252	Date Analysis Commenced	: 23-Apr-2015
Sampler	: ----	Issue Date	: 05-May-2015
Site	: Esk	No. of samples received	: 19
Quote number	: ----	No. of samples analysed	: 19

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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

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

sch4p4(6) Personal in

Position

Senior Inorganic Chemist
Senior Inorganic Chemist
Senior Organic Chemist
Laboratory Manager - Organics
2IC Organic Instrument Chemist

Accreditation Category

Brisbane Inorganics
Brisbane Inorganics
Sydney Organics
Sydney Organics
Brisbane Organics



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 insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

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

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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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 85848)									
EB1517239-008	MW5	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<25	<25	0.00	No Limit
EB1517180-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	24400	23000	5.99	0% - 20%
EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 86287)									
EB1517239-008	MW5	EG051G: Ferrous Iron	----	0.05	mg/L	0.60	0.63	5.08	0% - 50%
EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 87144)									
EB1517222-001	Anonymous	EG051G: Ferrous Iron	----	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 87566)									
EB1517123-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	599	599	0.00	0% - 20%
EB1517239-008	MW5	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 88694)									
EB1517239-001	RB	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EB1517239-011	MW10	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 88694)									
EB1517239-001	RB	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EB1517239-011	MW10	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 88694)									
EB1517239-001	RB	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EB1517239-011	MW10	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	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: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 85848)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	107	85	118
				<1	100 mg/L	103	85	118
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 86287)								
EG051G: Ferrous Iron	----	0.05	mg/L	<0.05	2 mg/L	108	85	120
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 87144)								
EG051G: Ferrous Iron	----	0.05	mg/L	<0.05	2 mg/L	102	85	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 87566)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	103	86	114
EP080/071: Total Petroleum Hydrocarbons (QCLot: 86410)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	1211 µg/L	91.3	38	114
EP071: C15 - C28 Fraction	----	100	µg/L	<100	2103 µg/L	87.7	50	132
EP071: C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 88694)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	160 µg/L	94.3	76	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 86410)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	1696 µg/L	90.6	43	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	1496 µg/L	89.0	49	134
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 88694)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	185 µg/L	95.0	75	123
EP080: C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTE	20	µg/L	<20	----	----	----	----
	X							
EP080: BTEXN (QCLot: 88694)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	110	77	119
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	83.5	78	119
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	20 µg/L	94.9	77	121
	106-42-3							
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	100	75	120
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	96.8	76	121
EP080: Sum of BTEX	----	1	µg/L	<1	----	----	----	----
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	105	78	122
EP080: Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----



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: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 85848)							
EB1517180-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	# Not Determined	70	130
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 86287)							
EB1517239-014	MW13	EG051G: Ferrous Iron	----	2 mg/L	97.6	70	130
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 87144)							
EB1517222-003	Anonymous	EG051G: Ferrous Iron	----	2 mg/L	125	70	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 87566)							
EB1517222-001	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 88694)							
EB1517239-002	RB	EP080: C6 - C9 Fraction	----	40 µg/L	129	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 88694)							
EB1517239-002	RB	EP080: C6 - C10 Fraction	C6_C10	40 µg/L	117	70	130
EP080: BTEXN (QCLot: 88694)							
EB1517239-002	RB	EP080: Benzene	71-43-2	10 µg/L	114	70	130
		EP080: Toluene	108-88-3	10 µg/L	120	70	130

QA/QC Compliance Assessment for DQO Reporting

Work Order	: EB1517239	Page	: 1 of 6
Client	: PARSONS BRINCKERHOFF AUST P/L (QLD)	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal info	Telephone	: +61 7 3552 8658
Project	: 2201681A Caltex Esk Remediation Strategy	Date Samples Received	: 22-Apr-2015
Site	: Esk	Issue Date	: 05-May-2015
Sampler	: ----	No. of samples received	: 19
Order number	: 82251	No. of samples analysed	: 19

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO ₄ 2- by DA	EB1517180--002	Anonymous	Sulfate as SO ₄ - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP033: C1 - C4 Hydrocarbon Gases	EB1517222--001	Anonymous	Methane	74-82-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EG051G: Ferrous Iron by Discrete Analyser							
Clear Plastic Bottle - Natural MW5,	MW23	----	----	----	23-Apr-2015	22-Apr-2015	1

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Nitrite as N by Discrete Analyser	1	0	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	20	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)					
Nitrite as N by Discrete Analyser	1	0	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)					
Nitrite as N by Discrete Analyser	1	0	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
Nitrite as N by Discrete Analyser	1	0	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	20	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.



Matrix: **WATER**

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
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) MW5, MW23	21-Apr-2015	----	----	----	23-Apr-2015	19-May-2015	✓
Clear Plastic Bottle - Natural (ED041G) MW13, MWA, MWB	22-Apr-2015	----	----	----	23-Apr-2015	20-May-2015	✓
EG051G: Ferrous Iron by Discrete Analyser							
Clear Plastic Bottle - HCl - Filtered (EG051G) MW4	21-Apr-2015	----	----	----	27-Apr-2015	28-Apr-2015	✓
Clear Plastic Bottle - Natural (EG051G) MW5, MW23	21-Apr-2015	----	----	----	23-Apr-2015	22-Apr-2015	✗
Clear Plastic Bottle - Natural (EG051G) MW13, MWA, MWB	22-Apr-2015	----	----	----	23-Apr-2015	23-Apr-2015	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) MW5, MW23	21-Apr-2015	----	----	----	23-Apr-2015	23-Apr-2015	✓
Clear Plastic Bottle - Natural (EK057G) MW13, MWA, MWB	22-Apr-2015	----	----	----	23-Apr-2015	24-Apr-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Natural (EK059G) MW5, MW23	21-Apr-2015	----	----	----	23-Apr-2015	23-Apr-2015	✓
Clear Plastic Bottle - Natural (EK059G) MW13, MWA, MWB	22-Apr-2015	----	----	----	23-Apr-2015	24-Apr-2015	✓
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid (EP033) MW4, MW23	21-Apr-2015	----	----	----	27-Apr-2015	05-May-2015	✓
Amber VOC Vial - Sulfuric Acid (EP033) MW13, MWA, MWB	22-Apr-2015	----	----	----	27-Apr-2015	06-May-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) MW4, MW7, MW23	21-Apr-2015	24-Apr-2015	28-Apr-2015	✓	28-Apr-2015	03-Jun-2015	✓
Amber Glass Bottle - Unpreserved (EP071) QC1, MW3, MW10, MW12, MWA, 22-383	22-Apr-2015	24-Apr-2015	29-Apr-2015	✓	28-Apr-2015	03-Jun-2015	✓

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Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons									
Amber VOC Vial - Sulfuric Acid (EP080) TRIP SPIKE,		ALS CONTROL SPIKE	17-Apr-2015	29-Apr-2015	01-May-2015	✔	30-Apr-2015	01-May-2015	✔
Amber VOC Vial - Sulfuric Acid (EP080) RB, MW4, MW7,		TB, MW5, MW23	21-Apr-2015	29-Apr-2015	05-May-2015	✔	30-Apr-2015	05-May-2015	✔
Amber VOC Vial - Sulfuric Acid (EP080) RB, MW2, MW9, MW11, MW13, MWB		QC1, MW3, MW10, MW12, MWA,	22-Apr-2015	29-Apr-2015	06-May-2015	✔	30-Apr-2015	06-May-2015	✔

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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(were) 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: **WATER**

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)							
C1 - C4 Gases	EP033	2	16	12.50	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ferrous Iron by Discrete Analyser	EG051G	1	5	20.00	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	7	28.57	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	0	0.00	10.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	13	15.38	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	20	0.00	10.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	19	10.53	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
C1 - C4 Gases	EP033	1	16	6.25	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ferrous Iron by Discrete Analyser	EG051G	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	7	14.29	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	0	0.00	5.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	13	15.38	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
C1 - C4 Gases	EP033	1	16	6.25	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ferrous Iron by Discrete Analyser	EG051G	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	7	14.29	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	0	0.00	5.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	7.69	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
C1 - C4 Gases	EP033	1	16	6.25	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Ferrous Iron by Discrete Analyser	EG051G	1	5	20.00	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	7	14.29	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Nitrite as N by Discrete Analyser	EK057G	1	0	0.00	5.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	7.69	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	20	0.00	5.00	✗	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 Schedule B(3) and 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
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Ferrous Iron by Discrete Analyser	EG051G	WATER	In house: Referenced to APHA 3500 Fe-B. A colorimetric determination based on the reaction between phenanthroline and ferrous iron at pH 3.2-3.3 to form an orange-red complex that is measured against a five-point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EB1529964	Page	: 1 of 6
Client	: PARSONS BRINCKERHOFF AUST P/L (QLD)	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal in	Contact	: sch4p4(6) Person
Address	: GPO BOX 2907 BRISBANE QLD, AUSTRALIA 4000	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: sch4p4(pb.com.au	E-mail	: sch4p4(6) Pers alsglobal.com
Telephone	: +61 07 38546222	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38314223	Facsimile	: +61-7-3243 7218
Project	: 2201681A Caltex Esk	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 82202	Date Samples Received	: 28-Sep-2015 11:50
C-O-C number	: 82202 <-> 82204	Date Analysis Commenced	: 29-Sep-2015
Sampler	: ---	Issue Date	: 06-Oct-2015 13:39
Site	: Esk	No. of samples received	: 35
Quote number	: ---	No. of samples analysed	: 17

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

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
sch4p4(6) Personal

Position

Senior Organic Chemist
Senior Organic Chemist

Accreditation Category

Brisbane Inorganics
Brisbane Organics



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 insufficient 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
ø = ALS is not NATA accredited for these tests.

- EP071: Sample EB1529744_002 shows poor matrix spike recovery. Insufficient sample for re-extraction.
- EP071: The LOR for QA1 has been raised due to background laboratory contamination.

Published on DESI Disclosure Log
RTI Act 2009



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB30 1.9-2.0m	SB30 5.8-5.9m	SB31 5.9-6.0m	SB31 7.0-7.1m	SB32 5.9-6.0m
Client sampling date / time					[24-Sep-2015]	[24-Sep-2015]	[24-Sep-2015]	[24-Sep-2015]	[24-Sep-2015]
Compound	CAS Number	LOR	Unit		EB1529964-001	EB1529964-002	EB1529964-008	EB1529964-009	EB1529964-012
					Result	Result	Result	Result	Result
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1	%		9.6	19.9	10.0	14.7	8.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	58	591	139
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	140	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	140	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	74	660	184
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	48	398	117
>C10 - C16 Fraction	>C10_C16	50	mg/kg		<50	<50	<50	80	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	80	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	80	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	0.5	17.0	0.6
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	6.6	104	17.3
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	2.3	16.3	5.9
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	12.2	95.6	31.6
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	4.4	28.6	11.2
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	26.0	262	66.6
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	16.6	124	42.8
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	1	1
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		95.3	86.9	93.9	94.5	99.4
Toluene-D8	2037-26-5	0.2	%		90.7	84.3	80.0	84.2	93.6
4-Bromofluorobenzene	460-00-4	0.2	%		86.8	75.4	82.0	90.8	93.6



Environmental

QUALITY CONTROL REPORT

Work Order	: EB1529964	Page	: 1 of 7
Client	: PARSONS BRINCKERHOFF AUST P/L (QLD)	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal inf	Contact	: sch4p4(6) Perso
Address	: GPO BOX 2907 BRISBANE QLD, AUSTRALIA 4000	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: sch4p4(6) pb.com.au	E-mail	: sch4p4(6) Pers @alsglobal.com
Telephone	: +61 07 38546222	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38314223	Facsimile	: +61-7-3243 7218
Project	: 2201681A Caltex Esk	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 82202	Date Samples Received	: 28-Sep-2015
C-O-C number	: 82202 <=> 82204	Date Analysis Commenced	: 29-Sep-2015
Sampler	: ----	Issue Date	: 06-Oct-2015
Site	: Esk	No. of samples received	: 35
Quote number	: ----	No. of samples analysed	: 17

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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

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

sch4p4(6) P

Position

Senior Organic Chemist
Senior Organic Chemist

Accreditation Category

Brisbane Inorganics
Brisbane Organics



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 insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

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

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RTI Act 2009



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 (%)
EA055: Moisture Content (QC Lot: 227331)									
EB1529964-001	SB30 1.9-2.0m	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	9.6	9.2	3.97	No Limit
EB1529964-026	SB35 1.9-2.0m	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	16.5	16.4	0.881	0% - 50%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 227329)									
EB1529964-001	SB30 1.9-2.0m	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EB1529964-026	SB35 1.9-2.0m	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 227330)									
EB1529964-001	SB30 1.9-2.0m	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EB1529964-026	SB35 1.9-2.0m	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 227329)									
EB1529964-001	SB30 1.9-2.0m	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EB1529964-026	SB35 1.9-2.0m	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 227330)									
EB1529964-001	SB30 1.9-2.0m	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.00	No Limit
EB1529964-026	SB35 1.9-2.0m	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 227329)									
EB1529964-001	SB30 1.9-2.0m	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EB1529964-026	SB35 1.9-2.0m	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
		EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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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: BTEXN (QC Lot: 227329) - continued									
EB1529964-026	SB35 1.9-2.0m	EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 227440)									
EB1529744-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<0.10	130	25.6	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<0.05	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<0.05	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 227726)									
EB1529892-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02	<20	0.00	No Limit
EB1530014-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	420	410	2.64	0% - 20%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 227440)									
EB1529744-001	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<0.10	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<0.10	130	26.1	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<0.10	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 227726)									
EB1529892-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02	<20	0.00	No Limit
EB1530014-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	430	420	2.68	0% - 20%
EP080: BTEXN (QC Lot: 227726)									
EB1529892-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<0.002	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<0.002	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<0.005	<5	0.00	No Limit
EB1530014-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	33	32	0.00	0% - 50%
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	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**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Result	Spike	Spike Recovery (%)	Recovery Limits (%)
				Concentration		LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 227329)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	16 mg/kg	82.8	66	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 227330)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	318 mg/kg	106	79	123
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	531 mg/kg	97.5	77	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 227329)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	18.5 mg/kg	82.4	66	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 227330)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	428 mg/kg	107	81	122
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	395 mg/kg	92.8	74	122
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080: BTEXN (QCLot: 227329)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	79.7	73	105
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	79.4	67	104
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	75.0	66	106
	106-42-3							
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	80.4	72	115
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	77.3	68	105
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	88.9	73	105

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh
EP080/071: Total Petroleum Hydrocarbons (QCLot: 227440)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	1211 µg/L	69.1	38	114
EP071: C15 - C28 Fraction	----	100	µg/L	<100	2103 µg/L	69.4	50	132
EP071: C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 227726)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	160 µg/L	86.2	76	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 227440)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	1696 µg/L	69.1	43	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	1496 µg/L	68.2	49	134
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 227726)								

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Sub-Matrix: **WATER**

Method: Compound				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
CAS Number	LOR	Unit	Result					
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 227726) - continued								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	185 µg/L	88.6	75	123
EP080: C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
	X							
EP080: BTEXN (QCLot: 227726)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	91.0	77	119
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	97.2	78	119
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	20 µg/L	96.3	77	121
	106-42-3							
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	90.5	75	120
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	96.4	76	121
EP080: Sum of BTEX	----	1	µg/L	<1	----	----	----	----
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	98.2	78	122
EP080: Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----

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**

Laboratory sample ID				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%)	Recovery Limits (%)	
					MS	Low	High
Client sample ID	Method: Compound	CAS Number					
EP080/071: Total Petroleum Hydrocarbons (QCLot: 227329)							
EB1529964-002	SB30 5.8-5.9m	EP080: C6 - C9 Fraction	----	8 mg/kg	111	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 227330)							
EB1529964-002	SB30 5.8-5.9m	EP071: C10 - C14 Fraction	----	318 mg/kg	102	70	130
		EP071: C15 - C28 Fraction	----	531 mg/kg	96.3	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 227329)							
EB1529964-002	SB30 5.8-5.9m	EP080: C6 - C10 Fraction	C6_C10	8 mg/kg	118	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 227330)							
EB1529964-002	SB30 5.8-5.9m	EP071: >C10 - C16 Fraction	>C10_C16	428 mg/kg	103	70	130
		EP071: >C16 - C34 Fraction	----	395 mg/kg	92.6	70	130
EP080: BTEXN (QCLot: 227329)							
EB1529964-002	SB30 5.8-5.9m	EP080: Benzene	71-43-2	2 mg/kg	72.7	70	130
		EP080: Toluene	108-88-3	2 mg/kg	79.3	70	130

Sub-Matrix: **WATER**

Laboratory sample ID				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%)	Recovery Limits (%)	
					MS	Low	High
Client sample ID	Method: Compound	CAS Number					
22-383	File A						



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 227440)							
EB1529744-002	Anonymous	EP071: C10 - C14 Fraction	----	1211 µg/L	# 65.2	70	130
		EP071: C15 - C28 Fraction	----	2103 µg/L	# 67.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 227726)							
EB1529892-002	Anonymous	EP080: C6 - C9 Fraction	----	40 µg/L	80.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 227440)							
EB1529744-002	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	1696 µg/L	# 65.4	70	130
		EP071: >C16 - C34 Fraction	----	1496 µg/L	# 69.2	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 227726)							
EB1529892-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	40 µg/L	84.3	70	130
EP080: BTEXN (QCLot: 227726)							
EB1529892-002	Anonymous	EP080: Benzene	71-43-2	10 µg/L	92.9	70	130
		EP080: Toluene	108-88-3	10 µg/L	95.3	70	130

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 RTI Act 2009



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB32 7.2-7.3m	SB33 4.9-5.0m	SB33 6.9-7.0m	SB34 2.3-2.5m	SB34 7.3-7.5m
Client sampling date / time					[24-Sep-2015]	[23-Sep-2015]	[23-Sep-2015]	[23-Sep-2015]	[23-Sep-2015]
Compound	CAS Number	LOR	Unit		EB1529964-013	EB1529964-015	EB1529964-017	EB1529964-022	EB1529964-023
					Result	Result	Result	Result	Result
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1	%		10.7	8.4	11.7	18.6	9.4
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		107	<10	380	468	61
C10 - C14 Fraction	----	50	mg/kg		<50	<50	90	70	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	90	70	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		127	<10	450	564	83
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		69	<10	249	468	80
>C10 - C16 Fraction	>C10_C16	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		4.6	<0.2	12.0	3.2	<0.2
Toluene	108-88-3	0.5	mg/kg		21.9	<0.5	76.3	15.6	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		4.0	<0.5	14.7	12.5	0.7
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		20.1	<0.5	71.9	47.2	1.7
ortho-Xylene	95-47-6	0.5	mg/kg		7.4	<0.5	26.2	17.3	0.5
^ Sum of BTEX	----	0.2	mg/kg		58.0	<0.2	201	95.8	2.9
^ Total Xylenes	1330-20-7	0.5	mg/kg		27.5	<0.5	98.1	64.5	2.2
Naphthalene	91-20-3	1	mg/kg		<1	<1	1	2	<1
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		91.9	102	97.6	81.4	94.8
Toluene-D8	2037-26-5	0.2	%		70.8	89.7	86.2	69.6	99.1
4-Bromofluorobenzene	460-00-4	0.2	%		71.2	89.9	90.5	81.0	102



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB35 1.9-2.0m	SB35 7.0-7.1m	SB36 6.0-6.1m	SB36 6.65-6.75m	QA3
Client sampling date / time					[22-Sep-2015]	[22-Sep-2015]	[23-Sep-2015]	[23-Sep-2015]	[23-Sep-2015]
Compound	CAS Number	LOR	Unit		EB1529964-026	EB1529964-027	EB1529964-031	EB1529964-032	EB1529964-035
					Result	Result	Result	Result	Result
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1	%		16.5	8.3	22.9	19.3	9.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	166	101
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	192	131
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	128	127
>C10 - C16 Fraction	>C10_C16	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	0.8	2.0	0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	1.6	20.4	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	5.6	1.1
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	0.7	27.4	2.4
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	9.0	0.6
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	3.1	64.4	4.3
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	0.7	36.4	3.0
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		112	97.5	104	101	103
Toluene-D8	2037-26-5	0.2	%		97.4	84.9	87.6	92.7	84.8
4-Bromofluorobenzene	460-00-4	0.2	%		104	91.2	84.6	92.5	86.6



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	QA1	QA2	----	----	----
Client sampling date / time					[22-Sep-2015]	[22-Sep-2015]	----	----	----
Compound	CAS Number	LOR	Unit		EB1529964-033	EB1529964-034	-----	-----	-----
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L		<60	90	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	300	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	110	----	----	----
[^] C10 - C36 Fraction (sum)	----	50	µg/L		<50	500	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	----	----	----
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	370	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	100	----	----	----
[^] >C10 - C40 Fraction (sum)	----	100	µg/L		<100	470	----	----	----
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	----	----	----
Toluene	108-88-3	2	µg/L		<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	----	----	----
[^] Total Xylenes	1330-20-7	2	µg/L		<2	<2	----	----	----
[^] Sum of BTEX	----	1	µg/L		<1	<1	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		99.3	97.7	----	----	----
Toluene-D8	2037-26-5	2	%		105	105	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		109	110	----	----	----

QA/QC Compliance Assessment for DQO Reporting

Work Order	: EB1529964	Page	: 1 of 5
Client	: PARSONS BRINCKERHOFF AUST P/L (QLD)	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal i	Telephone	: +61-7-3243 7222
Project	: 2201681A Caltex Esk	Date Samples Received	: 28-Sep-2015
Site	: Esk	Issue Date	: 06-Oct-2015
Sampler	: ----	No. of samples received	: 35
Order number	: 82202	No. of samples analysed	: 17

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP080/071: Total Petroleum Hydrocarbons	EB1529744--002	Anonymous	C10 - C14 Fraction	----	65.2 %	70-130%	Recovery less than lower data quality objective
EP080/071: Total Petroleum Hydrocarbons	EB1529744--002	Anonymous	C15 - C28 Fraction	----	67.2 %	70-130%	Recovery less than lower data quality objective
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	EB1529744--002	Anonymous	>C10 - C16 Fraction	>C10_C16	65.4 %	70-130%	Recovery less than lower data quality objective
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	EB1529744--002	Anonymous	>C16 - C34 Fraction	----	69.2 %	70-130%	Recovery less than lower data quality objective

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	1	18	5.56	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103)								
SB35 1.9-2.0m,	SB35 7.0-7.1m	22-Sep-2015	----	----	----	29-Sep-2015	06-Oct-2015	✔
Soil Glass Jar - Unpreserved (EA055-103)								
SB33 4.9-5.0m,	SB33 6.9-7.0m,	23-Sep-2015	----	----	----	29-Sep-2015	07-Oct-2015	✔
SB34 2.3-2.5m,	SB34 7.3-7.5m,							
SB36 6.0-6.1m,	SB36 6.65-6.75m,							
QA3								
Soil Glass Jar - Unpreserved (EA055-103)								
SB30 1.9-2.0m,	SB30 5.8-5.9m,	24-Sep-2015	----	----	----	29-Sep-2015	08-Oct-2015	✔
SB31 5.9-6.0m,	SB31 7.0-7.1m,							
SB32 5.9-6.0m,	SB32 7.2-7.3m							



Matrix: **SOIL**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP071) SB35 1.9-2.0m,	SB35 7.0-7.1m	22-Sep-2015	30-Sep-2015	06-Oct-2015	✓	01-Oct-2015	09-Nov-2015	✓
Soil Glass Jar - Unpreserved (EP071) SB33 4.9-5.0m, SB34 2.3-2.5m, SB36 6.0-6.1m, QA3	SB33 6.9-7.0m, SB34 7.3-7.5m, SB36 6.65-6.75m,	23-Sep-2015	30-Sep-2015	07-Oct-2015	✓	01-Oct-2015	09-Nov-2015	✓
Soil Glass Jar - Unpreserved (EP071) SB30 1.9-2.0m, SB31 5.9-6.0m, SB32 5.9-6.0m,	SB30 5.8-5.9m, SB31 7.0-7.1m, SB32 7.2-7.3m	24-Sep-2015	30-Sep-2015	08-Oct-2015	✓	01-Oct-2015	09-Nov-2015	✓
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080) SB35 1.9-2.0m,	SB35 7.0-7.1m	22-Sep-2015	29-Sep-2015	06-Oct-2015	✓	30-Sep-2015	06-Oct-2015	✓
Soil Glass Jar - Unpreserved (EP080) SB33 4.9-5.0m, SB34 2.3-2.5m, SB36 6.0-6.1m, QA3	SB33 6.9-7.0m, SB34 7.3-7.5m, SB36 6.65-6.75m,	23-Sep-2015	29-Sep-2015	07-Oct-2015	✓	30-Sep-2015	07-Oct-2015	✓
Soil Glass Jar - Unpreserved (EP080) SB30 1.9-2.0m, SB31 5.9-6.0m, SB32 5.9-6.0m,	SB30 5.8-5.9m, SB31 7.0-7.1m, SB32 7.2-7.3m	24-Sep-2015	29-Sep-2015	08-Oct-2015	✓	30-Sep-2015	08-Oct-2015	✓

Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)	QA2	22-Sep-2015	29-Sep-2015	29-Sep-2015	✓	30-Sep-2015	08-Nov-2015	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)	QA2	22-Sep-2015	29-Sep-2015	06-Oct-2015	✓	29-Sep-2015	06-Oct-2015	✓



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(were) 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)							
Moisture Content	EA055-103	2	15	13.33	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	2	15	13.33	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	15	13.33	10.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

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)							
TRH - Semivolatile Fraction	EP071	1	18	5.56	10.00	✖	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 Schedule B(3) and 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
Moisture Content	EA055-103	SOIL	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
TRH - 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 - C40.
TRH 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.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
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	ORG17	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.



Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EB1530452	Page	: 1 of 4
Client	: PARSONS BRINCKERHOFF AUST P/L (QLD)	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal in	Contact	: sch4p4(6) Pers
Address	: GPO BOX 2907 BRISBANE QLD, AUSTRALIA 4000	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: sch4p4(6) pb.com.au	E-mail	: sch4p4(6) Per @alsglobal.com
Telephone	: +61 07 38546222	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38314223	Facsimile	: +61-7-3243 7218
Project	: 2201681A Caltex Esk	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 2201681A	Date Samples Received	: 01-Oct-2015 17:15
C-O-C number	: ----	Date Analysis Commenced	: 02-Oct-2015
Sampler	: sch4p4(6) Person	Issue Date	: 09-Oct-2015 16:35
Site	: ----	No. of samples received	: 10
Quote number	: ----	No. of samples analysed	: 10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

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

sch4p4(6) Pe

Position

Senior Organic Chemist

Accreditation Category

Brisbane Organics



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 insufficient 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
ø = ALS is not NATA accredited for these tests.

- EP080: Sample required dilution due to the presence of high level contaminants. LOR values have been adjusted accordingly.

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Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				MW30	MW31	MW32	MW33	MW34
Client sampling date / time				[01-Oct-2015]	[01-Oct-2015]	[01-Oct-2015]	[01-Oct-2015]	[01-Oct-2015]
Compound	CAS Number	LOR	Unit	EB1530452-001	EB1530452-002	EB1530452-003	EB1530452-004	EB1530452-005
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	116000	134000	177000	18400	26600
C10 - C14 Fraction	----	50	µg/L	6790	5040	4980	3180	16400
C15 - C28 Fraction	----	100	µg/L	460	340	550	110	3800
C29 - C36 Fraction	----	50	µg/L	<50	60	70	<50	180
[^] C10 - C36 Fraction (sum)	----	50	µg/L	7250	5440	5600	3290	20400
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	121000	139000	182000	19800	28300
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	11600	22000	41700	8090	8730
>C10 - C16 Fraction	>C10_C16	100	µg/L	2950	2130	2110	1180	13900
>C16 - C34 Fraction	----	100	µg/L	370	290	470	110	2530
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
[^] >C10 - C40 Fraction (sum)	----	100	µg/L	3320	2420	2580	1290	16400
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	2830	2130	2110	1140	13700
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	45200	46200	54300	1910	10100
Toluene	108-88-3	2	µg/L	43700	51100	62800	5210	3570
Ethylbenzene	100-41-4	2	µg/L	2380	2780	3300	589	430
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	13000	12000	14200	3080	4160
ortho-Xylene	95-47-6	2	µg/L	5170	4970	5680	921	1310
[^] Total Xylenes	1330-20-7	2	µg/L	18200	17000	19900	4000	5470
[^] Sum of BTEX	----	1	µg/L	109000	117000	140000	11700	19600
Naphthalene	91-20-3	5	µg/L	121	<250	<250	44	198
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	105	101	106	124	91.7
Toluene-D8	2037-26-5	2	%	100	97.1	106	93.8	98.4
4-Bromofluorobenzene	460-00-4	2	%	101	93.4	112	93.2	98.1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				MW35	MW36	QC01	RS1	TB1
Client sampling date / time				[01-Oct-2015]	[01-Oct-2015]	[01-Oct-2015]	[01-Oct-2015]	[01-Oct-2015]
Compound	CAS Number	LOR	Unit	EB1530452-006	EB1530452-007	EB1530452-008	EB1530452-009	EB1530452-010
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	20	37400	25900	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	3750	13200	<50	----
C15 - C28 Fraction	----	100	µg/L	<100	240	3210	<100	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	130	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	3990	16500	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	30	40200	27400	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	11300	6680	<20	<20
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	1520	11400	<100	----
>C16 - C34 Fraction	----	100	µg/L	<100	230	2150	<100	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	1750	13600	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	1460	11200	<100	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	6	6480	11900	<1	<1
Toluene	108-88-3	2	µg/L	5	13200	3390	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	1090	269	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	7	5740	3940	<2	<2
ortho-Xylene	95-47-6	2	µg/L	2	2370	1220	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	9	8110	5160	<2	<2
^ Sum of BTEX	----	1	µg/L	20	28900	20700	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	57	183	<5	<5
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	97.1	104	87.6	104	100.0
Toluene-D8	2037-26-5	2	%	100	99.5	102	102	97.0
4-Bromofluorobenzene	460-00-4	2	%	107	105	101	111	101



Environmental

QUALITY CONTROL REPORT

Work Order	: EB1530452	Page	: 1 of 5
Client	: PARSONS BRINCKERHOFF AUST P/L (QLD)	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal i	Contact	: sch4p4(6) Perso
Address	: GPO BOX 2907 BRISBANE QLD, AUSTRALIA 4000	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: sch4p4(6) @pb.com.au	E-mail	: sch4p4(6) Per alsglobal.com
Telephone	: +61 07 38546222	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38314223	Facsimile	: +61-7-3243 7218
Project	: 2201681A Caltex Esk	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 2201681A	Date Samples Received	: 01-Oct-2015
C-O-C number	: sch4p4(6) Pers	Date Analysis Commenced	: 02-Oct-2015
Sampler	: sch4p4(6) Pers	Issue Date	: 09-Oct-2015
Site	: ----	No. of samples received	: 10
Quote number	: ----	No. of samples analysed	: 10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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

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
sch4p4(6) F	Senior Organic Chemist	Brisbane Organics



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 insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

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

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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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 231824)									
EB1530452-001	MW30	EP080: C6 - C9 Fraction	----	20	µg/L	116000	112000	3.06	0% - 20%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 231824)									
EB1530452-001	MW30	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	121000	117000	3.06	0% - 20%
EP080: BTEXN (QC Lot: 231824)									
EB1530452-001	MW30	EP080: Benzene	71-43-2	1	µg/L	45200	44500	1.45	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	2380	2290	4.12	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	13000	12700	2.80	0% - 20%
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	5170	5030	2.79	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	43700	42400	3.03	0% - 20%
		EP080: Naphthalene	91-20-3	5	µg/L	121	126	3.50	0% - 20%

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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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
							Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 231824)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	160 µg/L	107	76	122
EP080/071: Total Petroleum Hydrocarbons (QCLot: 231875)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	1211 µg/L	72.5	38	114
EP071: C15 - C28 Fraction	----	100	µg/L	<100	2103 µg/L	75.4	50	132
EP071: C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 231824)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	185 µg/L	107	75	123
EP080: C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 231875)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	1696 µg/L	73.0	43	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	1496 µg/L	77.4	49	134
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN (QCLot: 231824)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	103	77	119
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	104	78	119
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	20 µg/L	105	77	121
	106-42-3							
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	104	75	120
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	104	76	121
EP080: Sum of BTEX	----	1	µg/L	<1	----	----	----	----
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	106	78	122
EP080: Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----

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: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%)	
						Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 231824)							
EB1530452-002 22-383	MW31	EP080: C6 - C9 Fraction	File A	40 µg/L	# Not Determined	70 Page 296 of 345	130



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 231824)							
EB1530452-002	MW31	EP080: C6 - C10 Fraction	C6_C10	40 µg/L	# Not Determined	70	130
EP080: BTEXN (QCLot: 231824)							
EB1530452-002	MW31	EP080: Benzene	71-43-2	10 µg/L	# Not Determined	70	130
		EP080: Toluene	108-88-3	10 µg/L	# Not Determined	70	130

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QA/QC Compliance Assessment for DQO Reporting

Work Order	: EB1530452	Page	: 1 of 5
Client	: RHOFF AUST P/L (QLD)	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal in	Telephone	: +61-7-3243 7222
Project	: 2201681A Caltex Esk	Date Samples Received	: 01-Oct-2015
Site	: ----	Issue Date	: 09-Oct-2015
Sampler	: sch4p4(6) Pers	No. of samples received	: 10
Order number	: 2201681A	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP080/071: Total Petroleum Hydrocarbons	EB1530452--002	MW31	C6 - C9 Fraction	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	EB1530452--002	MW31	C6 - C10 Fraction	C6_C10	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080: BTEXN	EB1530452--002	MW31	Benzene	71-43-2	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080: BTEXN	EB1530452--002	MW31	Toluene	108-88-3	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	10	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	10	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)		01-Oct-2015	02-Oct-2015	08-Oct-2015	✔	06-Oct-2015	11-Nov-2015	✔
MW30,	MW31,							
MW32,	MW33,							
MW34,	MW35,							
MW36,	QC01,							
RS1								
EP080S: TPH(V)/BTEX Surrogates								
Amber VOC Vial - Sulfuric Acid (EP080)		01-Oct-2015	02-Oct-2015	15-Oct-2015	✔	02-Oct-2015	15-Oct-2015	✔
MW30,	MW31,							
MW32,	MW33,							
MW34,	MW35,							
MW36,	QC01,							
RS1,	TB1							

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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(were) 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: **WATER**

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)							
TRH - Semivolatile Fraction	EP071	0	10	0.00	10.00	✖	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	10	10.00	10.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	10	10.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	10	10.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
TRH - Semivolatile Fraction	EP071	0	10	0.00	5.00	✖	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	10	10.00	5.00	✔	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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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
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

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Certificate of Analysis

Parsons Brinckerhoff Australia P/L
Lvl 4, 69 Ann Street
Brisbane
QLD 4000



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention:

sch4p4(6) Person

Report

454959-W

Project name Caltex ESK Remediation Strategy

Project ID 2201681A

Received Date Apr 23, 2015

Client Sample ID			QC2
Sample Matrix			Water
Eurofins mgt Sample No.			B15-Ap16979
Date Sampled			Apr 22, 2015
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	92
TRH C10-C14	0.05	mg/L	4.9
TRH C15-C28	0.1	mg/L	0.3
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-36 (Total)	0.1	mg/L	5.2
BTEX			
Benzene	0.001	mg/L	32
Toluene	0.001	mg/L	8.2
Ethylbenzene	0.001	mg/L	1.9
m&p-Xylenes	0.002	mg/L	8.7
o-Xylene	0.001	mg/L	3.0
Xylenes - Total	0.003	mg/L	12
4-Bromofluorobenzene (surr.)	1	%	97
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene ^{N02}	0.02	mg/L	0.09
TRH C6-C10	0.02	mg/L	96
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	44
TRH >C10-C16	0.05	mg/L	2.6
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	2.5
TRH >C16-C34	0.1	mg/L	0.2
TRH >C34-C40	0.1	mg/L	< 0.1

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
 A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).
 If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins mgt Suite 1			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Apr 27, 2015	7 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Brisbane	Apr 23, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Apr 27, 2015	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			

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Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions								
TRH C6-C9			mg/L	< 0.02		0.02	Pass	
TRH C10-C14			mg/L	< 0.05		0.05	Pass	
TRH C15-C28			mg/L	< 0.1		0.1	Pass	
TRH C29-C36			mg/L	< 0.1		0.1	Pass	
Method Blank								
BTEX								
Benzene			mg/L	< 0.001		0.001	Pass	
Toluene			mg/L	< 0.001		0.001	Pass	
Ethylbenzene			mg/L	< 0.001		0.001	Pass	
m&p-Xylenes			mg/L	< 0.002		0.002	Pass	
o-Xylene			mg/L	< 0.001		0.001	Pass	
Xylenes - Total			mg/L	< 0.003		0.003	Pass	
Method Blank								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions								
Naphthalene			mg/L	< 0.02		0.02	Pass	
TRH C6-C10			mg/L	< 0.02		0.02	Pass	
TRH C6-C10 less BTEX (F1)			mg/L	< 0.02		0.02	Pass	
TRH >C10-C16			mg/L	< 0.05		0.05	Pass	
TRH >C16-C34			mg/L	< 0.1		0.1	Pass	
TRH >C34-C40			mg/L	< 0.1		0.1	Pass	
LCS - % Recovery								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions								
TRH C6-C9			%	109		70-130	Pass	
TRH C10-C14			%	113		70-130	Pass	
LCS - % Recovery								
BTEX								
Benzene			%	92		70-130	Pass	
Toluene			%	95		70-130	Pass	
Ethylbenzene			%	94		70-130	Pass	
m&p-Xylenes			%	86		70-130	Pass	
Xylenes - Total			%	87		70-130	Pass	
LCS - % Recovery								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions								
TRH C6-C10			%	103		70-130	Pass	
TRH >C10-C16			%	116		70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1				
TRH C6-C9		B15-Ap17356	NCP	%	85	70-130	Pass	
TRH C10-C14		M15-Ap17187	NCP	%	127	70-130	Pass	
Spike - % Recovery								
BTEX				Result 1				
Benzene		B15-Ap17356	NCP	%	83	70-130	Pass	
Toluene		B15-Ap17356	NCP	%	85	70-130	Pass	
Ethylbenzene		B15-Ap17356	NCP	%	86	70-130	Pass	
m&p-Xylenes		B15-Ap17356	NCP	%	85	70-130	Pass	
o-Xylene		B15-Ap17356	NCP	%	83	70-130	Pass	
Xylenes - Total		B15-Ap17356	NCP	%	84	70-130	Pass	
Spike - % Recovery								

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH C6-C10	B15-Ap17356	NCP	%	80			70-130	Pass	
TRH >C10-C16	M15-Ap17187	NCP	%	115			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	B15-Ap19964	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	M15-Ap17186	NCP	mg/L	12	12	<1	30%	Pass	
TRH C15-C28	M15-Ap17186	NCP	mg/L	8.5	7.2	16	30%	Pass	
TRH C29-C36	M15-Ap17186	NCP	mg/L	0.70	0.60	15	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	B15-Ap19964	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	B15-Ap19964	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	B15-Ap19964	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	B15-Ap19964	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	B15-Ap19964	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	B15-Ap19964	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	B15-Ap19964	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C6-C10	B15-Ap19964	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C6-C10 less BTEX (F1)	B15-Ap19964	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	M15-Ap17186	NCP	mg/L	12	12	5.0	30%	Pass	
TRH >C16-C34	M15-Ap17186	NCP	mg/L	6.4	5.4	17	30%	Pass	
TRH >C34-C40	M15-Ap17186	NCP	mg/L	0.20	0.20	4.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

Authorised By

Mark Rodriguez	Analytical Services Manager
Carroll Lee	Senior Analyst-Organic (VIC)
Richard Corner	Senior Analyst-Volatile (QLD)

sch4p4(6) Personal information

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National Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

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Certificate of Analysis

Parsons Brinckerhoff Australia P/L
Lvl 4, 69 Ann Street
Brisbane
QLD 4000



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention:

sch4p4(6) Person

Report 474077-S
Project name ESK
Project ID 2201681A
Received Date Sep 29, 2015

Client Sample ID			QA4
Sample Matrix			Soil
Eurofins mgt Sample No.			B15-Se27113
Date Sampled			Not Provided
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	20	mg/kg	56
TRH C10-C14	20	mg/kg	170
TRH C15-C28	50	mg/kg	< 50
TRH C29-C36	50	mg/kg	< 50
TRH C10-36 (Total)	50	mg/kg	170
BTEX			
Benzene	0.1	mg/kg	< 0.1
Toluene	0.1	mg/kg	< 0.1
Ethylbenzene	0.1	mg/kg	0.6
m&p-Xylenes	0.2	mg/kg	1.8
o-Xylene	0.1	mg/kg	0.6
Xylenes - Total	0.3	mg/kg	2.4
4-Bromofluorobenzene (surr.)	1	%	87
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene ^{N02}	0.5	mg/kg	0.9
TRH C6-C10	20	mg/kg	84
TRH >C10-C16	50	mg/kg	81
TRH >C16-C34	100	mg/kg	< 100
TRH >C34-C40	100	mg/kg	< 100
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	81
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	80
% Moisture	0.1	%	9.8

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Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Oct 01, 2015	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 01, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 01, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
BTEX and Naphthalene			
BTEX	Melbourne	Oct 01, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
% Moisture	Melbourne	Sep 29, 2015	14 Day
- Method: LTM-GEN-7080 Moisture			

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****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

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ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
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Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
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USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions								
TRH C6-C9			mg/kg	< 20		20	Pass	
TRH C10-C14			mg/kg	< 20		20	Pass	
TRH C15-C28			mg/kg	< 50		50	Pass	
TRH C29-C36			mg/kg	< 50		50	Pass	
Method Blank								
BTEX								
Benzene			mg/kg	< 0.1		0.1	Pass	
Toluene			mg/kg	< 0.1		0.1	Pass	
Ethylbenzene			mg/kg	< 0.1		0.1	Pass	
m&p-Xylenes			mg/kg	< 0.2		0.2	Pass	
o-Xylene			mg/kg	< 0.1		0.1	Pass	
Xylenes - Total			mg/kg	< 0.3		0.3	Pass	
Method Blank								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions								
Naphthalene			mg/kg	< 0.5		0.5	Pass	
TRH C6-C10			mg/kg	< 20		20	Pass	
TRH >C10-C16			mg/kg	< 50		50	Pass	
TRH >C16-C34			mg/kg	< 100		100	Pass	
TRH >C34-C40			mg/kg	< 100		100	Pass	
LCS - % Recovery								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions								
TRH C6-C9			%	85		70-130	Pass	
TRH C10-C14			%	129		70-130	Pass	
LCS - % Recovery								
BTEX								
Benzene			%	81		70-130	Pass	
Toluene			%	79		70-130	Pass	
Ethylbenzene			%	82		70-130	Pass	
m&p-Xylenes			%	90		70-130	Pass	
Xylenes - Total			%	86		70-130	Pass	
LCS - % Recovery								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions								
Naphthalene			%	101		75-125	Pass	
TRH C6-C10			%	76		70-130	Pass	
TRH >C10-C16			%	130		70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions								
TRH C6-C9			%	106		70-130	Pass	
Spike - % Recovery								
BTEX								
Benzene			%	87		70-130	Pass	
Toluene			%	88		70-130	Pass	
Ethylbenzene			%	92		70-130	Pass	
m&p-Xylenes			%	102		70-130	Pass	
o-Xylene			%	89		70-130	Pass	
Xylenes - Total			%	98		70-130	Pass	
Spike - % Recovery								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions								

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Naphthalene	M15-Se28071	NCP	%	91			70-130	Pass	
TRH C6-C10	M15-Se28071	NCP	%	97			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M15-Se28070	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	B15-Se28406	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	B15-Se28406	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	B15-Se28406	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M15-Se28070	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M15-Se28070	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M15-Se28070	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M15-Se28070	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M15-Se28070	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	M15-Se28070	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M15-Se28070	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	M15-Se28070	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	B15-Se28406	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	B15-Se28406	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	B15-Se28406	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	B15-Se27113	CP	%	9.8	10	6.0	30%	Pass	

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Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

Authorised By

Mark Rodriguez	Analytical Services Manager
Carroll Lee	Senior Analyst-Organic (VIC)
Carroll Lee	Senior Analyst-Volatile (VIC)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

sch4p4(6) Personal inform

sch4p4(6) Persona

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Eurofins | mgt shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins | mgt be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

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email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS

135558

Client:

Parsons Brinckerhoff Aust. Pty Ltd
GPO Box 5394
Sydney
NSW 2001

Attention: sch4p4(6) Pers

Sample log in details:

Your Reference: **2201681A**
No. of samples: 1 Water
Date samples received / completed instructions received 08/10/2015 / 08/10/2015

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date: 15/10/15 / 14/10/15
Date of Preliminary Report: Not Issued
NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

sch4p4(6) Pers

Laboratory Manager



Envirolab Reference: 135558
Revision No: R 00
22-383

Page 1 of 7

Page 315 of 345

vTRH(C6-C10)/BTEXN in Water		
Our Reference:	UNITS	135558-1
Your Reference	-----	QC01a
Date Sampled	-----	1/10/2015
Type of sample		Water
Date extracted	-	09/10/2015
Date analysed	-	10/10/2015
TRHC ₆ - C ₉	µg/L	370,000
TRHC ₆ - C ₁₀	µg/L	420,000
TRHC ₆ - C ₁₀ less BTEX (F1)	µg/L	400,000
Benzene	µg/L	12,000
Toluene	µg/L	3,400
Ethylbenzene	µg/L	520
m+p-xylene	µg/L	4,700
o-xylene	µg/L	1,500
Naphthalene	µg/L	210
Surrogate Dibromofluoromethane	%	100
Surrogate toluene-d8	%	96
Surrogate 4-BFB	%	97

svTRH (C10-C40) in Water		
Our Reference:	UNITS	135558-1
Your Reference	-----	QC01a
Date Sampled	-----	1/10/2015
Type of sample		Water
Date extracted	-	09/10/2015
Date analysed	-	12/10/2015
TRHC ₁₀ - C ₁₄	µg/L	20,000
TRHC ₁₅ - C ₂₈	µg/L	4,000
TRHC ₂₉ - C ₃₆	µg/L	<100
TRH>C ₁₀ - C ₁₆	µg/L	16,000
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	16,000
TRH>C ₁₆ - C ₃₄	µg/L	2,200
TRH>C ₃₄ - C ₄₀	µg/L	<100
Surrogate o-Terphenyl	%	124

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Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.

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QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXNin Water						Base II Duplicate II %RPD		
Date extracted	-			08/10/2015	[NT]	[NT]	LCS-W3	08/10/2015
Date analysed	-			09/10/2015	[NT]	[NT]	LCS-W3	09/10/2015
TRHC ₆ - C ₉	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W3	109%
TRHC ₆ - C ₁₀	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W3	109%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W3	105%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W3	103%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W3	113%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W3	113%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W3	114%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	101	[NT]	[NT]	LCS-W3	98%
Surrogate toluene-d8	%		Org-016	90	[NT]	[NT]	LCS-W3	98%
Surrogate 4-BFB	%		Org-016	95	[NT]	[NT]	LCS-W3	97%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH (C10-C40)in Water						Base II Duplicate II %RPD		
Date extracted	-			09/10/2015	[NT]	[NT]	LCS-W2	09/10/2015
Date analysed	-			09/10/2015	[NT]	[NT]	LCS-W2	09/10/2015
TRHC ₁₀ - C ₁₄	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W2	129%
TRHC ₁₅ - C ₂₈	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W2	109%
TRHC ₂₉ - C ₃₆	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W2	89%
TRH>C ₁₀ - C ₁₆	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W2	129%
TRH>C ₁₆ - C ₃₄	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W2	109%
TRH>C ₃₄ - C ₄₀	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W2	89%
Surrogate o-Terphenyl	%		Org-003	100	[NT]	[NT]	LCS-W2	89%

Report Comments:

Asbestos ID was analysed by Approved Identifier:
Asbestos ID was authorised by Approved Signatory:

Not applicable for this job
Not applicable for this job

INS: Insufficient sample for this test
NA: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

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Quality Control Definitions

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

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

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

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

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

Laboratory Acceptance Criteria

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

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EB1517239

<p>Client : PARSONS BRINCKERHOFF AUST P/L</p> <p>Contact : sch4p4(6) Personal infor</p> <p>Address : GPO BOX 2907 BRISBANE QLD, AUSTRALIA 4000</p> <p>E-mail : sch4p4(6) P pb.com.au</p> <p>Telephone : +61 07 38546222</p> <p>Facsimile : +61 07 3854 6323</p> <p>Project : 2201681A Caltex Esk Remediation Strategy</p> <p>Order number : 82251</p> <p>C-O-C number : 82251 <-> 82252</p> <p>Site : Esk</p> <p>Sampler :</p>	<p>Laboratory : Environmental Division Brisbane</p> <p>Contact : sch4p4(6) Pers</p> <p>Address : 2 Byth Street Stafford QLD Australia 4053</p> <p>E-mail : sch4p4(6) Pers alsglobal.com</p> <p>Telephone : +61 7 3552 8658</p> <p>Facsimile : +61-7-3243 7218</p> <p>Page : 1 of 3</p> <p>Quote number : ES2015PARBRIQLD0288 (EN/085/15)</p> <p>QC Level : NEPM 2013 Schedule B(3) and ALS QCS3 requirement</p>
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Dates

<p>Date Samples Received : 22-Apr-2015</p> <p>Client Requested Due Date : 29-Apr-2015</p>	<p>Issue Date : 23-Apr-2015</p> <p>Scheduled Reporting Date : 01-May-2015</p>
---	--

Delivery Details

<p>Mode of Delivery : Carrier</p> <p>No. of coolers/boxes : 1</p> <p>Receipt Detail : MEDIUM ESKY</p>	<p>Security Seal : Intact.</p> <p>Temperature : <6°C - Ice present</p> <p>No. of samples received / analysed : 19 / 19</p>
--	--

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Please be advised that samples ALS #1 and ALS #2 were logged for W-18 and not W-4 as per COC as these samples only have VOC vials.**
- **Please be advised that the Turnaround time have extended as the Methane is expected to be 5 days TAT upon receipt at ALS Sydney.**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- **Methane analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.
- **Please be advised that sample "MW4" (ALS #7) was not logged for NO3 and SO4 as the non preserved bottle was not submitted.**
- **Please take note that the extra sample "Trip Spike" (ALS #18) was logged for W-18 and additional sample ALS 19 as ALS Control Spike.**
- Please direct any queries related to sample condition / numbering / breakages to John Pickering (John.Pickering@alsglobal.com).
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

Method Client sample ID	Sample Container Received	Preferred Sample Container for Analysis
Ferrous Iron by Discrete Analyser : EG051G		
MW5	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - HCl - Filtered
MW13	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - HCl - Filtered
MWA	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - HCl - Filtered
MWB	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - HCl - Filtered
MW23	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - HCl - Filtered

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG051G Ferrous Iron by Discrete Analyser	WATER - EP033 - Methane Methane in Water	WATER - W-04 TRH/BTEXN	WATER - W-18 TRH(C6 - C9)/BTEXN	WATER - W-28 Natural Attenuation Indicators
EB1517239-001	21-Apr-2015 11:00	RB				✓	
EB1517239-002	22-Apr-2015 11:00	RB				✓	
EB1517239-003	21-Apr-2015 11:00	TB				✓	
EB1517239-004	22-Apr-2015 11:00	QC1			✓		
EB1517239-005	22-Apr-2015 07:59	MW2			✓		
EB1517239-006	22-Apr-2015 09:10	MW3			✓		
EB1517239-007	21-Apr-2015 16:54	MW4	✓	✓	✓		
EB1517239-008	21-Apr-2015 16:25	MW5			✓		✓
EB1517239-009	21-Apr-2015 15:54	MW7			✓		
EB1517239-010	22-Apr-2015 07:37	MW9			✓		
EB1517239-011	22-Apr-2015 09:19	MW10			✓		
EB1517239-012	22-Apr-2015 08:55	MW11			✓		
EB1517239-013	22-Apr-2015 08:43	MW12			✓		
EB1517239-014	22-Apr-2015 08:23	MW13			✓		✓
EB1517239-015	22-Apr-2015 09:39	MWA			✓		✓
EB1517239-016	22-Apr-2015 09:57	MWB			✓		✓
EB1517239-017	21-Apr-2015 15:30	MW23			✓		✓
EB1517239-018	[17-Apr-2015]	TRIP SPIKE				✓	
EB1517239-019	[17-Apr-2015]	ALS CONTROL SPIKE				✓	

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.



Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)

Email apinvoices@pb.com.au

MICHELLE PHAM

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- Chain of Custody (CoC) (COC)
- EDI Format - ENMRG (ENMRG)
- EDI Format - ESDAT (ESDAT)
- EDI Format - XTab (XTAB)

Email sch4p4@pb.com.au
Email @pb.com.au
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SACHIN SAMBHUS

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
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- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- Chain of Custody (CoC) (COC)
- EDI Format - ENMRG (ENMRG)
- EDI Format - ESDAT (ESDAT)
- EDI Format - XTab (XTAB)

Email sch4p4(6) P pb.com.au
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Email pb.com.au
Email pb.com.au

Job Title: Callex Esk Remediation Strategy					PB Job Number: 2201681A					Job Location: Esk					Project Manager:	
Laboratory Name: ALS					Terms of Business: PB					Other: X					Results Expected by/on: 5 days	
Address: 2 Byth St Stafford															Fax Results to: @pb.com.au	
Fax Number:															Fax Number: 0405635170	
Phone Number: 32437222															Phone Number:	
Contact Name:															Spreadsheet of Results Required: N	
Delivery Method: Courier															Format: excel & psdat	
Quote Number: EN-085-15															Turnaround Time Required: Standard	
															Invoice to: apinvoic@pb.com.au	
															Comments:	
Date Sampled	Time	Sample I.D.	Container Size	Sample Location	Medium*	Preservative Type	Filtered (X)	TPH	BTEX	PAH's	OC/OP/PCB's	Metals**		Initials	Comments/Additional Information and/or Analysis Required	
21.4.15	AM	RB			N									MP	MNA = methane, nitrate, sulphate, ferrous iron	
22.4.15	AM	RB														
21.4.15	AM	TB														
22.4.15	AM	QCI														
		QCC													Please forward QCC to Eurofins.	
22.4.15	0759	MW2														
22.4.15	0910	MW3														
21.4.15	1654	MW4														
21.4.15	1625	MW5														
21.4.15	1554	MW7														
22.4.15	0737	MW9														
22.4.15	0919	MW10														
Relinquished by: sch4p4(6) Personal information					Relinquished by:					Relinquished by:					Medium*	
Date & Time: 22.4.15 2.30pm					Date & Time:					Date & Time:					Legend*	
Company: PB					Company:					Company:					Metals: Al As Be Cd Co Cr Cu Fe Hg	
Signature: sch4p4(6) Per					Signature:					Signature:					Li Mg Mn Ni Pb Se Sn V Zn	
Received in Good Order & Condition by (Name): JCARES					Received in Good Order & Condition by (Name):					Received in Good Order & Condition by (Name):					Samples on Ice: ☒ Yes ☐ No	
Date & Time: 22/4/15 1515					Date & Time:					Date & Time:					Please fax back a signed copy when samples are received at the laboratory	
Company: ALS					Company:					Company:						
Signature: 9					Signature:					Signature:						

Environmental Division
Brisbane
Work Order Reference
EB1517239



Telephone: +61-7-3243 7222

Job Title: _____

Laboratory Name: _____

Address: _____

Fax Number: _____

Phone Number: _____

Contact Name: _____

Delivery Method: _____

Quote Number: _____

PB Job Number: _____

Job Location: _____

Project Manager: _____

Results Expected by/on: _____

Fax Results to: _____

Fax Number: _____

Phone Number: _____

Spreadsheet of Results Required: Y / N

Format: _____

Turnaround Time Required: _____

Invoice to: _____

Comments: _____

Date Sampled	Time	Sample I.D.	Container Size	Sample Location	Medium*	Preservative Type	Filtered (X)	TPH	BTEX	PAH's	OC/OP/PCB's	Metals**	W	M	V	Initials	Comments/Additional Information and/or Analysis Required
22/4/15	0855	MW11			W								X	X	X	MP	
22/4/15	0843	MW12			W								X	X	X		
22/4/15	0823	MW13			W								X	X	X		
22/4/15	0939	MWA			W								X	X	X		
22/4/15	0957	MWB			W								X	X	X		
21/4/15	1530	MW23			W								X	X	X		
EXTRA SAMPLE																	
18/4/15		TREP SPACE			W												

Relinquished by: **sch4p4(6) Personal information**

Date & Time: 22/4/15 2:30pm

Company: **sch4p4(6) Personal information**

Signature: _____

Received in Good Order & Condition by (Name): **CHAMP**

Date & Time: 22/4/15 1515

Company: **ALS**

Signature: **4**

Relinquished by: _____

Date & Time: _____

Company: _____

Signature: _____

Received in Good Order & Condition by (Name): _____

Date & Time: _____

Company: _____

Signature: _____

Medium*: S = Soil, W = Water, V = Vapour

Legend**: (circle the following to be tested)

Metals: Al As Be Cd Co Cr Cu Fe Hg
Li Mg Mn Ni Pb Se Sn V Zn

Samples on Ice: ☒ Yes ☐ No

Please fax back a signed copy when samples are received at the laboratory



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB1529964**

Client	: PARSONS BRINCKERHOFF AUST P/L (QLD)	Laboratory	: Environmental Division Brisbane
Contact	: [redacted] Personal i	Contact	: [redacted] Per
Address	: GPO BOX 2907 BRISBANE QLD, AUSTRALIA 4000	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]@pb.com.au	E-mail	: [redacted] Pe @alsglobal.com
Telephone	: +61 07 38546222	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38314223	Facsimile	: +61-7-3243 7218
Project	: 2201681A Caltex Esk	Page	: 1 of 3
Order number	: 82202	Quote number	: ES2015PARBRIQLD0288 (EN/085/15)
C-O-C number	: 82202 <-> 82204	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: Esk		
Sampler	:		

Dates

Date Samples Received	: 28-Sep-2015 11:50 AM	Issue Date	: 28-Sep-2015
Client Requested Due Date	: 06-Oct-2015	Scheduled Reporting Date	: 06-Oct-2015

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 2	Temperature	: 3.2°C, 6.7°C - Ice present
Receipt Detail	: MEDIUM ESKIES	No. of samples received / analysed	: 35 / 17

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.
- Please direct any queries related to sample condition / numbering / breakages to John Pickering (Samples.Brisbane@alsglobal.com).
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - S-04 TRH/BTEXN
EB1529964-001	[24-Sep-2015]	SB30 1.9-2.0m		✓	✓
EB1529964-002	[24-Sep-2015]	SB30 5.8-5.9m		✓	✓
EB1529964-003	[24-Sep-2015]	SB30 7.9-8.0m	✓		
EB1529964-004	[24-Sep-2015]	SB30 9.2-9.3m	✓		
EB1529964-005	[17-Sep-2015]	SB31 0-0.2m	✓		
EB1529964-006	[24-Sep-2015]	SB31 1.9-2.0m	✓		
EB1529964-007	[24-Sep-2015]	SB31 4.3-4.5m	✓		
EB1529964-008	[24-Sep-2015]	SB31 5.9-6.0m		✓	✓
EB1529964-009	[24-Sep-2015]	SB31 7.0-7.1m		✓	✓
EB1529964-010	[17-Sep-2015]	SB32 0-0.2m	✓		
EB1529964-011	[24-Sep-2015]	SB32 1.9-2.0m	✓		
EB1529964-012	[24-Sep-2015]	SB32 5.9-6.0m		✓	✓
EB1529964-013	[24-Sep-2015]	SB32 7.2-7.3m		✓	✓
EB1529964-014	[17-Sep-2015]	SB33 0-0.2m	✓		
EB1529964-015	[23-Sep-2015]	SB33 4.9-5.0m		✓	✓
EB1529964-016	[23-Sep-2015]	SB33 6.6-6.7m	✓		
EB1529964-017	[23-Sep-2015]	SB33 6.9-7.0m		✓	✓
EB1529964-018	[23-Sep-2015]	SB33 7.2-7.3m	✓		
EB1529964-019	[23-Sep-2015]	SB33 12.0-12.1m	✓		
EB1529964-020	[17-Sep-2015]	SB34 0-0.2m	✓		
EB1529964-021	[17-Sep-2015]	SB34 1.4-1.5m	✓		
EB1529964-022	[23-Sep-2015]	SB34 2.3-2.5m		✓	✓
EB1529964-023	[23-Sep-2015]	SB34 7.3-7.5m		✓	✓
EB1529964-024	[17-Sep-2015]	SB35 0-0.2m	✓		
EB1529964-025	[17-Sep-2015]	SB35 1.4-1.5m	✓		
EB1529964-026	[22-Sep-2015]	SB35 1.9-2.0m		✓	✓
EB1529964-027	[22-Sep-2015]	SB35 7.0-7.1m		✓	✓
EB1529964-028	[22-Sep-2015]	SB35 11.0-11.1m	✓		
EB1529964-029	[22-Sep-2015]	SB35 11.9-12.0m	✓		
EB1529964-030	[23-Sep-2015]	SB36 0-0.2m	✓		
EB1529964-031	[23-Sep-2015]	SB36 6.0-6.1m		✓	✓
EB1529964-032	[23-Sep-2015]	SB36 6.65-6.75m		✓	✓
EB1529964-035	[23-Sep-2015]	QA3		✓	✓



Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - W-04 TRH/BTEXN
EB1529964-033	[22-Sep-2015]	QA1	✓
EB1529964-034	[22-Sep-2015]	QA2	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

IVAN NERALIC

- *AU Certificate of Analysis - NATA (COA)	Email	sch4p4((pb.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	pb.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	pb.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	pb.com.au
- A4 - AU Tax Invoice (INV)	Email	pb.com.au
- Chain of Custody (CoC) (COC)	Email	pb.com.au
- EDI Format - ENMRG (ENMRG)	Email	pb.com.au
- EDI Format - ESDAT (ESDAT)	Email	pb.com.au
- EDI Format - XTab (XTAB)	Email	pb.com.au

Job Title: Calter Esk					PB Job Number: 2201681A					Job Location: Esk					Project Manager: sch4p4(6) Personal information																																								
Laboratory Name: ALS					Terms of Business: PB					Other: X					Checked: X																																								
Address: 2 Byth Street Stafford					<table border="1"> <tr> <th>Medium*</th> <th>Preservative Type</th> <th>Filtered (X)</th> <th>TPH</th> <th>BTEX</th> <th>PAH's</th> <th>OC/OP/PCB's</th> <th>Metals**</th> <th>Site S-4 (TRH/BTEX)</th> </tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>					Medium*	Preservative Type	Filtered (X)	TPH	BTEX	PAH's	OC/OP/PCB's	Metals**	Site S-4 (TRH/BTEX)																												Results Expected by/on: 12/10/15					Fax Results to:				
Medium*	Preservative Type	Filtered (X)	TPH	BTEX						PAH's	OC/OP/PCB's	Metals**	Site S-4 (TRH/BTEX)																																										
Fax Number: (07) 3352 3667					Fax Number:					Phone Number: (07) 3854 6057					Spreadsheet of Results Required: (Y) / N																																								
Phone Number: (07) 3243 7222										Format: Excel & Esdat					Turnaround Time Required: Standard																																								
Contact Name:										Invoice to: sch4p4(6) Personal information																																													
Delivery Method: Courier										Comments:																																													
Quote Number: EN-085-15										Initials					Comments/Additional Information and/or Analysis Required																																								

Date Sampled	Time	Sample I.D.	Container Size	Sample Location	Medium*	Preservative Type	Filtered (X)	TPH	BTEX	PAH's	OC/OP/PCB's	Metals**	Site S-4 (TRH/BTEX)	Initials	Comments/Additional Information and/or Analysis Required
24/09/15		SB30 1.9-2.0m	150 ml		S										
		SB30 5.8-5.9m			S										
		SB30 7.9-8.0m			S										
		SB30 9.2-9.3m			S										
17/09/15		SB31 0-0.2m			S										
24/09/15		SB31 1.9-2.0m			S										
		SB31 4.3-4.5m			S										
		SB31 5.9-6.0m			S										
		SB31 7.0-7.1m			S										
17/09/15		SB32 0-0.2m			S										
24/09/15		SB32 1.9-2.0m			S										
24/09/15		SB32 5.9-6.0m			S										

Environmental Division
Brisbane

Work Order Reference

EB1529964



Telephone : +61-7-3243 7222

Relinquished by: sch4p4(6) Personal information		Relinquished by:		Relinquished by:		Medium*: S = Soil, W = Water, V = Vapour	
Date & Time: 28/9/15		Date & Time:		Date & Time:		Legend**: (circle the following to be tested)	
Company: WSP Parsons Brinckerhoff		Company:		Company:		Metals: Al As Be Cd Co Cr Cu Fe Hg	
Signature: sch4p4(6) Personal information		Signature:		Signature:		Li Mg Mn Ni Pb Se Sn V Zn	
Received in Good Order & Condition by (Name): sch4p4(6) Personal information		Received in Good Order & Condition by (Name):		Received in Good Order & Condition by (Name):		Samples on Ice: ☒ Yes ☐ No	
Date & Time: 28/09/15 11:50		Date & Time:		Date & Time:		Please fax back a signed copy when samples are received at the laboratory	
Company: sch4p4(6) Personal information		Company:		Company:			
Signature:		Signature:		Signature:			

[illegible]

sch4p4(6) Personal info

Job Title: Calley Esk		PB Job Number: 2201681A		Job Location: Esk		Project Manager: sch4p4(6) Personal info	
Laboratory Name: ALS		Terms of Business		PB		Results Expected by/on: 12/10/15	
Address: 2 B.H. Street Stafford		Other		Checked		Fax Results to:	
Fax Number: (07) 3352 3667		Medium*		Preservative Type		Fax Number:	
Phone Number: (07) 3243 7222		Filtered (X)		TPH		Phone Number:	
Contact Name:		BTEX		PAH's		Spreadsheet of Results Required: (Y) / N	
Delivery Method: Courier		OC/OP/PCBs		Metals**		Format: Excel & Esdat	
Quote Number: EN-085-15		S-4 (TRH/STPH)				Turnaround Time Required: Standard	
						Invoice to: sch4p4(6) Personal info	
						Comments:	

Date Sampled	Time	Sample I.D.	Container Size	Sample Location	Medium*	Preservative Type	Filtered (X)	TPH	BTEX	PAH's	OC/OP/PCBs	Metals**	Initials	Comments/Additional Information and/or Analysis Required
20/09/15		SB35 1.4-1.5m	150ml		S								JS	Hold
22/09/15		SB35 1.9-2.0m			S									
27		SB35 7.0-7.1m			S									
28		SB35 11.0-11.1m			S									Hold
29		SB35 11.9-12.0m			S									
30/09/15		SB36 0-0.2m			S									
31/09/15		SB36 6.0-6.1m			S									
32/09/15		SB36 6.65-6.75m			S									
30/09/15		Q41	Vial + 100ml		W									
31/09/15		Q42	Vial + 100ml		W									
30/09/15		Q43	150ml		S									
23/09/15		Q44	150ml		S									

Please forward to HGT for testing
Brisbane for (TRH/BTEX) **Brisbane**

Relinquished by: sch4p4(6) Personal info	Relinquished by:	Relinquished by:	Medium*: S = Soil, W = Water, V = Vapour
Date & Time: 28/9/15	Date & Time:	Date & Time:	Legend**: (circle the following to be tested)
Company: WSP Power Brinckerhoff	Company:	Company:	Metals: Al As Be Cd Co Cr Cu Fe Hg
Signature: sch4p4(6) Personal info	Signature:	Signature:	Li Mg Mn Ni Pb Se Sn V Zn
Received in Good Order & Condition by (Name): sch4p4(6) Personal info	Received in Good Order & Condition by (Name):	Received in Good Order & Condition by (Name):	Samples on Ice: ☒ Yes ☐ No
Date & Time: 28/09 11:50	Date & Time:	Date & Time:	
Company: sch4p4(6) Personal info	Company:	Company:	
Signature:	Signature:	Signature:	

Please fax back a signed copy when samples are received at the laboratory



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB1530452**

Client	: PARSONS BRINCKERHOFF AUST P/L (QLD)	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal ir	Contact	: sch4p4(6) Pers
Address	: GPO BOX 2907 BRISBANE QLD, AUSTRALIA 4000	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: sch4p4(6) pb.com.au	E-mail	: sch4p4(6) Pers alsglobal.com
Telephone	: +61 07 38546222	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38314223	Facsimile	: +61-7-3243 7218
Project	: 2201681A Caltex Esk	Page	: 1 of 2
Order number	: 2201681A	Quote number	: ES2015PARBRIQLD0288 (EN/085/15)
C-O-C number	: ----	QC Level	: NEPM 2013, Schedule B(3) and ALS QCS3 requirement
Site	: sch4p4(6) Perso		
Sampler	: sch4p4(6) Perso		

Dates

Date Samples Received	: 01-Oct-2015 5:15 PM	Issue Date	: 02-Oct-2015
Client Requested Due Date	: 12-Oct-2015	Scheduled Reporting Date	: 12-Oct-2015

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 1.1°C - Ice present
Receipt Detail	: MEDIUM ESKIES	No. of samples received / analysed	: 10 / 10

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- **Please be advised that "QC01a" was forwarded to Envirolab for analysis, as per the chain of custody provided.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - W-04 TRH/BTEXN	WATER - W-18 TRH(C6 - C9)/BTEXN
EB1530452-001	[01-Oct-2015]	MW30	✓	
EB1530452-002	[01-Oct-2015]	MW31	✓	
EB1530452-003	[01-Oct-2015]	MW32	✓	
EB1530452-004	[01-Oct-2015]	MW33	✓	
EB1530452-005	[01-Oct-2015]	MW34	✓	
EB1530452-006	[01-Oct-2015]	MW35	✓	
EB1530452-007	[01-Oct-2015]	MW36	✓	
EB1530452-008	[01-Oct-2015]	QC01	✓	
EB1530452-009	[01-Oct-2015]	RS1	✓	
EB1530452-010	[01-Oct-2015]	TB1		✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

DAVID BRUCKNER

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- A4 - AU Tax Invoice (INV)
- Chain of Custody (CoC) (COC)
- EDI Format - ENMRG (ENMRG)
- EDI Format - XTab (XTAB)

Email sch4p4(6) ppk.com.au
Email ppk.com.au
Email ppk.com.au
Email ppk.com.au
Email ppk.com.au
Email ppk.com.au
Email ppk.com.au
Email ppk.com.au

IVAN NERALIC

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- A4 - AU Tax Invoice (INV)
- Chain of Custody (CoC) (COC)
- EDI Format - ENMRG (ENMRG)
- EDI Format - XTab (XTAB)

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Email pb.com.au
Email pb.com.au
Email pb.com.au
Email pb.com.au
Email pb.com.au
Email pb.com.au



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095
Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondeh Drive Clinton QLD 4680
Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850
Ph: 02 6372 6735 E: mudgee@mail@alsglobal.com

NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304
Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541
Ph: 024423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090
Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164
Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4818
Ph: 07 4796 0800 E: townsville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: portkemble@alsglobal.com

CLIENT: <u>Parsons Brinckerhoff</u>	TURNAROUND REQUIREMENTS: ☒ Standard TAT (List due date): <u>12/10/15</u>		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 comment:
OFFICE: <u>Brisbane</u>	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		
PROJECT: <u>Cattex Esk</u>	ALS QUOTE NO.: <u>EN-045-15V2</u>		
ORDER NUMBER: <u>2201681A</u>	COC SEQUENCE NUMBER (Circle) COC: <u>0</u> 2 3 4 5 6 7 OF: <u>0</u> 2 3 4 5 6 7		
PROJECT MANAGER: <u>sch4p4(6) Pers</u>	CONTACT PH: <u>—</u>	RECEIVED BY: <u>sch4p4(6) Persona</u>	INQUIRED BY:
SAMPLER: <u>sch4p4(6) Personal</u>	SAMPLER MOBILE: <u>sch4p4(6) Personal info</u>	DATE/TIME: <u>1/10/15</u>	RECEIVED BY:
COC emailed to ALS? (YES / NO) <u>NO</u>	EDD FORMAT (or default): <u>sch4p4(6) Pers</u>	DATE/TIME: <u>17.5 1/10/15</u>	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): <u>uspgroup.com</u>			
Email Invoice to (will default to PM if no other addresses are listed):			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	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 codes below)	(refer to)	TOTAL CONTAINERS	TRH C6-C60	BTEX-N W4	TRH C6-C60	BTEX-N W8							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	MW30 MW30	1/10/15	W	AG/VOA		3	1										
2	MW31					3	1										
3	MW32					3	1										
4	MW33					3	1										
5	MW34					3	1										
6	MW35					3	1										
7	MW36					3	1										
8	QCO1					3	1										
9	RS1			AG/VOA		3	1										
10	TBI			VOA		2			1								
TOTAL						29	9	1									

Environmental Division
Brisbane
Work Order Reference
EB1530452



Telephone : +61-7-3243 7222

Job Title: Caltex Esk Remediation Strategy					PB Job Number: 2201681A					Job Location: Esk					Project Manager: sch4p4(6) Personal information				
Laboratory Name: ALS					Terms of Business: PB					Other: X					Results Expected by/on: 5 days				
Address: 2 Byth St Stafford															Fax Results to: sch4p4(6) Personal information @pb.com.au				
Fax Number:															Fax Number: sch4p4(6) Personal information @pb.com.au				
Phone Number: 32437222															Phone Number: sch4p4(6) Personal information				
Contact Name:															Spreadsheet of Results Required: (Y) / N				
Delivery Method: Courier															Format: excel & psdat				
Quote Number: EN-085-15															Turnaround Time Required: standard				
															Invoice to: apinvoices@pb.com.au				
															Comments:				
Date Sampled	Time	Sample I.D.	Container Size	Sample Location	Medium*	Preservative Type	Filtered (X)	TPH	BTEX	PAH's	OC/OP/PCBs	Metals**	Initials	Comments/Additional Information and/or Analysis Required					
21.4.15	AM	RB			W							X	MP	MNA = methane, nitrate, sulphate, ferrous iron Please forward QCT to Eurofins.					
22.4.15	AM	RB									X								
21.4.15	AM	TB									X								
22.4.15	AM	QCI									X								
↓	↓	QCT									X								
22.4.15	0759	MW2									X								
22.4.15	0910	MW3									X								
21.4.15	1654	MW4									X								
21.4.15	1625	MW5									X								
21.4.15	1554	MW7									X								
22.4.15	0737	MW9									X								
22.4.15	0919	MW10									X								
Relinquished by: sch4p4(6) Personal information					Relinquished by:					Relinquished by:					Medium*: S = Soil, W = Water, V = Vapour				
Date & Time: 22.4.15 2:30pm					Date & Time:					Date & Time:					Legend**: (circle the following to be tested)				
Company: PB					Company:					Company:					Metals: Al As Be Cd Co Cr Cu Fe Hg				
Signature: sch4p4(6) Pers					Signature:					Signature:					Li Mg Mn Ni Pb Se Sn V Zn				
Received in Good Order & Condition by (Name): sch4p4(6) Pers					Received in Good Order & Condition by (Name):					Received in Good Order & Condition by (Name):					Samples on Ice: ☒ Yes ☐ No				
Date & Time: 22/4/15 1515					Date & Time: 23-4-15 9am					Date & Time: File A					Please fax back a signed copy when samples are received at the laboratory				
Company: ALS					Company: Eurofins					Company:									
Signature: sch4p4(6) Pers					Signature: sch4p4(6) Pers					Signature:									

Published on DESI Disclosure Log
RTI Act 2009

ice.

8.8
8.8
8.6

5.4c.

Sample Receipt Advice

Company name: **Parsons Brinckerhoff Aust P/L QLD**
Contact name: **sch4p4(6) Personal**
Project name: **Caltex ESK Remediation Strategy**
Project ID: **2201681A**
COC number: **82251**
Turn around time: **5 Day**
Date/Time received: **Apr 23, 2015 9:00 AM**
Eurofins | mgt reference: **454959**

Sample information

- ☒ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☒ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 5.4 degrees Celsius.
- ☒ All samples have been received as described on the above COC.
- ☒ COC has been completed correctly.
- ☒ Attempt to chill was evident.
- ☒ Appropriately preserved sample containers have been used.
- ☒ All samples were received in good condition.
- ☒ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ☒ Appropriate sample containers have been used.
- ☒ Sample containers for volatile analysis received with zero headspace.
- ☒ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Mark Rodriquez on Phone : (+61) 8 8947 1557 or by e.mail: MarkRodriquez@eurofins.com.au

Results will be delivered electronically via e.mail to Sachin Sambus - ssambhus@pb.com.au.

Company Name: Parsons Brinckerhoff Aust P/L QLD
Address: Lvl 4, 69 Ann Street
Brisbane
QLD 4000
Project Name: Caltex ESK Remediation Strategy
Project ID: 2201681A

Order No.:
Report #: 454959
Phone: 3854 6200
Fax:

Received: Apr 23, 2015 9:00 AM
Due: Apr 30, 2015
Priority: 5 Day
Contact Name: sch4p4(6) Person

Eurofins | mgt Client Manager: Mark Rodriquez

Sample Detail					Eurofins mgt Suite 1
Laboratory where analysis is conducted					
Melbourne Laboratory - NATA Site # 1254 & 14271					X
Sydney Laboratory - NATA Site # 18217					
Brisbane Laboratory - NATA Site # 20794					X
External Laboratory					
Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
QC2	Apr 22, 2015		Water	B15-Ap16979	X

Job Title: Coltux Esk					PB Job Number: 2201681A		Job Location: Esk		Project Manager: sch4p4(6) Personal info															
Laboratory Name: ALS					Terms of Business: PB		Other: ☒		Results Expected by/on: 12/10/15															
Address: 2 B.H. Street Stafford					<table border="1"> <tr> <th>Medium*</th> <th>Preservative Type</th> <th>Filtered (X)</th> <th>TPH</th> <th>BTEX</th> <th>PAH's</th> <th>OC/OP/PCB's</th> <th>Metals**</th> </tr> <tr> <td>S</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>S, Pb, Cu, Zn (TRH/BTEX)</td> </tr> </table>		Medium*	Preservative Type	Filtered (X)	TPH	BTEX	PAH's	OC/OP/PCB's	Metals**	S							S, Pb, Cu, Zn (TRH/BTEX)	Fax Results to:	
Medium*	Preservative Type	Filtered (X)	TPH	BTEX			PAH's	OC/OP/PCB's	Metals**															
S									S, Pb, Cu, Zn (TRH/BTEX)															
Fax Number: (07) 3352 3667							Fax Number:																	
Phone Number: (07) 3243 7222					Phone Number:																			
Contact Name:					Spreadsheet of Results Required: (Y) / N		Format: Excel & Esdat		Turnaround Time Required: Standard															
Delivery Method: Courier					Invoice to: sch4p4(6) Personal inform		Comments:		Initials															
Quote Number: EN-005-15					Comments/Additional Information and/or Analysis Required																			
Date Sampled	Time	Sample I.D.	Container Size	Sample Location	Medium*	Preservative Type	Filtered (X)	TPH	BTEX	PAH's	OC/OP/PCB's	Metals**												
17/09/15		SB35 1.4-1.5m	150ml		S																			
22/09/15		SB35 1.9-2.0m			S																			
		SB35 7.0-7.1m			S																			
		SB35 11.0-11.1m			S																			
		SB35 11.9-12.0m			S																			
23/09/15		SB36 0-0.2m			S																			
23/09/15		SB36 6.0-6.1m			S																			
23/09/15		SB36 6.65-6.75m			S																			
22/09/15		QA1	Vial + 100ml		W																			
22/09/15		QA2	Vial + 100ml		W																			
23/09/15		QA3	150ml		S																			
23/09/15		QA4	150ml		S																			
Relinquished by: sch4p4(6) Personal info					Relinquished by:					Relinquished by:														
Date & Time: 22/9/15					Date & Time:					Date & Time:														
Company: WSP Brinckerhoff					Company:					Company:														
Signature: sch4p4(6) Personal info					Signature:					Signature:														
Received in Good Order & Condition by (Name):					Received in Good Order & Condition by (Name):					Received in Good Order & Condition by (Name):														
Date & Time:					Date & Time:					Date & Time:														
Company: 22-383					Company:					Company:														
Signature:					Signature:					Signature:														
										<p>Legend*: S = Soil, W = Water, V = Vapour</p> <p>Legend**: (circle the following to be tested)</p> <p>Metals: Al As Be Cd Co Cr Cu Fe Hg</p> <p>Li Mg Mn Ni Pb Se Sn V Zn</p> <p>Samples on Ice: ☒ Yes ☐ No</p>														
										<p>Please fax back a signed copy when samples are received at the laboratory</p>														

Sample Receipt Advice

Company name: **Parsons Brinckerhoff Aust P/L QLD**

Contact name: **sch4p4(6) Person**

Project name: **ESK**

Project ID: **2201681A**

COC number: **82204**

Turn around time: **5 Day**

Date/Time received: **Sep 29, 2015**

Eurofins | mgt reference: **474077**

Sample information

- ☒ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☒ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt
Sample Receipt : degrees Celsius.
- ☒ All samples have been received as described on the above COC.
- ☒ COC has been completed correctly.
- ☒ Attempt to chill was evident.
- ☒ Appropriately preserved sample containers have been used.
- ☒ All samples were received in good condition.
- ☒ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ☒ Appropriate sample containers have been used.
- ☒ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Mark Rodriquez on Phone : (+61) 8 8947 1557 or by e.mail: MarkRodriquez@eurofins.com.au

Results will be delivered electronically via e.mail to Ivan Neralic - ineralic@pb.com.au.

Company Name: Parsons Brinckerhoff Aust P/L QLD
Address: Lvl 4, 69 Ann Street
Brisbane
QLD 4000
Project Name: ESK
Project ID: 2201681A

Order No.:
Report #: 474077
Phone: 3854 6200
Fax:

Received: Sep 29, 2015 12:00 AM
Due: Oct 7, 2015
Priority:
Contact Name: sch4p4(6) Per

Eurofins | mgt Client Manager: Mark Rodriquez

Sample Detail					BTEX and Naphthalene	Moisture Set	Total Recoverable Hydrocarbons
Laboratory where analysis is conducted							
Melbourne Laboratory - NATA Site # 1254 & 14271					X	X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
External Laboratory							
Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
QA4	Not Provided		Soil	B15-Se27113	X	X	X

SAMPLE RECEIPT ADVICE

Client Details	
Client	Parsons Brinckerhoff Aust. Pty Ltd
Attention	sch4p4(6) Perso

Sample Login Details	
Your Reference	2201681A
Envirolab Reference	135558
Date Sample Received	08/10/2015
Date Instructions Received	08/10/2015
Date Results Expected to be Reported	15/10/2015

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	1 Water
Turnaround Time Requested	Standard
Temperature on receipt (°C)	10.0
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: sch4p4@envirolabservices.com.au	Email: sch4p4@envirolabservices.com.au

Sample and Testing Details on following page

Sample Id	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water
QC01a	✓	✓

Published on DESI Disclosure Log
RTI Act 2009

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 42 43 44

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Client: WSP Parsons Brinckerhoff	Client Project Name / Number / Site etc (ie report title):
Contact Person: sch4p4(6) Personal	
Project Mgr: sch4p4(6) Personal inf	PO No.: 2201691A
Sampler: sch4p4(6) Personal inf	Envirolab Quote No. :
Address: 69 Ann St, Brisbane (Level 3)	Date results required:
	Or choose: standard / same day / 1 day / 2 day / 3 day Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Phone: sch4p4(6) Personal informa Mob:	Report format: esdat / equis / excel
Email: sch4p4(6) Person wspgroup.com	Lab Comments:

Sample information					Tests Required						Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample							Provide as much information about the sample as you can
1	QCola	-	1/10/15	Water	TRH C6-C60 BTEX-N						<div style="text-align: right;"> Received Temp 21°C </div>

Relinquished by (Company):	WSP - PB	sch4p4(6)	Received by (Company):	sch4p4(6) Personal information	Lab use only:
Print Name:	sch4p4(6) Personal	2/10/15	Print Name:	sch4p4(6) Personal information	Samples Received: Cool or Ambient (circle one)
Date & Time:	sch4p4(6) Personal	1410	Date & Time:	2/10/15 sch4p4(6) 5:10 pm	Temperature Received at: (if applicable)
Signature:	sch4p4(6) Personal		Signature:	File A	Transported by: Hand delivered

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