









TOTAL E&P PNG LIMITED

PAPUA LNG

Upstream Environmental Impact Statement

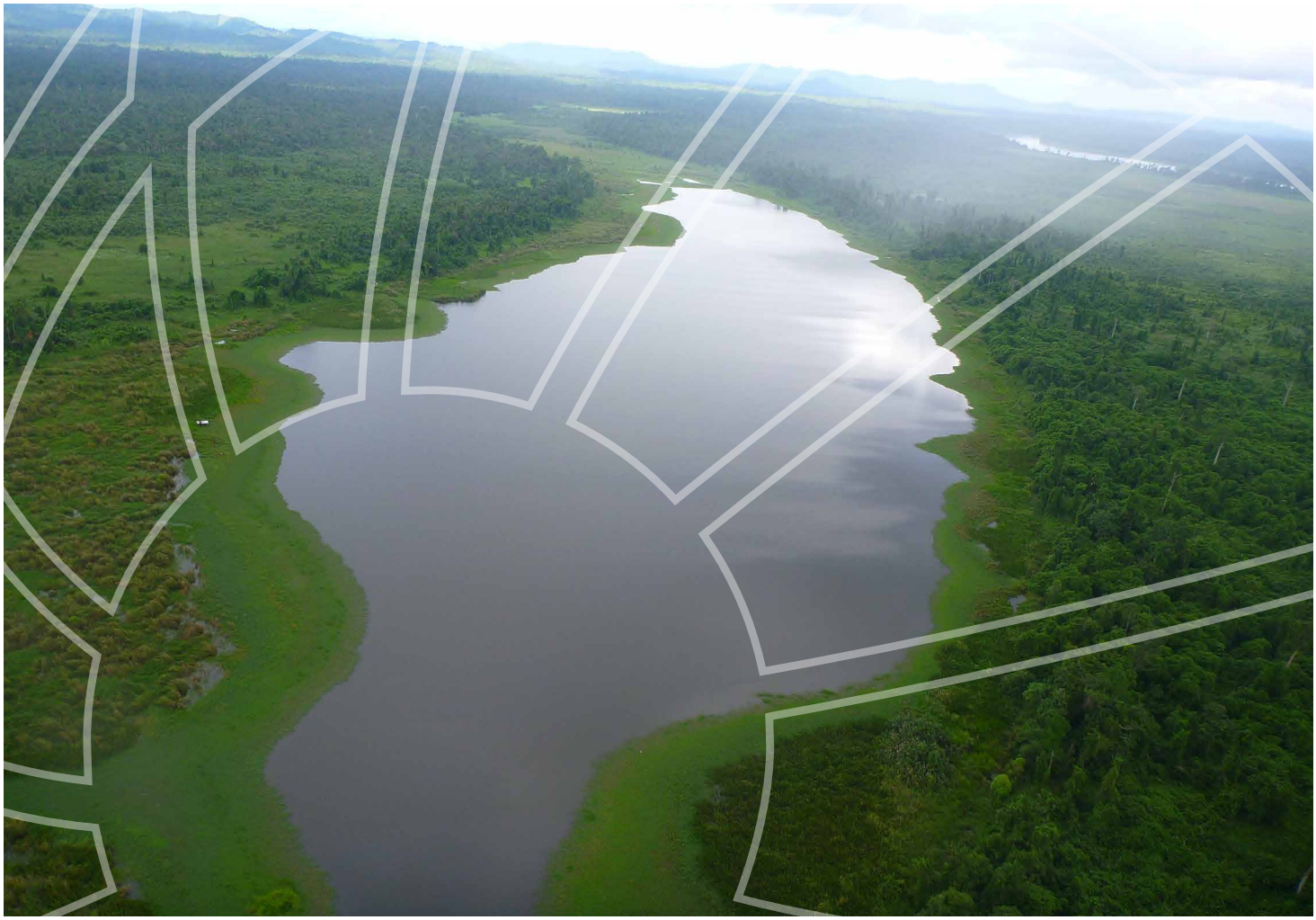
Volume 2: Environmental and Social Baseline

Part 3
Upstream Surface Water and Sediment Quality Baseline Report

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BMT WBM

"Where will our knowledge take you?"



Papua LNG Project

Upstream Surface Water and Sediment Quality Baseline Report

August 2017

Prepared for Total Exploration and Production PNG Limited

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Papua LNG Project - Upstream Surface Water and Sediment Quality Baseline Report

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Synopsis: **ESBS Technical Report prepared by BMT WBM for Papua LNG EIS/ESHIA for the following components: Upstream Surface Water and Sediment Quality Baseline**

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Report Number	Description
1	***Papua LNG ESBS – Upstream Surface Water & Sediment Quality***

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Executive Summary

Background

Total E&P PNG Limited (TEP PNG), a wholly owned subsidiary of TOTAL S.A. (TOTAL), is the largest partner in a joint venture to develop the Elk-Antelope gas field, located in Petroleum Retention License 15 (PRL-15) in Gulf Province, Papua New Guinea. This Project, known as the Papua LNG Project, will comprise upstream production well development and associated infrastructure at the gas field within PRL-15, construction of an upstream central processing facility (CPF) and delivery of gas and condensate via onshore and offshore export pipelines to a LNG plant site at Caution Bay, Central Province, 20 km northwest of Port Moresby.

This technical report provides the findings of a baseline study in relation to surface water and sediment quality in the study area. This technical report forms part of the Environmental and Social Baseline Study (ESBS) for the Project Environmental Impact Statement/Environmental, Social and Health Impact Assessment (EIS/ESHIA) which is being managed by ERIAS Group. The study area encompasses PRL-15, and the Purari River below Hathor Gorge, including the estuary of the lower Purari and Wame-Varoi rivers.

The key objectives of the ESBS for surface water and sediment quality are to:

- Identify the national, international and corporate regulatory and policy framework for assessment of impacts to surface water and sediment quality, including the technical elements required to conduct an EIS/ESHIA.
- On the basis of a review of previous studies and data collection, describe baseline surface water and sediment quality conditions with reference to relevant guideline levels.

The Project is regulated under the *Environment Act 2000*, the *Oil and Gas Act 1998*, with aspects of the Marine Pollution Acts. This report provides baseline water and sediment quality information which adheres to International environmental standards, including the International Finance Corporation (IFC) Performance Standards and TOTAL company environmental performance standards.

Study Approach

The study was based on a review and analysis of existing information, together with targeted field surveys. Four field sampling events were completed between 20 June and 9 July 2016 (estuarine sites, as part of marine surveys), between 18 and 29 July 2016 (freshwater sites only), between 12 and 31 January (estuarine sites, as part of marine surveys) and between 13 and 22 February 2017 (freshwater sites only). Both desktop review and field surveys focused on the following:

- Physicochemical qualities of all surface waters within the study area – this provides the baseline environment for water quality against which impacts can be monitored and accounts for any pre-existing ‘pollution’ associated with natural or anthropogenic causes. In assessing surface water quality, particular focus was provided in regards to temporal changes of all physicochemical parameters associated with seasonality.
- Physicochemical qualities of in-stream sediment within the study area – this provides the baseline environment for sediment quality against which impacts can be monitored and accounts for any pre-existing contamination in sediment, associated with natural or anthropogenic causes.

Field surveys were not intended to provide a complete coverage of the entire study area but provide a representation of the surface water and sediment quality environment for the study area sufficient for the purposes of the EIS/ESHIA.

Study Findings

Water Quality

Overall

Water temperature was fairly consistent between sites and seasonal differences were minimal, with a temperature range of approximately 6°C (~24°C to 30°C). The pH was slightly alkaline at all sites (pH between 7.0 and 8.4), with minimal seasonal variability indicated in the data.

Total alkalinity was comprised predominantly of bicarbonate anions, and the high bicarbonate levels reflect the widespread presence of calcareous rocks in the catchment.

Nutrients and metals/metalloids were found in low concentrations at all sites during the dry season and wet season surveys. Metal/metalloid concentrations were less than water quality guidelines at all sites during both seasons.

Total petroleum hydrocarbon, polycyclic aromatic hydrocarbons (PAH) and benzene-toluene-ethylbenzene-xylene-naphthalene (BTEXN) concentrations were below laboratory limits of reporting at all sites.

Key characteristics of each broad study area are summarized briefly below.

Tributary Streams in PRL-15

Surface water quality at tributary stream sites within PRL-15 is characterized by low electrical conductivity (<400 µs/cm), with minimal seasonal variability. Water was well-oxygenated (85 to 120% saturation) at most tributary sites in PRL-15, except for one site located at a tie channel to the PRL-15 oxbow wetlands (30% saturation). The low dissolved oxygen level, and lower pH, at this site was most likely due to water outflow from the oxbow wetlands. Such water features typically have very low levels of dissolved oxygen and lower pH due to breakdown of organic material, and low pH. Tannin-stained waters observed entering the Purari River at this location during the field survey also provided evidence of such water.

Turbidity and total suspended sediment (TSS) levels in tributary streams in PRL-15 (not including tributary stream locations at the confluence with Purari River) were generally lower than other sites. Tributary streams in PRL-15 (sites 1B, 2 3B, 4, 5, 6, 9 and 10) had a median TSS of 7 mg/L (with a range of 1 to 130 mg/L) and a median turbidity of 6 NTU (with a range of 0.1 to 90 NTU). In comparison, the median TSS and turbidity at Purari River main channel sites (discussed below) was 84 mg/L and 91 NTU, respectively.

Slightly lower pH (pH 6.3 to 7.7) was recorded within the Elk/Antelope gas field development area in previous studies (DES, 2008; GHD, 2015a, 2015b, 2015c, 2015d) compared to the present study (pH 7.0 to 8.5). Also, GHD (2015a, 2015b, 2015c) and DES (2008) recorded higher turbidity (up to 400 NTU) at tributary sites in PRL-15. These differences in pH and turbidity may be due to the range in seasonal conditions that occur depending on rainfall and runoff.

The only exceedance of guideline values for dissolved metals/metalloids across the study area was dissolved zinc (9 µg/L) at Site 4 (located on Mena River near Antelope 3 staging camp) during the dry season survey, which marginally exceeded the ANZECC/ARMCANZ (2000) guideline value (8 µg/L). However, the total zinc

concentration at this site was less than the guideline value, indicating contamination of the filtered sample. GHD (2015a, 2015b, 2015c) found similarly low levels of dissolved metals/metalloids (mostly below the laboratory limits of reporting) at Era River tributary sites in PRL-15, with all metals/metalloids below guideline values.

Purari River (PRL-15 and Purari Delta)

Electrical conductivity in the freshwater reaches of the Purari River (sites 11, 12, 13, 14, 15, 16, 17, 18 and 19) was below 400 µS/cm, and generally lower during the wet season. Dissolved oxygen at these sites was generally within the acceptable guideline range of 85% to 120% saturation.

Spot measurements showed turbidity and TSS was variable between sites and seasons, with turbidity higher at main channel Purari River sites in PRL-15 and Purari delta sites than other sites. In general, turbidity in the Purari River main channel was higher during the northwest monsoon season than during the southeast trade wind season. The freshwater reaches of Purari River had a median TSS of 84 mg/L (with a range of 21 to 484 mg/L) and a median turbidity of 91 NTU (with a range of 8 to 300 NTU). This range in TSS levels is consistent with that reported in Petr (1983a, 1983b), which reported TSS ranging from 29 to 778 mg/L.

Continuous turbidity measurements (using a deployed water quality logger) in the Purari River at Herd Base were higher (around 200 to 400 NTU) compared to turbidity spot measurements described above (8 to 300 NTU). While turbidity was approximately 200 to 400 NTU for much of the deployment period, turbidity increased to about 1,000 NTU following rainfall events in the catchment when river flows increased.

Purari Delta Estuary

Electrical conductivity at the Purari delta estuary sites was highly variable (100 to 28,000 µS/cm), depending on proximity to the coast and the season, with EC generally lower during the wet season. Water profiling at the estuarine sites indicated that water quality was relatively consistent through the water column, indicating minimal stratification at the time of sampling. The exception to this was one site near the Purari River mouth during the wet season survey, which recorded low EC (~100 µS/cm) in surface layers and much higher EC in bottom layers (~20,000 µS/cm). This is indicative of a salt wedge (i.e. saline marine waters underlying fresh fluvial waters), which is typical of river mouth environments.

Dissolved oxygen was also generally lower in the Purari delta estuary sites compared to other sites. Low dissolved oxygen is typical in estuarine waters where stratification/poor water mixing and breakdown of organic matter depletes oxygen.

Estuarine reaches of the Purari delta (sites 20, 21, 22B, 23 and 24) had a median TSS concentration of 45 mg/L (with a range of 8 to 228 mg/L) and a median turbidity of 13 NTU (with a range of 5 to 227 NTU).

Vaihua River Estuary

Electrical conductivity and salinity in Vaihua River estuary is reflective of a marine environment, with electrical conductivity around 55,000 µS/cm and salinity around 35 ppt. pH levels during the both surveys were slightly lower than the ANZECC recommended guideline range for marine waters (pH 8.0 to 8.4), which is likely reflective of the estuarine waters. Turbidity ranged between 1.9 NTU and 8.3 NTU, while TSS ranged between 6 mg/L and 14 mg/L.

Dissolved oxygen was slightly below the ANZECC and Environment (Water Quality Criteria) Regulation 2002 (PNG ER) guideline values at both sites during both surveys, while nutrients were mostly below laboratory limits of reporting.

Dissolved metals/metalloids were mostly below guideline levels, except for a slight exceedance of the ANZECC guideline value for dissolved copper at one site during the wet season survey (however, the total copper concentration was less than the guideline value, indicating contamination of the filtered sample).

Summary of Sediment Quality Conditions

Overall

Particle size of bed sediments was variable across the study area. Sites with higher proportions of silts and clays in bed sediments also had higher amounts of organic matter/carbon and higher concentrations of nutrients.

Concentrations of metals/metalloids in sediment were relatively consistent between monitoring sites (i.e. tributary streams and Purari River in PRL-15, Purari delta and Purari delta estuary). Concentrations were below the lower sediment quality guideline values (below which adverse ecological effects are not expected) for all metals/metalloids, except for nickel which exceeded the guideline value at all sites. However, as found elsewhere in Papua New Guinea, it is not unusual for background nickel concentrations in sediment to exceed the guideline values, reflecting the natural catchment lithology.

Total petroleum hydrocarbon, PAH and BTEXN concentrations were below laboratory limits of reporting at all sites.

Key characteristics of each broad study area are summarized below.

Tributary Streams in PRL-15

Tributary streams in PRL-15 were characterized by large proportions (55% to 85%) of silts and clays. Site 3B on Kuku Creek in PRL-15 had higher amounts of organic matter/carbon and also higher concentrations of nutrients.

While nickel exceeded the lower sediment quality guideline value at all sites, one tributary site in PRL-15 (Site 9) also exceeded the Simpson *et al.* (2013) high sediment quality guideline value (above which adverse ecological effects could occur).

Purari River (PRL-15 and Purari Delta)

In the section of the Purari River within PRL-15, the furthest upstream site and the furthest downstream site were mostly sand and gravel, while sites in between had approximately 50% sands/gravels and 50% silts/clays. The difference in sediment types in the Purari River sites was due to the local hydrodynamics at each site, with higher energy environments (where coarser sediments typically occur) at the furthest upstream site and the furthest downstream site, and depositional environments (where finer sediments typically occur) at the sites sampled in between.

Sites in the Purari River near Herd Base and also in the Purari River delta upstream of the estuary had higher amounts of organic matter/carbon and also higher concentrations of nutrients. These sites also generally had relatively high proportions of silts and clays in bed sediments, to which nutrients more readily bind than sands and gravels.

Purari Delta Estuary

Particle size of sediment within the estuarine reaches of the Purari River delta was variable, with some sites dominated by sand and gravel, while other sites were dominated by silts and clays. The downstream site in the Wame River estuary (Site 23) was mostly silts and clays (98%) while the site further upstream (Site 24) had a lower proportion of silts and clays (39%) and a larger proportion of sand (61%). The variability in bed sediment particle size is likely due to the local hydrodynamics of each sample site.

Sites 22B and 23 in the estuarine area of the Purari River delta had higher amounts of organic matter/carbon and also higher concentrations of nutrients, most likely due to the high proportion (>90%) of silts and clays at these sites.

Contents

Executive Summary i
Background i
Study Approach i
Study Findings ii
1 Introduction 1
1.1 Project Overview 1
1.2 Study and Objectives 3
2 Regulatory Framework and Standards 4
2.1 Papua New Guinean Authorities and Legislation 4
2.1.1 Environmental Impact Assessment Requirements 4
2.1.2 Environmental Assessment Criteria 5
2.2 International Standards and Guidelines 6
2.2.1 Environmental Impact Assessment Requirements 6
2.2.2 Environmental Assessment Criteria 7
2.3 TOTAL Company Standards and Commitments 7
3 Study Area 9
3.1 Study Area 9
3.2 Climate 14
3.2.1 PRL-15 and Purari Delta 14
3.2.2 Vaihua River Estuary 14
3.3 Anthropogenic Setting 15
3.3.1 PRL-15 and Purari Delta 15
3.3.2 Vaihua River Estuary 16
4 Existing Information 17
4.1 Prior Studies within the Study Area 17
4.2 Studies in Neighboring Regions 17
4.3 Summary 23
5 Approach and Methods 24
5.1 General Approach 24
5.2 Data Sources 26
5.3 Field Surveys 27
5.3.1 Sampling Activities 27
5.3.2 Site Selection 36

5.4 Permits Obtained 37
5.5 Water and Sediment Quality Guidelines 37
5.6 Limitations 41
6 Baseline Characterization 42
6.1 Overview 42
6.2 Water Quality Conditions 42
6.2.1 In-situ Physicochemical Data 42
6.2.1.1 Previous Studies 49
6.2.1.2 Water Quality Profiling 49
6.2.2 Continuous Water Quality Measurements 55
6.2.3 Laboratory Data 56
6.2.3.1 Major Ions and Alkalinity 56
6.2.3.2 Metals and Metalloids 61
6.2.3.3 Total Suspended Solids, Organic Carbon, Chlorophyll, Coliforms and Nutrients 64
6.2.3.4 Hydrocarbons 67
6.2.4 Vaihua River Estuary 67
6.3 Sediment Quality Conditions 73
6.3.1 Particle Size Distribution 73
6.3.2 Metals and Metalloids 74
6.3.3 Nutrients and Organic Material 76
6.3.4 Hydrocarbons 77
6.3.5 Comparison to Other Studies 77
6.4 Palustrine Wetlands 77
6.4.1 PRL-15 Oxbow Wetlands (Site 1) 77
6.4.2 Palustrine Wetlands Southwest of PRL-15 78
7 Summary and Conclusions 79
7.1.1 Summary of Water Quality Conditions 79
7.1.2 Summary of Sediment Quality Conditions 81
8 Study Team 83
9 Glossary and Abbreviations 84
10 References 86
Appendix A Photos of Sampling Sites A-1
Appendix B Laboratory Data B-1
Appendix C Hydrocarbon Data – Water C-1
Appendix D Hydrocarbon Data – Sediment D-1

List of Figures

Figure 1-1	Schematic of the Project	2
Figure 3-1	Upstream Surface Water and Sediment Quality Study Area – PRL-15 and Purari River	10
Figure 3-2	Upstream Surface Water and Sediment Quality Study Area – Vaihua River Estuary	11
Figure 3-3	Purari River Main Channel (July 2016)	12
Figure 3-4	Purari River Floodplain South of PRL-15 (February 2017)	12
Figure 3-5	Purari River Floodplain Near Delta (July 2016)	13
Figure 3-6	Study Area Clear Tributary Stream in PRL-15 (February 2017)	13
Figure 4-1	PRL-15 Water Quality Survey Sites – Elk/Antelope Gasfield Project EIS (DES, 2008) and Drilling Pads Assessed by GHD (2015a, 2015b, 2015c, 2015d)	19
Figure 4-2	Purari River Water Quality – Survey Sites (Petr, 1983a)	20
Figure 4-3	Purari River Water Quality – Survey Sites – Petr (1983b)	21
Figure 4-4	Vaihua River Estuary Water and Sediment Sampling Sites – PNG LNG Project EIS (Hydrobiology, 2009)	22
Figure 5-1	PRL-15 and Purari River Sampling Sites	29
Figure 5-2	Purari Delta and Estuary Sampling Sites	30
Figure 5-3	Vaihua River Estuary Sampling Sites	31
Figure 5-4	ProDSS Multiparameter Water Quality Meter used for In Situ Measurements	34
Figure 5-5	Water Sampling for Laboratory Analysis	34
Figure 5-6	Sediment Sampling for Laboratory Analysis using Van Veen Grab	35
Figure 5-7	Bereima Bullet, Vessel Used for River-based Sampling	35
Figure 5-8	Purari Humbii, Vessel Used for River-based Sampling	36
Figure 6-1	Electrical Conductivity Data	47
Figure 6-2	Turbidity Data	47
Figure 6-3	Dissolved Oxygen Data	48
Figure 6-4	Tannin-stained Water of Nea Creak (Site 11 tributary) at Confluence with Purari River During the Dry Season Survey	48
Figure 6-5	In-situ Water Quality Profiling Data – pH and EC - Purari Delta	51
Figure 6-6	In-situ Water Quality Profiling Data – Turbidity and DO - Purari Delta	52
Figure 6-7	In-situ Water Quality Profiling Data – pH and EC - Purari Delta Estuary	53
Figure 6-8	In-situ Water Quality Profiling Data – Turbidity and DO - Purari Delta Estuary	54
Figure 6-9	Wet Season Turbidity and Water Depth Data in Purari River at Herd Base	55
Figure 6-10	Piper Plot of Major Ions	60
Figure 6-11	TSS Data	67

Figure 6-12 Sediment Particle Size Distributions 74
Figure 6-13 Palustrine Wetlands Immediately to the Southwest of PRL-15 78

List of Tables

Table 4-1 Summary of Previous Relevant Environmental Assessment Studies 18
Table 5-1 Upstream Surface Water and Sediment Quality Parameters 25
Table 5-2 Summary of Surface Water and Sediment Quality Sampling Activities 28
Table 5-3 Description of Sampling Sites 32
Table 5-4 Relevant Water and Sediment Quality Guidelines for Benchmarking 38
Table 5-5 Water Quality Objectives and Guideline Values 39
Table 5-6 Sediment Quality Guideline Values 40
Table 5-7 Pesticide and PAH Screening Values for PNG MPR 40
Table 6-1 Physicochemical Data 45
Table 6-2 Summary of Continuous Turbidity Data at Herd Base 55
Table 6-3 Major Ions and Alkalinity Data 58
Table 6-4 Total Metals/Metalloids Data 62
Table 6-5 Dissolved Metals/Metalloids Data 63
Table 6-6 TSS, Organic Carbon, Chlorophyll, Coliforms and Nutrients 66
Table 6-7 Physicochemical Data – Vaihua River Estuary 69
Table 6-8 Major Ions Data – Vaihua River Estuary 69
Table 6-9 TSS, Organic Carbon, Chlorophyll, Coliforms and Nutrients Data – Vaihua River Estuary 70
Table 6-10 Total and Dissolved Metals/Metalloids Data – Vaihua River Estuary 71
Table 6-11 Sediment Particle Size Distribution Data 73
Table 6-12 Total Metals/Metalloids in Sediment 75
Table 6-13 Nutrients, Total Organic Matter and Total Organic Carbon in Sediment (mg/kg) – Dry Season (June/July 2016) 76
Table 8-1 Study team for ESBS Technical Report 83
Table C-1 PAH in water – dry season (June/July 2016) C-2
Table C-2 PAH in water – wet season (Jan/Feb 2017) C-2
Table C-3 TPH/TRH in water – dry season (June/July 2016) C-3
Table C-4 TPH/TRH in water – wet season (Jan/Feb 2017) C-3
Table C-5 BTEXN in water – dry season (June/July 2016) C-4
Table C-6 BTEXN in water – wet season (Jan/Feb 2017) C-4

Table D-1 PAH in sediment – dry season (June/July 2016) D-2
Table D-2 TPH/TRH in water – dry season (June/July 2016) D-2
Table D-3 BTEXN in sediment – dry season (June/July 2016) D-3

1 Introduction

1.1 Project Overview

Joint venture partners, Total E&P PNG Limited (TEP PNG) (40.13%), ExxonMobil (37.03% - through SPI (208) Limited (35.48%) and SPI Security Holdings Limited (4.55%)), and Oil Search Limited (22.84% - through PAC LNG Assets Limited (6.75%), Pac LNG International Limited (5.10%), Pac Overseas Limited (5%), Pac LNG Holdings Limited (3.49%) and Pac LNG Investments Limited (2.50%)) are planning the development of the Elk-Antelope gas fields located in Gulf Province, Papua New Guinea. The gas fields are located within Petroleum Retention License 15 (PRL-15). The Project will include infrastructure development inside PRL-15, and the construction of gas and condensate pipelines (export pipeline) to a liquefied natural gas (LNG) plant site at Caution Bay, 20 km northwest of Port Moresby.

The Project area comprises the physical footprint of the various Project components and associated infrastructure as detailed below (Figure 1-1).

- Production, processing and related facilities (within PRL-15):
  - Wellpads and the associated gathering system (including flowlines and trunkline).
  - Central processing facility (CPF).
  - Logistics base and river offloading facilities, accommodation camps, airstrip, roads and bridges.
  - Quarries and communications infrastructure.
  - Initial section of the onshore export pipeline.
- Onshore pipeline (outside PRL-15):
  - Remainder of the onshore export pipeline to landfall on the Gulf coast including valve stations
  - Temporary laydown areas and camps.
  - Quarries and communications infrastructure.
- Transport (river) corridors:
  - River transport routes— the Purari, Urika-Ivo and Wame-Varoi rivers.
- Offshore pipeline:
  - Offshore section of the export pipeline to a LNG plant site, Caution Bay.

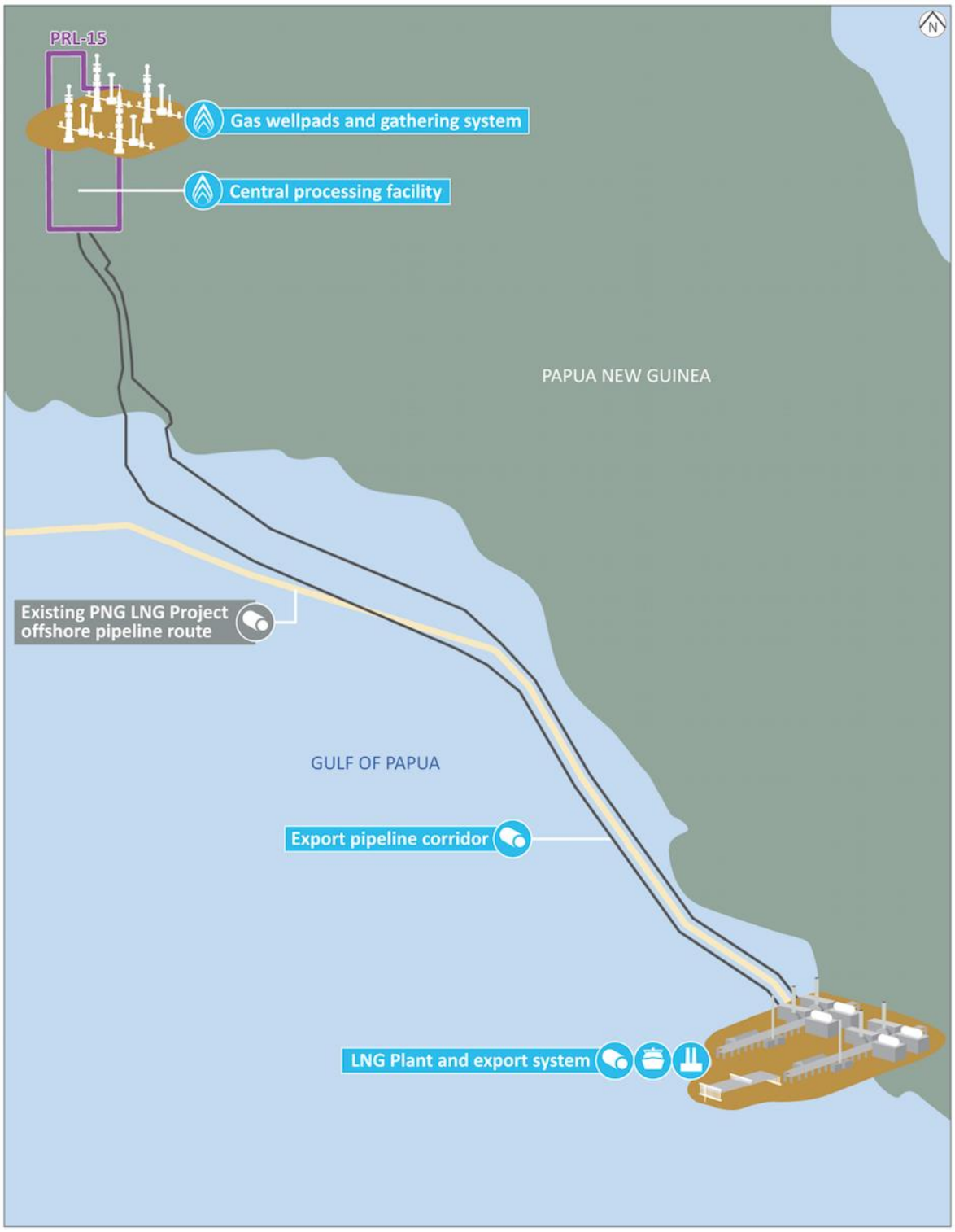


Figure 1-1 Schematic of the Project

1.2 Study and Objectives

This technical report describes the baseline surface water and sediment quality of areas potentially affected by the Project. This report is part of the Upstream Surface Water and Sediment Quality Study for the Environmental Impact Statement and the Environmental, Social and Health Impact Assessment (EIS/ESHIA) for the Project. In particular, this report forms part of the Environmental and Social Baseline Study (ESBS) component of the EIS/ESHIA.

The study objectives for the Upstream Surface Water and Sediment Quality Study are to:

- Characterize stream and estuarine water and sediment quality at areas identified as at risk from Project activities and comparative high value areas.
- Support assessment of Project-related impacts on aquatic biodiversity and resource uses (ecosystem services), such as drinking water quality and subsistence fisheries.
- Plan and execute baseline studies to collect sufficient data to underpin assessment of potential Project impacts to satisfy International Finance Corporation (2012) environmental and social performance standards and to meet Papua New Guinea requirements under the *Environment Act 2000*.

Within the context of these study objectives, this technical report achieves the following:

- Identifies the national, international and corporate regulatory and policy framework for assessment of impacts to surface water and sediment quality, including the technical elements required to conduct an EIS/ESHIA.
- On the basis of a review of previous studies and data collected through field surveys, describes baseline surface water and sediment quality conditions with reference to relevant guidelines.

2 Regulatory Framework and Standards

The Project is regulated primarily under the *Environment Act 2000* and the *Oil and Gas Act 1998*. In addition, TEP PNG will be guided by company environmental performance specifications and international guidelines for the purposes of the EIS/ESHIA. Therefore, there are three sets of performance standards/guidelines applicable to the EIS/ESHIA:

- Papua New Guinea Legislation, including Conservation and Environmental Protection Authority (CEPA) operational procedures and codes of practice under the *Environment Act 2000*.
- International environmental and social guidelines, including the IFC Performance Standards on Environmental and Social Sustainability.
- TOTAL standards and commitments.

2.1 Papua New Guinean Authorities and Legislation

The following Papua New Guinean legislation is considered relevant for the purposes of the Project EIS/ESHIA:

- *Environment Act 2000*, including regulations and operational procedures/information guidelines.
- *Oil and Gas Act 1998*.
- *Marine Pollution (Sea Dumping) Act 2013* and Marine Pollution (Sea Dumping) Regulation.[1]
- Public Health (Drinking Water) Regulation 1984.

These instruments identify critical aspects of the EIS process and criteria for the purposes of baseline comparison and impact assessment. These areas are discussed in more detail below.

2.1.1 Environmental Impact Assessment Requirements

An EIS in Papua New Guinea is required under the *Environment Act 2000* in order to assess and understand the potential environmental impacts of significant activities prior to the issue of an Environment Permit. In particular, an EIS is required for Level 3 Activities identified under the Environment (Prescribed Activities) Regulation 2002. The Project is a Level 3 Activity in accordance with Sub-Category 18 of the Regulation. The *Environment Act 2000* and EIS process is administered by CEPA.

Under the *Oil and Gas Act 1998* the issue of licenses for petroleum projects, including Petroleum Development Licenses (PDLs), Pipeline Licenses (PLs) and Petroleum Processing Facility Licenses (PPFLs) require consideration of environmental aspects and management actions. A PDL can only be issued where the Minister administering the Act is satisfied that the project provides for the protection of the environment and welfare of people in the project area. In practice, the Minister relies on the EIS developed under the *Environment Act 2000* in making this assessment. The Minister administering the Act is the Minister of the Department of Petroleum and Energy.

[1] While the focus of this Act is the marine environment, it is included as it provides context for characterizing sediment in freshwater and estuarine environments.

The *Marine Pollution (Sea Dumping) Act 2013* requires a Sea Dumping Permit for the purposes of placement of certain waste material within marine waters. This includes dredged material but only where material meets the contaminant guidelines set under the Marine Pollution (Sea Dumping) Regulation 2013. Non-compliant material cannot be placed at sea. An application for a Sea Dumping Permit is considered separately to the application for an Environment Permit, though the assessment of dredged material contamination levels can be undertaken as part of an EIS. This process is administered by the National Maritime Safety Authority (NMSA). This legislation is considered relevant to the Project since it provides criteria to assess contamination status of in-stream sediment, particularly where this material may be subject to dredging and at-sea placement (see Section 2.2.2).

In preparing an EIS and applying for an Environment Permit, a proponent is required to following the process set out in operational procedures and guidelines prepared by CEPA. These include the following:

- Operational Procedure (2013): *Information Requirements for Permit Application & Registration of Intention to Carry Out Preparatory Works*.
- Information Guideline GL-ENV/02/2004: *Guideline for Conduct of Environmental Impact Assessment & Preparation of Environmental Impact Statement*.
- Information Guideline GL-ENV/03/2004: *Guideline for Submission of an Application for an Environment Permit to Discharge Waste.*
- Technical Guideline IB-ENV/04/2004: *Water & Land Discharges*.

In addition to the requirements of these guidelines, the *Marine Pollution (Prevention and Response) Act 2013* requires proponents for new petroleum-related facilities to undertake a marine pollution risk assessment as part of an EIS. This allows for marine pollution risks to be assessed as part of an Environment Permit application. A detailed marine pollution contingency plan must then be developed after the approval of the installation.

2.1.2 Environmental Assessment Criteria

Papua New Guinea legislation establishes environmental assessment criteria for water under Schedule 1 of the Environment (Water Quality Criteria) Regulation 2002 and Public Health (Drinking Water) Regulation 1994. These criteria (provided in Section 5) are for ambient water quality required for the purposes of preserving aquatic life and ensuring water is suitable for human consumption (respectively).

For the purposes of EIS/ESHIA, these criteria are the ‘benchmark’ intended to be achieved for the ambient environment beyond prescribed mixing zones. By comparison to international guidelines, there are some gaps in these criteria.

The Marine Pollution (Sea Dumping) Regulation provides contaminant guidelines for dredged material proposed to be placed at sea. These criteria represent the ‘screening’ thresholds for dredged material, with any material that shows contaminant levels in excess of these thresholds requiring further assessment. It is to be noted that these ‘screening’ thresholds’ are similar to sediment quality guidelines described in ANZECC/ARMCANZ (2000) (see Section 2.2), which are applied to both freshwater and marine sediments.

2.2 International Standards and Guidelines

TEP PNG has committed to preparing an EIS/ESHIA for the Project consistent with a number of international standards and guidelines. These are:

- Equator Principles and World Bank Safeguards.
- IFC Performance Standards.
- Organization for Economic Cooperation and Development (OECD) Common Approaches.
- International Petroleum Industry Environmental Conservation Association (IPIECA) Guidelines.
- Any international convention ratified by the Government of Papua New Guinea (that has not been given effect under legislation listed above).

In addition to these instruments, the following international guidelines have been used previously for benchmarking and/or assessment in Papua New Guinean EIS/ESHIA. These are:

- Australian and New Zealand Fresh and Marine Water Quality Guidelines (ANZECC/ARMCANZ, 2000), which also include interim sediment quality guidelines.
- Simpson et al. (2013) revision to ANZECC/ARMCANZ (2000) interim guidelines for sediment quality.
- World Health Organization (WHO) Drinking Water Guidelines (2011).

These instruments provide ‘good practice’ guidance for environmental impact assessment and/or provide important assessment and benchmarking criteria for water and sediment quality.

In addition to these guidelines, it is also noted that the International Union for the Conservation of Nature (IUCN) has established an international approach for recognizing threatened ecosystems. This has been adopted for the ESHIA in accordance with IFC Performance Standards.

2.2.1 Environmental Impact Assessment Requirements

Preparation of an ESHIA for the purposes of environmental due diligence is required under the World Bank Safeguards, Equator Principles and OECD Common Approaches. The IFC Performance Standards provide specific guidance on the ESHIA process.

IFC Performance Standard (PS) 1 establishes the framework for preparing an ESHIA in order to assess and manage the impacts from a particular activity. The remaining Performance Standards (PS2 to PS8) provide more detail on the assessment and management of impacts in particular areas, including pollution/discharges to the environment (PS3) and biodiversity conservation (PS6). The IFC Performance Standards are supplemented by Environmental, Health and Safety (EHS) guidelines which provide examples of good international industry practice (GIIP) for certain activities.

In accordance with the IFC Performance Standards an ESHIA is required to consider the risk of an activity to the environment within the activity’s ‘area of influence’. This includes consideration of the impacting processes in the relevant industry-specific IFC EHS Guidelines.

Under Performance Standard 3 the ESHIA is required to describe the ambient environment conditions in the area of influence, including the assimilative capacity. This then forms the basis of

assessing potential pollution impacts and for the setting of impact criteria. Performance Standard 6 requires the ESHIA to include a distinction between 'modified', 'natural' and 'critical' habitat in order to appropriately quantify and manage impacts to biodiversity and ecosystems services.

The IPIECA has prepared a number of guidelines for the petroleum industry to advise proponents on best practice related to ESHIA processes. These guidelines include a focus on biodiversity and ecosystem services, oil spill preparedness, and water.

The key features of the most relevant guidelines include: locating and assessing sensitive areas (including protected areas, sensitive habitats and rate, threatened or endangered species) as part of project planning; assessing baseline ecological conditions to inform the occurrence of and vulnerability to alien invasive species; and assessing the potential impacts of abstraction of and discharge to naturally-occurring water sources, including cumulative impacts and the effects of climate change.

2.2.2 Environmental Assessment Criteria

There are two types of relevant criteria provided by international standards and guidelines: 1) ambient environment criteria (i.e. the parameters to be met for the receiving environment), and 2) discharge/emission criteria (i.e. criteria to be met in discharge streams).

International ambient environment criteria adopted for assessment purposes (provided in Section 5) come from the following guidelines:

- ANZECC/ARMCANZ (2000) – fresh and marine water quality (supplementing the criteria from the PNG Environment (Water Quality Criteria) Regulation 2002).
- Simpson et al. (2013) – freshwater and marine sediment quality.
- WHO guidelines (2011) – drinking water quality.

For the purposes of the ESBS Report, only ambient environment criteria are considered to be relevant. Discharge criteria will be considered as part of the Project impact assessment.

2.3 TOTAL Company Standards and Commitments

TOTAL has developed the following general specifications for the purpose of environmental impact assessment that are relevant to the Project EIS/ESHIA:

- GS EP ENV 120: Environmental Impact Assessment of E&P Activities.
- GS EP ENV 111: Environmental Baseline and Monitoring Studies: Onshore Sites.
- GS EP ENV 112: Environmental Baseline and Monitoring Studies: Offshore Sites.

GS EP ENV 120 provides details on the process for undertaking an environmental impact assessment and preparing an environmental management plan. The instrument adopts the ISO14001 approach for impact assessment and management. Some relevant specific requirements of the specification include:

- Identification of the physical, biological and socio-economic context of a project, including sensitivities of the environment.

- Assessment of impacts within an ‘area of influence’.
- Use of a modeling study (if relevant) to assess liquid effluent discharges dispersion.

The specifications also identify a methodology for impact assessment and contents of an environmental management plan (including oil spill contingency plan).

GS EP ENV 111 and GS EP ENV 112 specify the type of data to be collected for baseline purposes. These include physicochemical properties of in-stream sediment and surface water, rare and endangered species, and flora and fauna bioindicators.

3 Study Area

3.1 Study Area

The Project occurs across the northern and eastern ends of the Gulf of Papua, as shown in Figure 1-1. Studies are being undertaken across much of this area as part of the EIS/ESHIA. For the purposes of this report, the study area includes the upstream components associated with:

- Freshwater and estuarine waterways in the area of PRL-15 and downstream within the Purari delta, including the Urika-Ivo and Wame-Varoi rivers.
- Estuarine waterways of the Vaihua River at Caution Bay.

NOTE: Freshwater areas of the Vaihua River are included within the 'downstream' study area and therefore not included within this report. Estuarine areas of this river have been included due to the connectivity between these waters and marine areas, assessed as part of the Marine Water and Sediment Quality Baseline Report (BMT WBM, 2017b; Part 12 of ESBS Dossier).

The waterways in the area of PRL-15 include the Purari River downstream of Hathor Gorge and its tributaries, together with the upper parts of the Era River catchment (Mena River and Boa Creek). These areas are shown in Figure 3-1 and Figure 3-2.

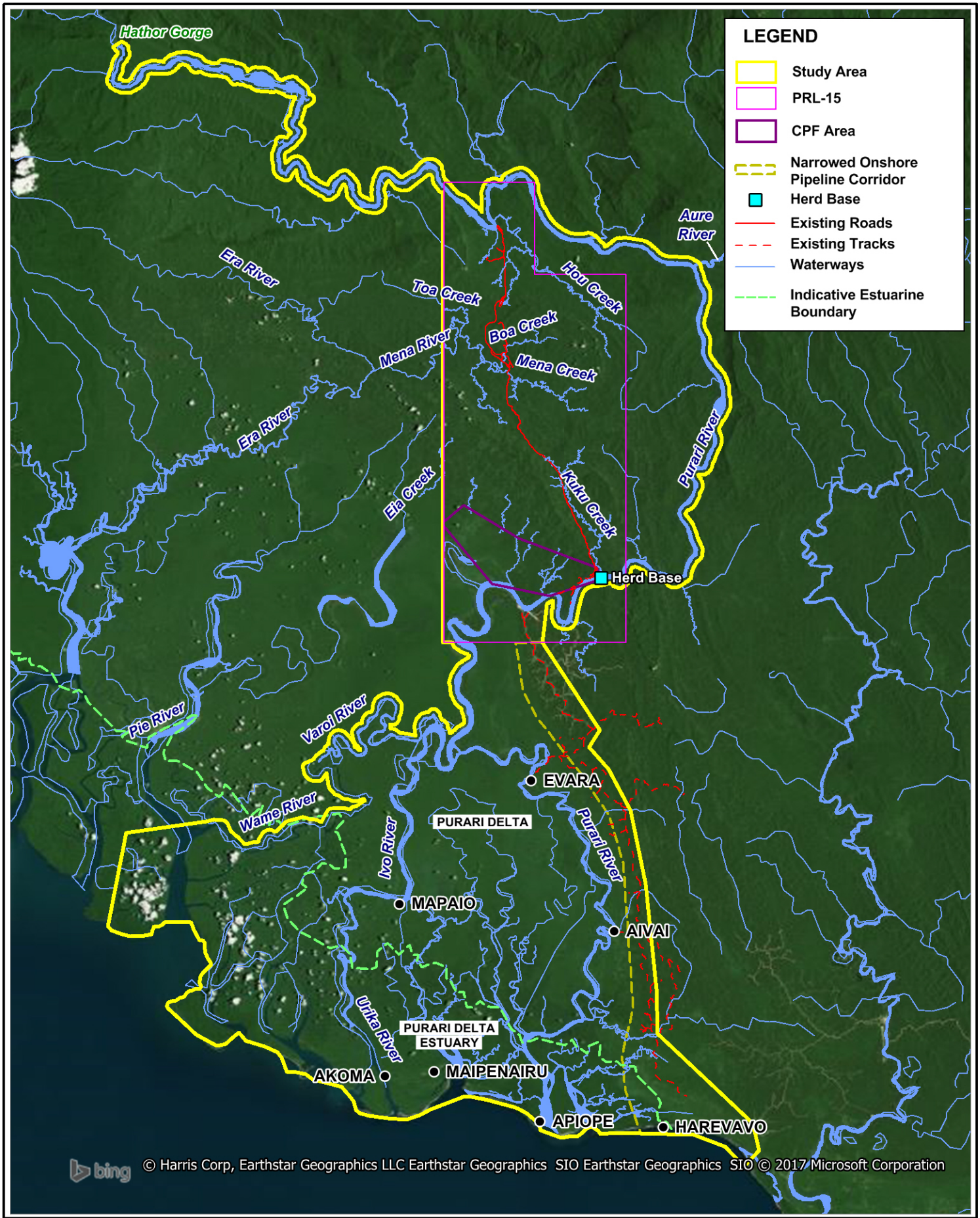
Figure 3-3 to Figure 3-6 show some of the waterways and waterbodies which occur within the study area.

In describing the study area, a distinction is made between freshwater and estuarine areas, as follows:

- All waterways and waterbodies in PRL-15 are considered to be freshwater.
- All waterways and waterbodies upstream of the indicative mangrove line mapped by Shearman (2010) are considered to be freshwater while all waterways and waterbodies downstream of this line are estuarine. This indicative line is shown in Figure 3-1.
- All of the Vaihua River estuary within the study area is considered to be estuarine.

When referring to the Purari River catchment within the study area, the following terminology is used:

- Purari River – this refers to the Purari River main channel and tributaries between Hathor Gorge and the Ivo River distributary.
- Purari delta – this refers to the low, flat depositional land within the Purari River catchment where the Purari River main channel branches into distributary rivers channels, including the Urika-Ivo and Wame-Varoi rivers, before flowing into the Gulf of Papua. It refers to the freshwater section of these waterways.
- Purari delta estuary – this refers to all of the Purari, Wame-Varoi and Urika-Ivo river catchments and tributaries seaward of the indicative estuarine boundary shown in Figure 3-1.



Title:

Upstream Surface Water and Sediment Quality Study Area – PRL-15 and Purari River

Figure: 3-1

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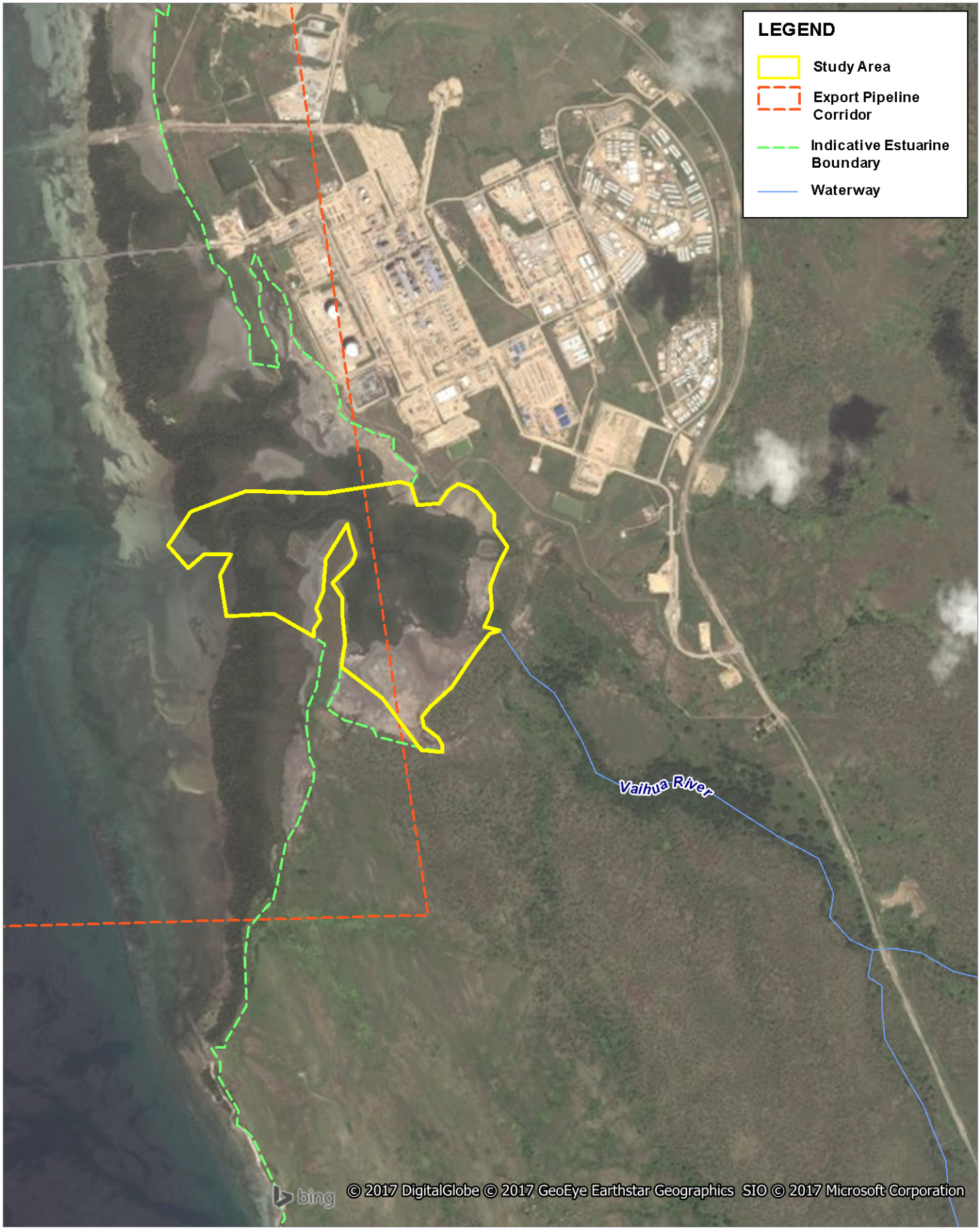
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Title:

Upstream Surface Water and Sediment Quality Study Area – Vaihua River Estuary

Figure: 3-2

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Figure 3-3 Purari River Main Channel (July 2016)



Figure 3-4 Purari River Floodplain South of PRL-15 (February 2017)



Figure 3-5 Purari River Floodplain Near Delta (July 2016)



Figure 3-6 Study Area Clear Tributary Stream in PRL-15 (February 2017)

3.2 Climate

The following provides an overview of the climatic setting of the study area. More detailed climatic and meteorological information is provided in the Upstream Hydrology and Meteorology Baseline Report (BMT WBM, 2017a; Part 2 of ESBS Dossier) and the Physical Oceanography Baseline Report (BMT WBM, 2017c; Part 10 of ESBS Dossier).

3.2.1 PRL-15 and Purari Delta

Two surface pressure systems influence wind and overall climate processes in southern Papua New Guinea (McAlpine *et al.* 1983):

- Southeast trade winds – which prevail from about May to October.
- Northwest monsoon – which prevails from about December to March.

These wind streams are driven by the positioning of the subtropical high pressure belt and the inter-tropical convergence zone (ITCZ) (Evesson, 1983).

Rainfall in the Purari River catchment downstream of Hathor Gorge is driven primarily by a low-level convergence. This brings high levels of rain throughout the year, with significantly higher rain during the southeast trade wind season than during the northwest monsoon season (Evesson, 1983). This contrast to areas further inland where rainfall is highest during the monsoon due to convergence with inland mountains (Evesson, 1983; McAlpine *et al.* 1983). Mean rainfall for entire Purari River catchment is 3,500 mm, in contrast to the 8,900 mm experience at Wabo (Evesson, 1983). This same rainfall pattern is also experienced in the Pie and Era river catchments. However, the Aure River (a tributary of the Purari River downstream of Hathor Gorge) has similar patterns to catchments further inland, with higher rainfall in northwest monsoon season (Pickup and Chewings, 1983).

Rainfall patterns are not greatly affected by cyclones as the study area is located north of the main cyclone belt (Evesson, 1983).

Mean annual temperatures throughout the year do not fluctuate dramatically, with 1 to 2°C of variation between months (McAlpine *et al.* 1983). June to September are the coolest months of the year, while November to February are the hottest (McAlpine *et al.* 1983).

3.2.2 Vaihua River Estuary

The Vaihua River estuary follows the same climatic patterns for Caution Bay. The main seasonal climatic patterns here consist of:

- Dry season[2] from May to October, with prevailing southeast trade winds.
- Wet season from December to March, when the lighter northwest monsoon winds prevail. Approximately 80% of the mean annual rainfall of 1,200 mm occurs during the wet season.
- Transition periods during April and November, when winds are generally calmer.

[2] For the purposes of this report, the sampling undertaken in June-July 2016 during the southeast trade wind season is referred to as the ‘dry season’, and the sampling undertaken during January-February 2017 during the northwest monsoon season is referred to as the ‘wet season’.

The coolest months are July and August when the mean daily maximum and minimum temperatures are 28°C and 23°C respectively. The warmest months are December and January when the mean daily maximum and minimum temperatures are 32°C and 34°C respectively. There is little variation in the mean daily minimum (±1°C) and maximum (±4°C) temperatures throughout the year (CNS, 2009).

The Vaihua River catchment is north of the main cyclone belt and occurrence of such events in the Gulf of Papua is rare, with only five named cyclones in 15 years entering the gulf, situated well south of Caution Bay. Cyclones generally occur from February to April.

3.3 Anthropogenic Setting

The following provides an overview of the anthropogenic setting of the study area, including population distribution and aquatic-based activities. More detailed information is provided in the Upstream Community and Demographics Baseline Report (Finlayson, 2017; Part 14 of ESBS Dossier) and Land and Natural Resources Use Baseline Report (Booyong Forest Science, 2017; Part 18 of ESBS Dossier).

3.3.1 PRL-15 and Purari Delta

The predominant land uses within the Purari River catchment generally fall into one of two categories: 1) undisturbed forest, broadly corresponding with the extent of the southern fold mountains, and 2) cleared rural areas, corresponding with highland valleys further inland. The inland southern fold mountains surrounding the mid reaches of the catchment are steep, highly erodible, and have a higher proportion of naturally exacerbated sediment transport. In contrast, the highland valleys are more stable and have a greater coverage of vegetation, such as anthropogenic grasslands. These land use categories contribute to sediment transport and sediment generation processes, and generally dictate the contribution of sediment from a particular sub-catchment.

The general area of PRL-15 in the Purari River catchment is characterized by low population densities. The Elk-Antelope gasfields and PRL-15 area are used by Pawaians.

Low population density in PRL-15 has meant there has been little agricultural pressure on the land, and the vast majority of Pawaian land remains covered by primary forest. Pawaian subsistence is largely practiced on the move in small mobile family or extended family groups operating from bush camps. Sago cultivation is the principal staple in the lowland areas, with production restricted to the river zones (e.g. Purari River and its tributaries). Sago is supplemented by other riverine foods, including fish and prawns.

The export pipeline corridor south of PRL-15 is largely unpopulated however has been modified by large-scale industrial logging. The Gulf Province coastal region and the onshore export pipeline corridor near the coast features a generally low inland population scattered or concentrated in small villages along riverbanks, and a much denser population in large villages and hamlets along the coastal strip. Seven of the principal villages in this area are: Evara, Mapaio, Aivai, Akoma, Aiope, Harevavo and Hororo.

The more remote inland communities rely almost entirely on native flora and fauna for their livelihoods and wellbeing. The people in this region practice a variety of subsistence activities

including sago cultivation and production, swidden gardening of sweet potato, yam, taro, banana, cassava/tapioca, pawpaw and sugarcane, cultivation of trees (e.g. coconuts), pig husbandry, hunting and trapping, and fishing. Market opportunities limit the production of cash crops at a village level and almost all colonial era copra and rubber plantations have closed.

3.3.2 Vaihua River Estuary

The catchment of the Vaihua River includes the PNG LNG Facilities, located immediately adjacent to the estuarine area. There are no permanent settlements in the vicinity of this facility, although residents of the coastal villages of Caution Bay may use this area. Caution Bay generally is populated by mixed populations of people from the Koita and Motu people groups. The population density across the region is 10 persons/km^2.

4 Existing Information

The following section describes studies that are considered relevant to the study area. The actual content of this literature has been integrated, as relevant, into the findings listed in Section 6.

4.1 Prior Studies within the Study Area

Table 4-1 summarizes all the significant previous environmental impact assessment studies conducted within the study area. These represent a body of existing information relevant to the study area which have been used in the preparation of the Surface Water and Sediment Quality Baseline Report. NOTE: This section considers only published reports.

The survey sites from these previous studies that overlap with the study area are shown in the following figures:

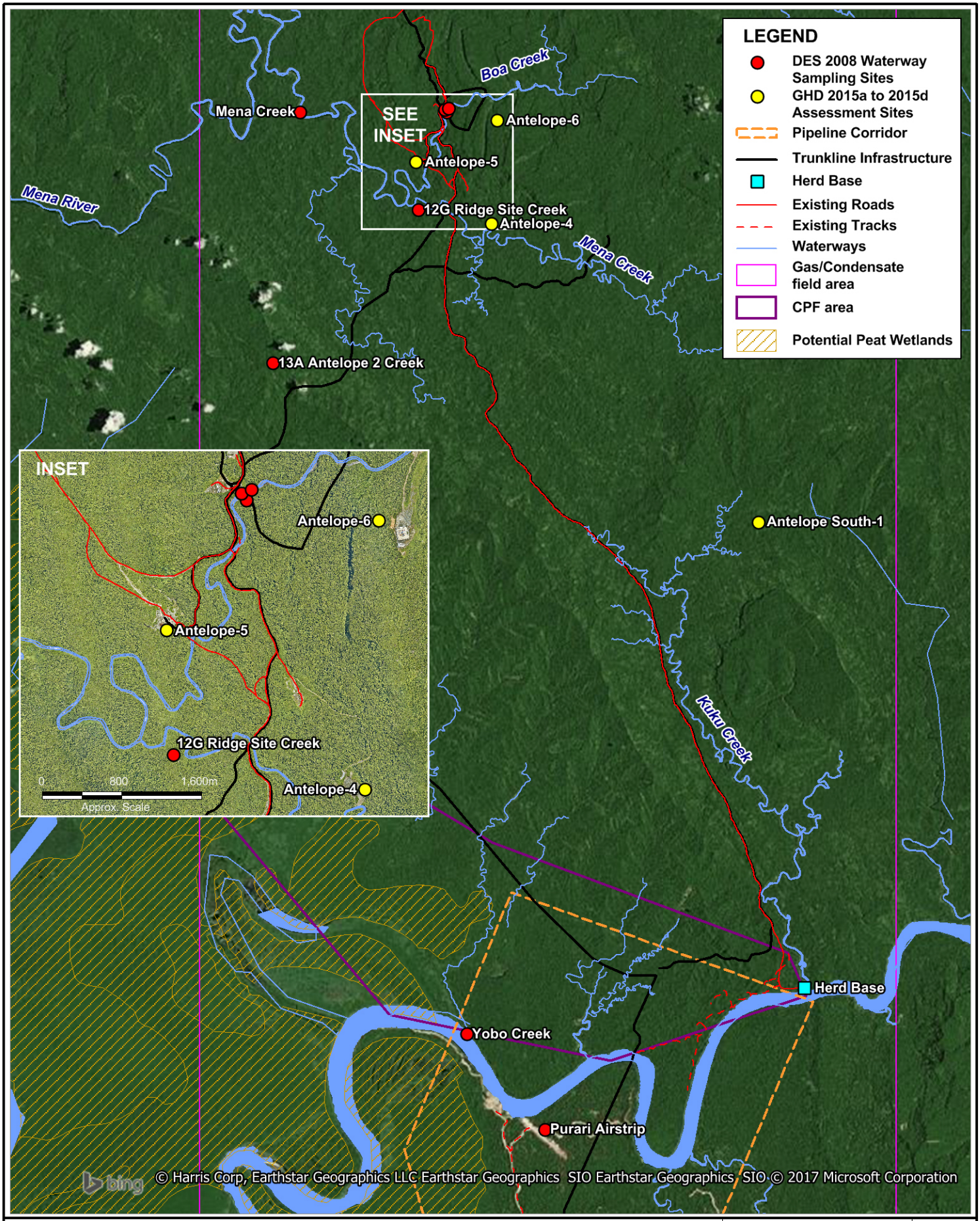
- Figure 4-1 – water sampling sites in PRL-15 (DES, 2008; GHD, 2015a, 2015b, 2015c, 2015d).
- Figure 4-2 and Figure 4-3 – water sampling sites in Purari River (Petr, 1983a, 1983b), including upstream of Hathor Gorge.
- Figure 4-4 – water and sediment sampling sites in Vaihua River estuary.

4.2 Studies in Neighboring Regions

Environmental impact statements prepared in catchments outside the study area include the PNG LNG Project EIS (CNS, 2009) and the P'nyang Project EIS (CNS, 2015). These EIS documents provide surface water and sediment quality information for the Fly River (both studies) and Kikori River (only PNG LNG Project EIS) catchments. Both of these studies provide a contextual understanding of the surface water and sediment quality of large river systems discharging into the Gulf of Papua.

Table 4-1 Summary of Previous Relevant Environmental Assessment Studies

Project/study	Year	Author	Geographic overlap	Relevance to ESBS	Relevant reports
Elk/Antelope Gasfield Project EIS (prepared for InterOil)	2008	Douglas Environmental Services (DES)	PRL-15 and adjoining areas	Detailed surface water quality information for PRL-15 and Purari River	Elk/Antelope Gasfield Project Environmental Impact Statement (DES, 2008)
PRL-15 well pad environmental impact assessments and environmental management plans (prepared for InterOil)	2015	GHD	PRL-15	Detailed surface water quality information for PRL-15 drilling pad environmental assessments	Antelope South-4 Environmental Impact Assessment and Environmental Management Plan (2015) Antelope South-5 Environmental Impact Assessment and Environmental Management Plan (2015) Antelope South-6 Environmental Impact Assessment and Environmental Management Plan (2015) Antelope South-1 Environmental Impact Assessment and Environmental Management Plan (2015)
PNG LNG Project EIS (prepared for ExxonMobil)	2009	Coffey Natural Systems (CNS)	Vaihua River estuary	Detailed surface water and sediment quality information for Vaihua River estuary	Receiving Onshore Environment: LNG Facilities (Chapter 12) (2009) LNG Facilities Water and Sediment Quality Baseline (Hydrobiology, 2009)
Purari River (Wabo) Hydroelectric Scheme Environmental Studies	1979	Papua New Guinea Government	Uncertain, though results of EIS are mostly reported in Petr (1983a and 1983b)		



Title:

PRL-15 Water Quality Survey Sites – Elk/Antelope Gasfield Project EIS (DES, 2008) and Drilling Pads Assessed by GHD (2015a to 2015d)

Figure: **4-1**

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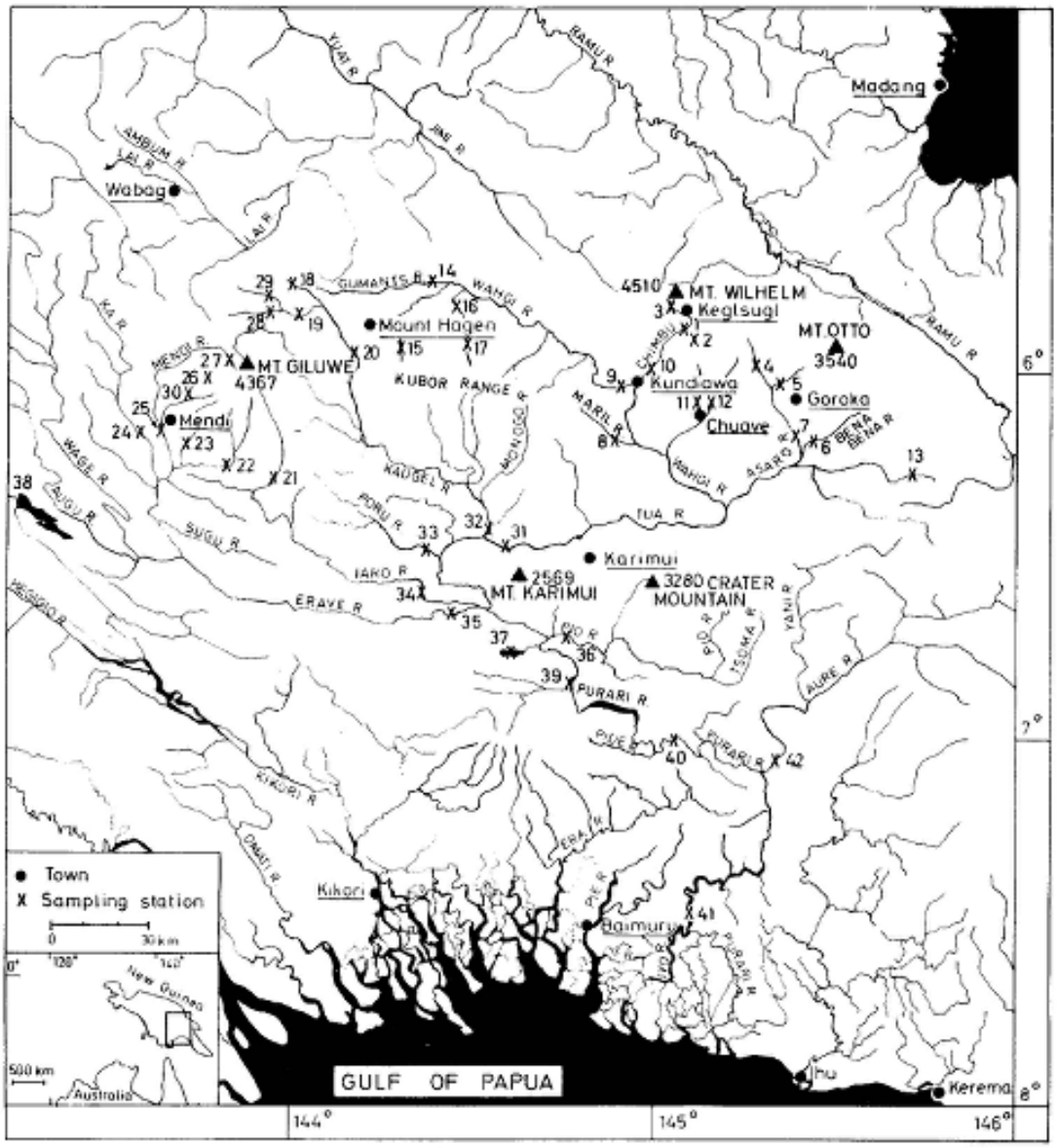


Fig. 1. **Purari River basin with sampling stations.**

Figure 4-2 Purari River Water Quality – Survey Sites (Petr, 1983a)

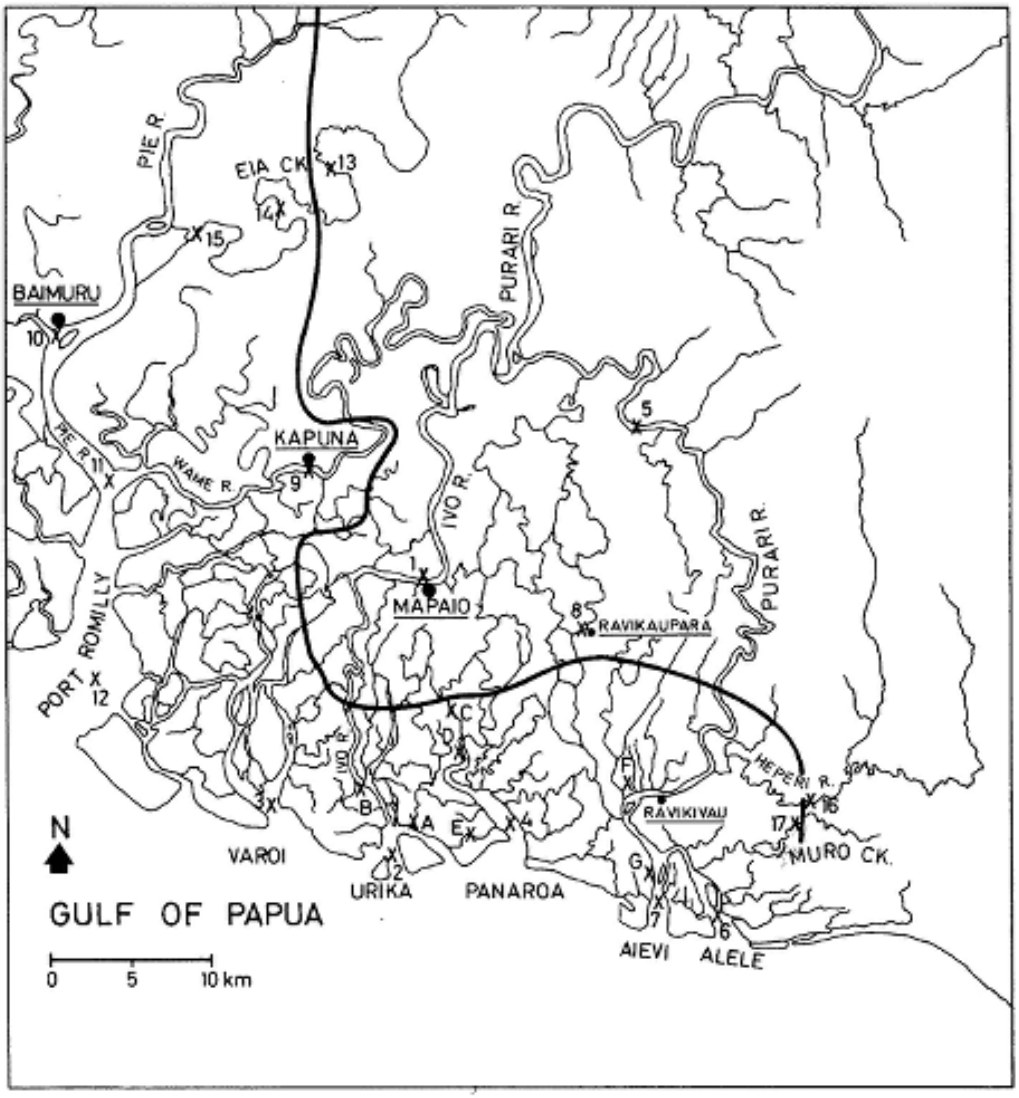


Fig. 5. **The Purari Delta. Numbers refer to water sampling stations, letters refer to the interstitial water samples. The line marks the upper limit of the mangrove *Sonneratia lanceolata* distribution, which is taken as a boundary between the brackish and freshwater reaches of the delta.**

Figure 4-3 Purari River Water Quality – Survey Sites – Petr (1983b)



Note: Orange = estuarine sites, Blue = freshwater sites

Figure 4-4 Vaihua River Estuary Water and Sediment Sampling Sites – PNG LNG Project EIS (Hydrobiology, 2009)

4.3 Summary

Based on the studies cited above, the following information is known to be available for the study area:

- Surface water quality information from waterbodies within the Purari, Era and Pie river catchments at the following locations:
  - Purari River at Wabo.
  - Aure River (catchment of Purari River).
  - Main channel and tributaries of the Purari, Wame-Varoi and Urika-Ivo rivers in the Purari delta.
  - Hou and Kuku creeks (catchments of Purari River).
  - Eia Creek (catchment of Pie River).
  - Pie River at Baimuru.
  - Boa and Mena creeks in the Mena River catchment (catchment of Era River).
- Surface and sediment quality information for Vaihua River estuary.

Regional/adjoining information is available from the Matupe River catchment to the east as well as multiple catchments within Western Province to the west. This provides some relevant information that can be used to contextualize the study area.

5 Approach and Methods

This section provides a summary of the approach adopted for the desktop studies and field survey data collection. A complete description is provided within the scope and methods ('rationale') report for the freshwater and estuarine studies (ERIAS Group, 2016) and relevant addendum (ERIAS Group, 2017).

5.1 General Approach

The study was based on a review and analysis of existing information, together with targeted field surveys to address identified data gaps. Both desktop review and field surveys focused on the following:

- Water quality (determined based on physicochemical parameters, nutrients and toxicants) of surface waters within the study area, including consideration of changes associated with location and seasonality.
- Sediment quality (determined based on physicochemical parameters, nutrients and toxicants) of in-stream sediment within the study area.

The parameters that were analyzed in the present study (which is further described in Section 5-3) are listed in Table 5-1. This includes the limits of reporting (LORs) and analysis method employed by laboratories.

In undertaking the study, benchmarking of water and sediment quality was undertaken against criteria established by Papua New Guinea legislation and international guidelines. These are described in Section 5.5.

The study approach focused on streams that potentially could be affected by Project activities, including tributary streams of the Era River in the area of the gas field, the Purari River and tributary streams within PRL-15 (including the vicinity of the proposed CPF), and downstream in the Purari delta. The study also considered the estuarine area of the Vaihua River at Caution Bay.

Table 5-1 Upstream Surface Water and Sediment Quality Parameters

Parameter	Analysis method	Limits of reporting
Surface Water		
Total suspended solids (TSS)	American Public Health Association (APHA) 2540 D (gravimetric, dried at 103-105ºC)	1 mg/L
Major cations (Ca, Mg, Na, K)	APHA 3120 (inductively coupled plasma - atomic emission spectrometry (ICP/AES)) Hardness: APHA 2340 B (by calculation)	1 mg/L
Major anions (Cl, SO_4, alkalinity)	Various (turbidimetric, flow injection analysis, titration)	0.1-1.0 mg/L
Total organic carbon (TOC)	APHA 5310 B (high temperature combustion)	1 mg/L
Dissolved organic carbon (DOC)	APHA 5310 B (high temperature combustion)	1 mg/L
Total petroleum hydrocarbons (TPH)	Gas chromatography-flame ionization detector (GC-FID)	20-100 µg/L
Polycyclic aromatic hydrocarbons (PAH)	Gas chromatography-mass spectrometry (GC-MS)	1-5 µg/L
Benzene, toluene, ethylbenzene, xylene, naphthalene (BTEXN)	Gas chromatography-mass spectrometry (GC-MS)	1-5 µg/L
Ammonia	APHA 4500 NH_3^- - H (flow injection analysis phenate method)	0.01 mg/L
Nitrite and nitrate	APHA 4500-NO_2^- I/NO_3^- I (flow injection analysis)	
Total phosphorus	APHA 4500 P – H (manual digestion and flow injection analysis)	
Reactive phosphorus	APHA 4500 P – H (flow injection analysis)	
Total nitrogen	APHA 400 N_{org}/NO_3 (flow injection analysis)	0.1 mg/L
Dissolved metals (As, Cd, Cr, Cu, Ni, Pb, Zn)	United States Environmental Protection Agency (USEPA) 6020 (inductively coupled plasma - mass spectrometry (ICP/MS))	Cd: 0.0001 mg/L Zn: 0.005 mg/L As, Cr, Cu, Ni, Pb: 0.001 mg/L
Dissolved metals (Al, Ba, Co, Fe, Sn, Sr, V)	USEPA 6020 (ICP/MS)	Ba, Co, Sr: 0.001 mg/L Fe: 0.05 mg/L Al: 0.01 mg/L V: 0.01 mg/L
Dissolved Hg	Cold vapor atomic absorption spectrometry (CV AAS)	0.0001 mg/L
Total metals (As, Cd, Cr, Cu, Ni, Pb, Zn)	USEPA 6020 (ICP/MS)	Cd: 0.0001 mg/L Zn: 0.005 mg/L As, Cr, Cu, Ni, Pb: 0.001 mg/L
Total metals (Al, Ba, Co, Fe, n, Sr, V)	USEPA 6020 (ICP/MS)	Ba, Co, Sr: 0.001 mg/L Fe: 0.05 mg/L Al: 0.01 mg/L V: 0.01 mg/L

Parameter	Analysis method	Limits of reporting
Total Hg	CV AAS	0.0001 mg/L
Coliforms enumeration	DTS method code 3-3-2-3	-
In-stream Sediment		
Moisture	AS 1289 3.6.3 (gravimetric)	1%
Particle size distribution (PSD)	Sieving	1%
Total phosphorus as P	APHA 4500 P-H (flow injection analysis)	2 mg/kg
Total nitrogen as N	APHA 4500 N_{org}/NO_3 APHA 4500 $NO_2/_3$ (flow injection analysis)	TKN, NH_3, TN: 20 mg/kg NO_2: 0.1 mg/kg
TPH	USEPA 5030/8260 (GC/FID)	10-100 mg/kg
BTEXN/PAH	USEPA 3640/827- (GC-MS)	0.2-1.0 / 0.5-2.0 mg/kg
TOC	AS 1289 3.6.3 (high temperature combustion)	0.5%
Total metals (Al, As, Ba, Fe, Sn, Sr)	USEPA 200.2 (mod) (inductively coupled plasma - atomic emission spectrometry (ICP/AES))	Al, Fe: 50 mg/kg As: 1 mg/kg Sr: 2 mg/kg Cr, Cu: 0.1 mg/kg Ba: 10 mg/kg
Total metals (Cd, Co, Cr, Cu, Pb, Ni, V, Zn)	USEPA 6020 (ICP/MS)	Zn: 0.5 mg/kg V: 1 mg/kg Cd, Co, Cr, Pb, Ni: 0.1 mg/kg
Total Hg	APHA 3112 Hg-B (CV AAS)	0.1 mg/kg

5.2 Data Sources

The key data sources utilized for desktop assessments were the published data in Petr (1983a and 1983b), the Elk/Antelope Gasfield Project EIS (DES, 2008) and the environmental impact assessments conducted by GHD for the PRL-15 wellpads (2015a, 2015b, 2015c, 2015d), and in the PNG LNG Project EIS for Vaihua River estuary.

5.3 Field Surveys

5.3.1 Sampling Activities

Four field sampling events were completed on 20 June to 9 July 2016 (Purari delta and Vaihua River estuary), 18 to 29 July 2016 (PRL-15), 12 to 31 January (Purari delta and Vaihua River estuary) and 13 to 22 February 2017 (PRL-15).

Sampling activities consisted of the following:

Surface water quality

- Collection of site-based physicochemical water quality data using a calibrated YSI probe, and visual observations of surface conditions. Data collected using included temperature, pH, salinity, electrical conductivity (EC), dissolved oxygen (DO) and turbidity. Visual observations were made of color, smell, algae presence, iridescence, bacterial aggregates, rubbish, and precipitates.
- Collection of water quality depth profiles (i.e. measurements logged every second through the water column from surface to bottom) using a calibrated YSI probe. This was undertaken at the Purari delta and Purari delta estuary sites where stratification of the water column could be present due to marine influence. Water quality profiling at sites in PRL-15 was not undertaken as these sites are likely to be well mixed and are not influenced by marine waters.
- Deployment of a calibrated water quality instrument at the Herd Base jetty to continuously measure and log turbidity for the duration of the field survey and subsequent periods.
- Collection of grab surface water samples for analytical testing of the parameters listed in Table 5-1.

In-stream sediment quality

- Collection of bed sediment samples for analytical testing of the parameters listed in Table 5-1. Samples were also tested in the field for reduction-oxidation potential (redox). Testing of sediment was only undertaken during a single season as in-stream sediment quality is not expected to significantly change across seasons.

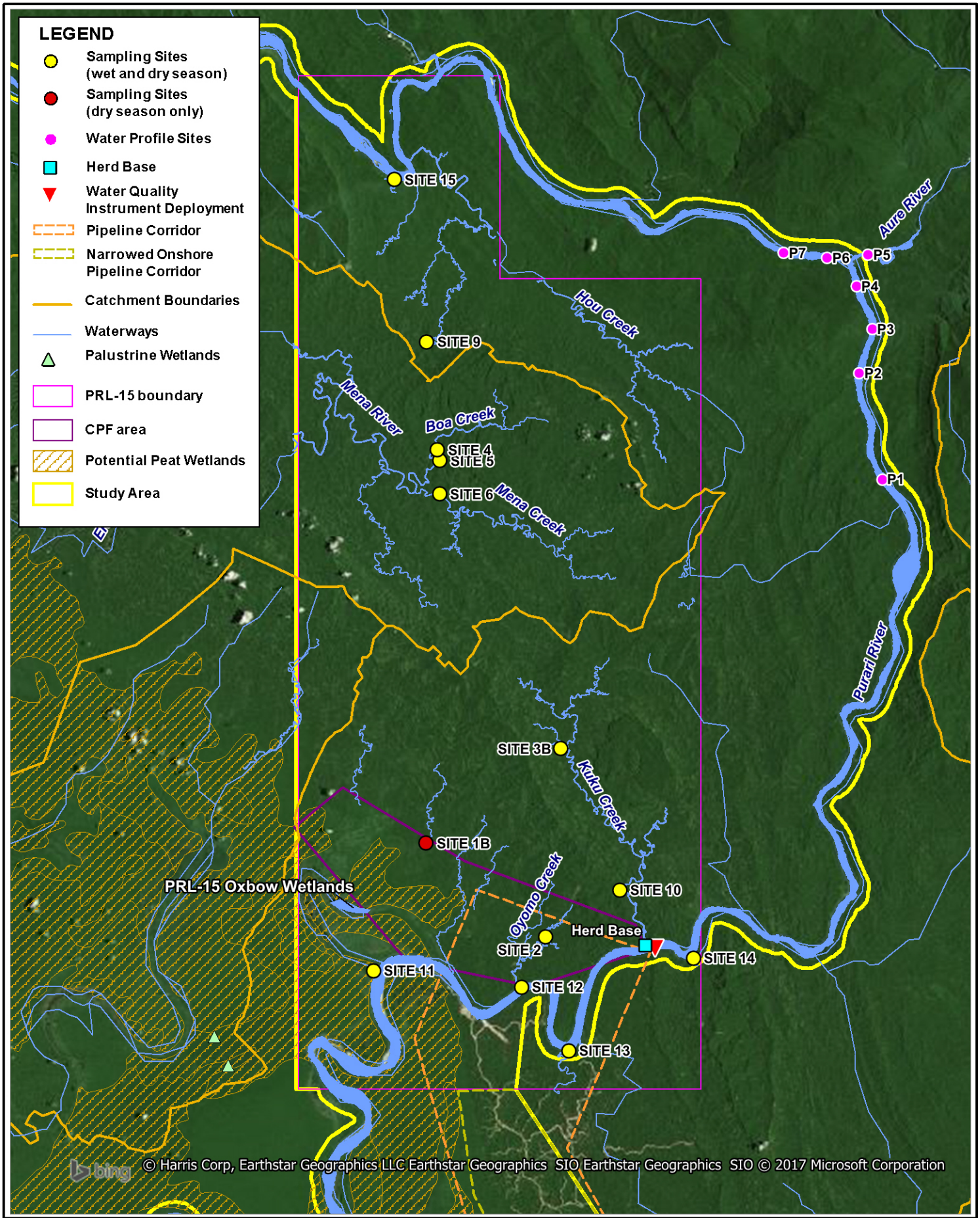
Not all activities were conducted as part of all four surveys. This is shown in Table 5-2, which provides summaries of survey activities undertaken at each survey location. A total of 33 sites were sampled across both surveys, with a summary of the rational for site selection provided in Section 5.3.2. These are shown in Figure 5-1 to Figure 5-3. Each sampling site is described further in Table 5-3. See Appendix A for photos of each sampling site.

Sampling techniques are shown in Figure 5-4 to Figure 5-6.

Estuarine field surveys (June to July 2016 and January 2017) were conducted from a live-aboard research vessel, the *Browse Enterprise*, while freshwater surveys (July 2016 and February 2017) were conducted from the Herd Base and Antelope 3 field camps in PRL-15 with travel undertaken by helicopter, light vehicle and river-going vessels (*Bereima Bullet* and *Purari Humbii*).

Table 5-2 Summary of Surface Water and Sediment Quality Sampling Activities

Sampling activity	Sites	Survey	Notes
In situ water quality data collection and visual observations	1B, 2, 3B, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15	July 2016 February 2017	Site 1B was sampled in July 2016 only due to logistics constraints in February 2017
	16, 17, 18, 19, 20, 21, 22B, 23, 24, 28, 29	June-July 2016 January 2017	
	P1-P7	February 2017	
In situ redox testing of sediment	1B, 2, 3B, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15	July 2016	Site 1B was sampled in July 2016 only due to logistics constraints in February 2017
	16, 17, 18, 19, 20, 21, 22B, 23, 24	January 2017	No sediment sampling was possible at sites 28 and 29 (Vaihua River estuary) due to risk of unexploded ordnances
Continuous water quality measurement and logging	Herd Base	July 2016 February 2017	Data from July 2016 not available as instrument could not be accessed for retrieval
Collection of surface water samples for analytical testing	1B, 2, 3B, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15	July 2016 February 2107	Site 1B was sampled in July 2016 only due to logistics constraints in February 2017
	16, 17, 18, 19, 20, 21, 22B, 23, 24, 28, 29	June-July 2016 January 2017	
Collection of in-stream sediment samples for analytical testing	1B, 2, 3B, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15	July 2016	Site 1B was sampled in July 2016 only due to logistics constraints in February 2017
	16, 17, 18, 19, 20, 21, 22B, 23, 24	June-July 2016	No sediment sampling was possible at sites 28 and 29 (Vaihua River estuary) due to risk of unexploded ordnances



Title:

PRL-15 and Purari River Sampling Sites

Figure: 5-1

Rev: A

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0 5 10km

Approx. Scale

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Title:

Purari Delta and Estuary Sampling Sites

Figure: 5-2

Rev: A

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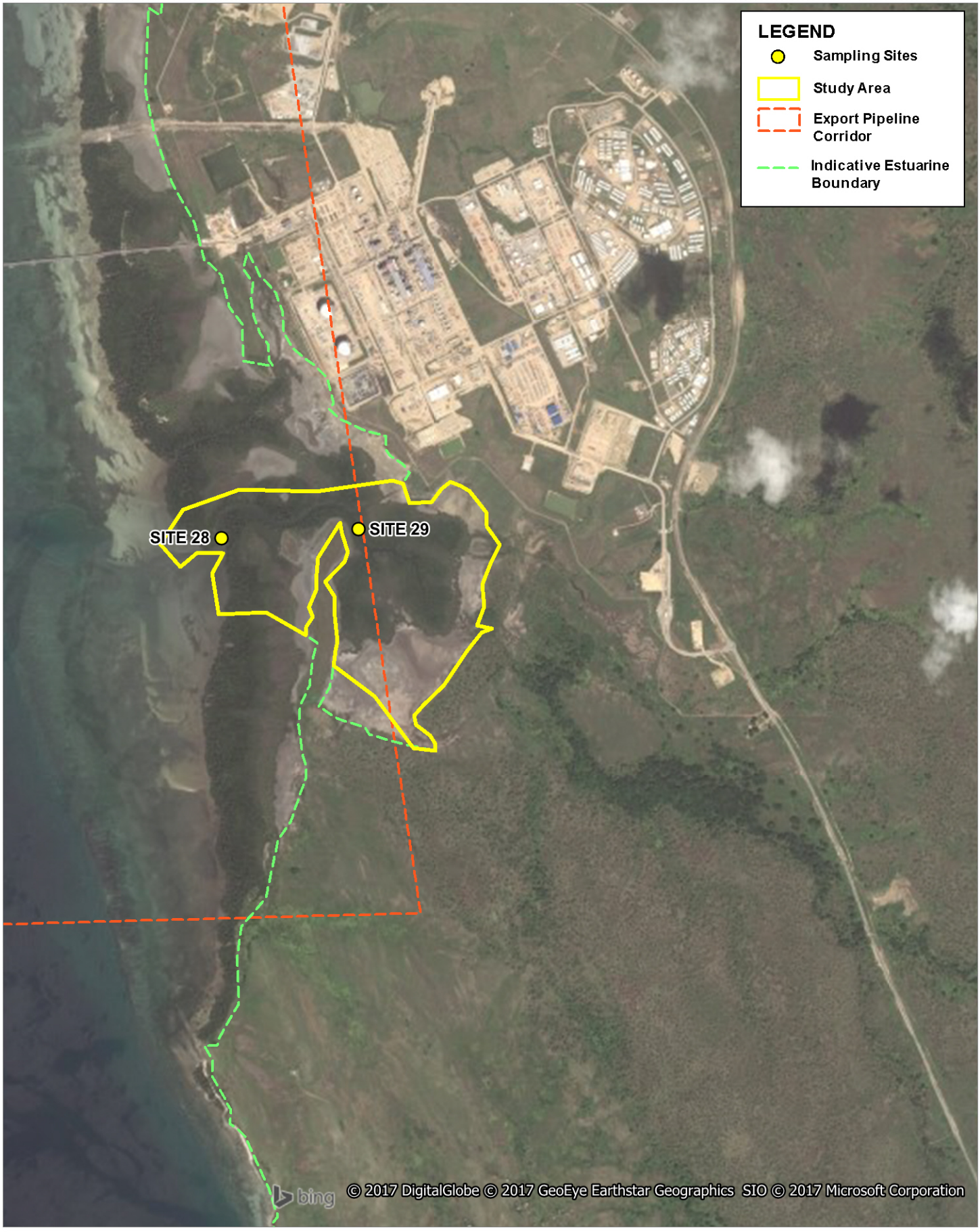
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Title:
Vaihua River Estuary Sampling Sites

Figure: 5-3

Rev: A

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Table 5-3 Description of Sampling Sites

No.*	Coordinates[1]	Description	Catchment	Waterway type
1B	-7.313214º, 145.138162º	Unnamed creek located upstream of the PRL-15 oxbow wetlands (Site 1) (Fly Camp D)	Purari River	Freshwater
2	-7.351679º, 145.187657º	Oyomo Creek, within/adjacent to the proposed footprint of the proposed CPF (Fly Camp C)	Purari River	Freshwater
3B	-7.274346º, 145.194072º	Unnamed tributary stream of Kuku Creek, upstream of access road	Purari River	Freshwater
4	-7.151558º, 145.142889º	Boa Creek, near Antelope-3 Operations Camp	Era River	Freshwater
5	-7.155956º, 145.143757º	Unnamed tributary stream of Boa Creek, near Antelope-3 Operations Camp	Era River	Freshwater
6	-7.16968º, 145.143757º	Mena River, near Antelope-3 Operations Camp	Era River	Freshwater
9	-7.107039º, 145.138461º	Unnamed tributary stream of Hou Creek	Purari River	Freshwater
10	-7.332508º, 145.218444º	Unnamed creek north of Herd Base	Purari River	Freshwater
11	-7.365724º. 145.116371º -7.36578º, 145.1164º	Mouth of downstream tie-channel (Nea Creek) to PRL-15 oxbow wetlands (Site 1) – adjacent to Mapaio fish camp – tributary and mouth	Purari River	Freshwater
12	-7.372452º, 145.17719º -7.37207º, 145.1778º	Mouth of unnamed creek flowing from footprint of the proposed CPF – tributary and mouth	Purari River	Freshwater
13	-7.398552º. 145.197266º -7.39893º, 145.197º	Mouth of unnamed tributary creek to Purari River, downstream of Herd Base – tributary and mouth	Purari River	Freshwater
14	-7.36044º, 145.249125º -7.36048º, 145.2491º	Mouth of unnamed tributary creek to Purari River, upstream of Herd Base – tributary and mouth	Purari River	Freshwater
15	-7.040197º, 145.125063º -7.04122º, 145.1244º	Mouth of unnamed tributary creek to Purari River, upstream of Hou Creek – tributary and mouth	Purari River	Freshwater
16	-7.503741º, 145.084094º	Urika-Ivo River main channel, downstream of split of Purari River	Urika-Ivo River	Freshwater
17	-7.517744º, 145.144975º	Purari River main channel, downstream of split of Purari River	Purari River	Freshwater
18	-7.6748675º, 145.2439989º	Mouth of unnamed tributary creek to Purari River, at Aivai	Purari River	Freshwater
19	-7.7388594º, 145.223255º	Unnamed tributary creek of Purari River	Purari River	Freshwater
20**	-7.837921º, 145.271344º	Upper Oeha Creek	Purari River	Estuarine
21	-7.827696º, 145.238810º	Unnamed tributary creek of Purari River (lower delta)	Purari River	Estuarine
22B**	-7.801099º, 145.196801º	Lower Karere Creek of Purari River (lower delta)	Purari River	Estuarine
23	-7.584074º, 144.891937º	Mouth of unnamed tributary creek to Wame-Varoi River (lower delta)	Wame-Varoi River	Estuarine

No.*	Coordinates[1]	Description	Catchment	Waterway type
24	-7.595789º, 144.948395º	Unnamed tributary creek of Wame-Varoi River (lower delta)	Wame-Varoi River	Estuarine
28	-9.350952º, 147.008769º	Lower Vaihua River estuary	Vaihua River	Estuarine
29	-9.350352º, 147.015366º	Upper Vaihua River estuary	Vaihua River	Estuarine
P1	-7.16357°, 145.3273°	Purari River downstream of confluence with Aure River	Purari River	Freshwater
P2	-7.1198°, 145.3179°	Purari River downstream of confluence with Aure River	Purari River	Freshwater
P3	-7.10174°, 145.3232°	Purari River downstream of confluence with Aure River	Purari River	Freshwater
P4	-7.08403°, 145.3167°	Purari River downstream of confluence with Aure River	Purari River	Freshwater
P5	-7.07108°, 145.3215°	Aure River, upstream of confluence with Purari River	Aure River	Freshwater
P6	-7.07244°, 145.3045°	Purari River upstream of confluence with Aure River	Purari River	Freshwater
P7	-7.0704°, 145.2865°	Purari River upstream of confluence with Aure River	Purari River	Freshwater

[1]Coordinates based on Papua New Guinea 1994 datum (PNG94), Universal Trans Mercator (UTM) Zone 55.

*Sites 1, 7 and 8 are not included here as they were observation sites only for freshwater and estuarine ecology – see Upstream Freshwater and Estuarine Biodiversity Baseline Report (BMT WBM, 2017b).

**Additional measurements were taken at alternatives to these sites during the June-July 2016 survey to inform estuarine biodiversity survey (conducted at the same time) investigations of low fish numbers observed in these areas.



Figure 5-4 ProDSS Multiparameter Water Quality Meter used for In Situ Measurements



Figure 5-5 Water Sampling for Laboratory Analysis



Figure 5-6 Sediment Sampling for Laboratory Analysis using Van Veen Grab



Figure 5-7 *Bereima Bullet*, Vessel Used for River-based Sampling



Figure 5-8 *Purari Humbii*, Vessel Used for River-based Sampling

5.3.2 Site Selection

Sites were selected for the field survey in order to provide sufficient level of data to characterize the existing environment of the study area. The primary aims in site selection were to allow characterization of (1) sites that are in the likely vicinity or sub-catchment of Project infrastructure (based on indicative alignments and locations), and/or (2) sites that represent the various biotopes within the study area. Sites were sampled for both water and sediment quality and aquatic biodiversity purposes. See further the Upstream Freshwater and Estuarine Biodiversity Baseline Report (BMT WBM, 2017b; Part 5 of ESBS Dossier).

The rationale for each of the individual sites is as follows:

- Sites 1B to 6 and sites 9 and 10 represent freshwater sites within small tributary streams which flow either into the Purari River (sites 1B, 2, 3B, 9 and 10) or into the Mena River which flows into the Era River (sites 4, 5 and 6). These sites are representative of all small tributary streams within PRL-15 which may be impacted by Project activities.

  NOTE: Site 3B is an *alternative* to the original Site 3 which was located in the Pie River catchment but could not be accessed due to logistical constraints. Site 1B was selected to provide information to support understanding of the PRL-15 oxbow wetlands (which could not be accessed for sampling).

- Sites 11 to 17 represent freshwater sites within the Purari River, upstream of the delta, including sites within PRL-15 (sites 11 to 15) and further downstream (sites 16 and 17). Of these sites, sites 14 and 15 are also considered to provide 'reference' sites as they are upstream of likely impacts from Project activities. Sites 11 to 15 are located at the junction of tributary streams with the Purari River. Measurements of physicochemical parameters was undertaken immediately upstream of the mouths of these tributary streams, in addition to the full suite of sampling and analysis undertaken in the Purari River main channel.
- Sites 18 and 19 represent freshwater sites within the main channel of the Purari River, within the delta but upstream of the indicative estuarine boundary. These sites are located near the confluence of tributaries draining from the area where the proposed onshore export pipeline corridor occurs.
- Sites 20, 21 and 22B represent estuarine sites within the Purari delta estuary, associated with the Purari River arm, including tributaries draining from the onshore export pipeline corridor. Site 22B was sampled as an alternative to the originally proposed Site 22 due to the low dissolved oxygen at the original site leading to poor fish catches during the June-July 2016 field survey.
- Sites 23 and 23 represent estuarine sites within the Purari delta estuary, associated with the Wame-Varoi River arm. These sites were identified in order to characterize the area that could potentially be used as a river transport corridor as part of Project construction and/or operational phases.
- Sites 28 and 29 represent estuarine sites within the Vaihua River estuary, with the catchment of the existing LNG plant for the PNG LNG Project and adjoining marine areas to be used for the Papua LNG Project.
- Sites P1 to P7 are sites in the Purari River main channel upstream of Herd Base, selected to provide a comparison of water quality upstream and downstream of the Aure River. Sites P1 to P4 are downstream of the Aure River confluence, whereas sites P5 to P7 are upstream.

5.4 Permits Obtained

As water and sediment quality collected during field surveys were tested at Australian laboratories, a Permit to Import was required to import samples into Australia. The laboratory used for analysis, Australian Laboratory Services (ALS), holds the relevant permits and no additional permits were required to be obtained directly by BMT WBM or ERIAS Group.

5.5 Water and Sediment Quality Guidelines

Guidelines for benchmarking of water and sediment quality are described in Section 2, and the numerical objectives adopted for assessment purposes are summarized in Table 5-4.

Table 5-4 Relevant Water and Sediment Quality Guidelines for Benchmarking

Guideline	Abbreviated form	Relevance
Schedule 1 of the Environment (Water Quality Criteria) Regulation 2002	PNG ER	Legally enforceable water quality criteria, typically adopted for Environment Permit conditions (discharge and receiving water quality).
ANZECC/ARMCANZ (2000) Water Quality Guidelines	ANZECC	International good practice guidelines, providing 'trigger values' for the protection of aquatic species. NOTE: For the purpose of the ESBS, trigger values for the 95% level of species protection have been adopted as this level of protection is typically used for slightly to moderately disturbed ecosystems where biological communities are in healthy condition and ecosystem integrity is largely retained. Less stringent (90% and 80% level of protection) and more (99% level of protection) stringent levels are also available, with the former usually used for highly disturbed ecosystems and the latter used for high conservation pristine environments.
Public Health (Drinking Water) Regulation 1984	PNG PHR	Recommended national standards for raw water to be used for drinking.
World Health Organization drinking water guidelines (2011)	WHO	Recommended international guidelines for water to be used for drinking.
Schedule 2 of the Marine Pollution (Sea Dumping) Regulation 2014	PNG MPR	Screening criteria for dredged material proposed to be placed at sea. Material that does not meet these criteria is considered to require further assessment.
Simpson *et al.* 2013 Sediment Quality Guideline Values	SQGV SQG-High	International good practice guidelines representing concentration levels of sediment relative to ecotoxicological effects. The SQGV criteria represent concentrations below which effects are not expected. SQG-High criteria are also provided, which represent concentrations above which effects could occur.

The numerical criteria/objectives provided within these guidelines have been used for the purposes of 'benchmarking' the existing environment, noting that criteria from Papua New Guinea regulations are the legally enforceable standards.

These criteria/objectives are presented in Table 5-5 (water) and Table 5-6 and Table 5-7 (sediment).

NOTE: There is an absence of toxicity data specific for estuarine environments upon which guideline values can be based. As a precautionary approach, therefore, where both freshwater and marine guidelines are available, the more stringent of the two have been applied for estuarine waters. For metals for which toxicity is dependent on water hardness, freshwater trigger values have been used for salinities up to 2,500 mg/L (electrical conductivity of approximately 4,000 µS/cm), adjusted for water hardness. For higher salinities, marine trigger values for metals have been used consistent with the approach described in ANZECC/ARMCANZ (2000).

Table 5-5 Water Quality Objectives and Guideline Values

Parameter	Units	Water Quality Objectives / Guideline Values			
		PNG ER[1]	ANZECC	PNG PHR[3]	WHO[3]
Temperature	°C	No alteration >2°C	-	-	-
Dissolved Oxygen	% sat	-	85 – 120	-	-
	mg/L	>6	-	-	-
Turbidity	NTU	No alteration >25	-	25	-
Electrical Conductivity	µS/cm	-	-	-	-
pH	-	No alteration to natural pH	6.0 – 8.0	6.5 – 9.2	-
TSS	mg/L	-	-	1,500	600
Total coliforms	CFU/100mL	200	-	3	0
Potassium (K)	mg/L	5	-	-	-
Sulfate (SO_4^{2-})	mg/L	400	-	250	
Silver (Ag)	µg/L	50	0.05	50	-
Aluminum (Al)	µg/L	-	55 (if pH >6.5) n/a if pH <6.5	-	-
Arsenic (As) as III	µg/L	50	24	50	10
Barium (Ba)	µg/L	1,000	-	700	700
Cadmium (Cd)*	µg/L	10 (1)	0.2	10	3
Chromium (Cr) as Cr VI	µg/L	50 (10)	1	-	50
Cobalt (Co)	µg/L	Limit of detection	-	-	-
Copper (Cu)*	µg/L	1,000 (30)	1.4 (1.3)	-	2,000
Iron (Fe)	µg/L	1,000	-	-	-
Lead (Pb)*	µg/L	5 (4)	3.4	100	10
Mercury (Hg)	µg/L	0.2	0.06 ^	1	6
Nickel (Ni)*	µg/L	1,000	11 (7)	-	70
Strontium (Sr)	µg/L	-	-	-	-
Tin (Sn)	µg/L	500	-	-	-
Vanadium (V)	µg/L	-	-	-	-
Zinc (Zn)*	µg/L	5,000	8	-	-
Ammonia **	mg/L	3.6	0.9	-	-
Nitrate	mg/L	45.0	0.7	45	50

NOTE: Water quality objectives/guideline values for metals/metalloids are dissolved concentrations

1 PNG ER guidelines values are those relevant to freshwater (ambient). Where the PNG ER thresholds for marine waters are more stringent than freshwater, these have been listed in brackets - these thresholds will apply for estuarine waters

2 ANZECC/ARMCANZ (2000) values based on a 95% level of species protection. Where the triggers for marine waters are more stringent than freshwater, these have been listed in brackets - these thresholds will apply for estuarine waters.

^ Cadmium, mercury and nickel values are for protection of 99% of species as per ANZECC/ARMCANZ (2000), due to the risk from bioaccumulation and secondary poisoning (Hg and Cd), or because the 95% level is not considered sufficiently protective (Ni).

3 Drinking water guidelines are health- based guidelines, except for turbidity and pH which are aesthetic guideline values.

* Trigger values provided in ANZECC/ARMCANZ (2000) for Cd, Cu, Pb, Ni, Zn are dependent on water hardness – values presented are based on a hardness of <50 mg/L of $CaCO_3$.

** Water quality objectives/guideline values for ammonia are dependent on temperature and pH –values presented are based on temperature of 25ºC and pH of 7.

Table 5-6 Sediment Quality Guideline Values

Analyte	Units	PNG MPR [1]	SQGV	SQG-High
Silver (Ag)	mg/kg	1.0	1.0	4.0
Antimony (Sb)	mg/kg	2	2	25
Arsenic (As)	mg/kg	20	20	70
Cadmium (Cd)	mg/kg	1.5	1.5	10
Chromium (Cr)	mg/kg	80	80	370
Copper (Cu)	mg/kg	65	65	270
Mercury (Hg)	mg/kg	0.15	0.15	1
Nickel (Ni)	mg/kg	21	21	52
Lead (Pb)	mg/kg	50	50	220
Zinc (Zn)	mg/kg	200	200	410
Total PCBs	µg/kg	23	-	-
Pesticides	µg/kg	See Table 5-7 below	-	-
TPH	mg/kg	550	280	550
PAH	µg/kg	See Table 5-7 below	10,000	50,000
Radionuclides	Bq/g	35	-	-
Tributyltin (as Sn)	ng Sn/g	9	-	-

[1] PNG MPR guidelines are intended for assessment of dredged material to be disposed at sea, however in the absence of specific guidelines for freshwater sediment have been used in the assessment of freshwater and estuarine sediment.

Table 5-7 Pesticide and PAH Screening Values for PNG MPR

PAH	Unit	Screening value	Pesticide	Unit	Screening value
Acenapthene	µg/kg	16	DDD	µg/kg	2
Acenapthalene	µg/kg	44	DDE	µg/kg	2.2
Anthracene	µg/kg	85	Total DDT	µg/kg	1.6
Fluorene	µg/kg	19	Dieldrin	µg/kg	0.02
Napthalene	µg/kg	160	Chlordane	µg/kg	0.5
Penanthrene	µg/kg	240	Lindane	µg/kg	0.32
Low-molecular-weight PAHs	µg/kg	552	Endrin	µg/kg	0.02
Benzo [a] anthracene	µg/kg	261			
Benzo [a] pyrene	µg/kg	430			
Dibenz [a] anthracene	µg/kg	63			
Fluoranthene	µg/kg	600			
Chrysene	µg/kg	384			
Pyrene	µg/kg	665			
High-molecular-weight PAHs	µg/kg	1,700			
Total PAHs	µg/kg	10,000			

5.6 Limitations

The following limitations in study approach are noted:

- Not all waterways potentially affected by the Project were sampled. Instead, representative sites have been sampled and used as the basis for defining the likely surface water and sediment quality across the study area.
- While sampling was undertaken across multiple surveys in order to account for seasonality in water quality, the variability that may be experienced on a longer temporal scale has not been captured in sampling. The period between 2015 and early 2016 was regarded as an El Nino event in Papua New Guinea and thus may potentially have had an impact on the representativeness of conditions sampled. In addition, there was high variability in site conditions during the field surveys, especially in regards to river height and inundation extent. As a result, conditions being sampled per site differed from day-to-day. This has impacted on the ability to derive conclusions based on comparisons between sites.
- Site 1B in PRL-15 was not sampled during the wet season survey in February 2017 due to access restrictions. The dry season survey results indicate that other small freshwater streams sampled within PRL-15 are characteristic of this site, however depending on final Project design, further investigations may be required post-EIS/ESHIA to characterize this stream.
- During the first freshwater field survey (July 2016), a water quality instrument was deployed in the Purari River at Herd Base to collect continuous turbidity measurements. Due to increased river water levels in the Purari River, the instrument could not be retrieved due to safety concerns. Therefore, continuous water quality data from the July 2016 field survey was not available to include in this report. However, continuous data was successfully collected in February 2017.

These limitations have not restricted the ability to characterize the baseline freshwater and estuarine water and sediment quality suitable for the preparation of an EIS/ESHIA.

6 Baseline Characterization

This section provides an overview of the surface water and sediment quality baseline for the study area within the context of national and international benchmarking standards. It includes discussion on both in-situ physicochemical measurements and water and sediment samples collected for laboratory analysis, based on historical field studies and the June-July 2016, July 2016, January 2017 and February 2017 surveys.

This section also provides an overview of water quality associated with palustrine wetlands identified in the study area. These wetlands have the potential to be important ecosystem features, in part due to unique water quality regimes. These are discussed further in the Freshwater and Estuarine Biodiversity Baseline Report (BMT WBM, 2017b; Part 5 of ESBS Dossier).

6.1 Overview

Streams and wetlands are important environmental assets in the study area and surrounds as they underpin aquatic ecology and resource values (i.e. habitat), and provide a drinking water source, in the case of streams. These values are described in further detail in the Freshwater and Estuarine Biodiversity Baseline Report (BMT WBM, 2017b) and the Upstream Land and Natural Resources (Ecosystem Services – Provisioning) Baseline Report (Booyong Forest Science, 2017).

In describing the study sites in the following sections, a distinction is made between the following areas (as described in Section 3.1):

- PRL-15 sites – freshwater sites occurring within the PRL-15 lease area in the Purari River catchment and the Era River catchment.
- Purari delta sites – freshwater sites occurring within the Purari River main channel downstream of the split of the Purari River into the Purari, Wame-Varoi and Urika-Ivo rivers, downstream to the indicative estuarine boundary shown in Figure 3-1.
- Purari delta estuary sites – estuarine sites occurring within the Purari, Wame-Varoi and Urika-Ivo river catchments and tributaries upstream to the indicative estuarine boundary shown in Figure 3-1.
- Vaihua River estuary – estuarine sites of the Vaihua River near the proposed LNG site at Caution Bay.

6.2 Water Quality Conditions

6.2.1 In-situ Physicochemical Data

Results of physicochemical parameters measured in-situ in surface waters (~0.3 m depth) during June/July 2016 (south east trade wind ‘dry’ season[3]) and January/February 2017 (north west monsoon ‘wet’ season) surveys are summarized in Table 6-1. Values not complying with water quality guideline values are highlighted.

[3] Noting the reversed seasonality at PRL-15 sites as mentioned in Section 5.3.

Electrical conductivity, turbidity and dissolved oxygen (DO) data are also presented as graphs in Figure 6-1 to Figure 6-3.

From these results, the following key observations can be made:

- Water temperature was fairly consistent at all sites, ranging between 24°C and 30°C, and seasonal variability was minimal (variability up to about 4°C). The highest temperature was recorded at the tributary at Site 13 during the dry season survey, which had very little flow at the time of sampling.
- Electrical conductivity was below 400 µS/cm at all freshwater sites during both surveys (PRL-15 sites and Purari delta sites 16, 17, 18 and 19), while EC at Purari delta estuary sites (sites 20, 21, 22B, 23 and 24) was up to 28,000 µs/cm (Figure 6-1). Overall, EC was generally lower during the wet season survey compared to the dry season survey, especially at the Purari delta estuary sites. Site 22B (Purari estuary) and Site 23 (Wame estuary) had significantly higher EC during the dry season survey (~10,000 to 15,000 µS/cm) compared to the wet season survey (~100 to 200 µS/cm).
- pH was slightly alkaline during both surveys, with pH values between 7.0 and 8.4 at all sites. During the wet season survey, slightly higher pH values were recorded within PRL-15 and slightly lower pH values were recorded in the Purari delta and Purari delta estuary sites. Some pH values (mostly at the PRL-15 sites) slightly exceeded the ANZECC/ARMCANZ (2000) guideline values for freshwater and marine water. The slightly alkaline pH in PRL-15 is most likely due to the widespread presence of calcareous rocks in the catchment (Petr, 1983a and 1983b), also resulting in elevated total alkalinity values as discussed in Section 6.2.3.1.
- Turbidity was variable between sites, with the highest turbidity measured in the tributary stream at the mouth of Oyomo Creek (Site 12 - 300 NTU) during the dry season survey, which was higher than turbidity in the main channel of the Purari River immediately downstream of this location, where turbidity was 145 NTU. However, during the wet season survey, turbidity in Oyomo Creek (Site 12) was lower than the main channel. At other tributary stream locations (sites 11, 13, 14, and 15), turbidity was much lower in the tributary than in the main channel of the Purari River (Figure 6-2). In general, turbidity was higher during the wet season survey compared to the dry season survey.
- Turbidity data can be summarized based on the three main types of waterways in the study area, as follows:
    - Tributary streams in PRL-15 (sites 1B-10): median turbidity of 6 NTU, with a range of values between 0.1 and 90 NTU
    - Freshwater reaches of Purari River (sites 11-19): median turbidity of 91 NTU, with a range of values between 8 and 300 NTU
    - Estuarine reaches of Purari River (sites 20-24): median turbidity of 13 NTU, with a range of values between 5 and 227 NTU.
- Dissolved oxygen levels at most PRL-15 sites and Purari delta sites were within the acceptable 8range (85 to 120%) during both surveys, except for Site 11 tributary (dry season survey) which

recorded very low DO (30%). Site 11 is located in Nea Creek in a tie channel to the PRL-15 oxbow wetlands (Site 1). Water was observed to be tannin-stained, most likely due to the breakdown of organic material in the oxbow wetlands (also resulting in low levels of DO and lowered pH). While pH was neutral (pH 7.2) at this site, it was lower than all other sites. The difference in water color between the Site 11 tributary (Nea Creek) and Site 11 Purari River main stem during the dry season survey is illustrated in Figure 6-4.

- Dissolved oxygen levels at Purari delta estuary sites were mostly below the relevant water quality guideline value (Figure 6-3). Low dissolved oxygen is typical in estuarine waters where stratification/poor water mixing and breakdown of organic matter can consume oxygen.

Table 6-1 Physicochemical Data

Site ID	Date		Temp		EC		Salinity		pH		ORP		Turbidity		Dissolved Oxygen			
			ºC		µS/cm		ppt		-		mV		NTU		% sat		mg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
PRL-15 Sites																		
1B	24/7/16	-	24.8	-	165	-	0.08	-	7.4	-	252	-	32	-	81	-	6.7	-
2	22/7/16	18/02/2017	26.7	25.6	376	268	0.18	0.13	7.6	7.7	275	100	16	5.5	91	93	7.3	7.6
3B	24/7/16	15/02/2017	25.2	26.7	350	395	0.17	0.19	8.1	8.1	235	91	18	2.2	96	98	7.9	7.8
4	25/7/16	16/02/2017	26.1	28.3	108	85	0.05	0.04	8.0	8.1	222	71	6.0	6.0	100	101	8.1	7.9
5	25/7/16	17/02/2017	25.3	24.4	228	248	0.11	0.12	8.1	7.6	245	11	3.6	7.3	96	87	7.9	7.2
6	25/7/16	18/02/2017	24.9	27.9	153	225	0.07	0.11	7.7	8.1	242	90	90	6.6	91	90	7.5	7.0
9	27/7/16	15/02/2017	24.8	24.2	182	179	0.09	0.08	8.1	7.9	267	93	1.6	1.8	95	94	7.9	7.9
10	26/7/16	18/02/2017	25.3	27.2	368	370	0.17	0.18	8.3	8.4	292	73	0.6	0.1	98	108	8.0	8.5
11 (main channel)	23/7/16	21/02/2017	25.3	24.3	145	122	0.07	0.06	8.0	8.3	285	87	95	220	91	103	7.5	8.6
11 (tributary)	23/7/16	-	26.2	-	144	-	0.07	-	7.2	-	267	-	7.6	-	30	-	2.4	-
12 (main channel)	23/7/16	19/02/2017	24.8	24.5	122	121	0.06	0.06	8.1	8.1	272	84	145	263	89	101	7.4	8.4
12 (tributary)	23/7/16	19/02/2017	25.4	27.1	151	95	0.07	0.04	7.6	7.9	281	79	300	91	92	92	7.5	7.3
13 (main channel)	21/7/16	21/02/2017	25.9	24.0	140	118	0.07	0.05	7.8	8.5	278	75	146	268	90	103	7.3	8.7
13 (tributary)	21/7/16	19/02/2017	30.5	26.2	289	132	0.14	0.06	7.6	8.2	268	74	8.5	64	91	88	6.8	7.1
14 (main channel)	21/7/16	14/02/2017	25.9	29.0	165	206	0.08	0.10	7.7	7.4	252	115	148	15	88	100	7.2	7.7
14 (tributary)	21/7/16	-	26.2	-	231	-	0.11	-	7.3	-	194	-	41	-	88	-	7.1	-
15 (main channel)	20/7/16	20/02/2017	25.9	25.3	150	65	0.07	0.03	7.8	8.2	280	78	17	86	97	82	7.9	6.7
15 (tributary)	20/7/16	-	27.1	-	127	-	0.06	-	7.5	-	236	-	11	-	89	-	7.1	-
Purari Delta Sites																		
16	3/7/16	21/01/2017	25.2	24.6	252	135	0.12	0.06	8.1	7.5	-	-	79	285	92	96	7.6	8.0
17	3/7/16	20/01/2017	25.8	24.3	266	132	0.13	0.06	8.1	7.6	-	-	70	276	92	97	7.5	8.1
18	27/6/16	19/01/2017	26.1	24.7	227	138	0.11	0.06	7.9	7.6	-	-	79	186	85	93	6.9	7.7
19	27/6/16	19/01/2017	26.3	24.9	225	142	0.11	0.07	7.9	7.5	-	-	69	196	85	92	6.8	7.6

Site ID	Date		Temp		EC		Salinity		pH		ORP		Turbidity		Dissolved Oxygen			
			°C		µS/cm		ppt		-		mV		NTU		% sat		mg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
Purari Delta Estuary Sites ^																		
20	29/6/16	17/01/2017	28.6	28.5	25,580	9,980	15.53	5.59	7.2	7.0	-	-	8.3	6.4	58	47	4.2	3.5
20B*	29/6/16	17/01/2017	28.6	29.1	27,944	26,187	17.11	15.93	7.3	7.4	-	-	9.0	5.0	59	67	4.2	4.7
21	28/6/16	18/01/2017	28.1	27.4	16,063	8,439	9.36	4.67	7.2	7.0	-	-	7.1	9.0	48	45	3.6	3.5
22	30/6/16	-	27.2	-	8,896	-	4.95	-	7.6	-	-	-	14	-	76	-	5.9	-
22B	30/6/16	18/01/2017	27.4	24.9	16,727	153	9.79	0.07	7.7	7.4		-	14	134	83	91	6.2	7.5
22C*	30/6/16	-	27.2	-	4,568	-	2.42	-	7.4	-	-	-	13	-	56	-	4.4	-
23	3/7/16	22/01/2017	27.5	25.9	10,660	232	6.01	0.11	7.6	7.1	-	-	47.1	131.2	69	78	5.2	6.3
24	3/7/16	22/01/2017	25.8	24.7	275	129	0.13	0.06	7.7	7.7	-	-	59.7	226.9	73	90	5.9	7.5
Guideline values (freshwater)	***PNG ER***		-		-		-		-		-		-		-		*>6*	
	ANZECC/ARMCANZ		-		-		-		*6 - 8*		-		-		*85 - 120*		-	
	Drinking water (PNG PHR)		-		-		-		*6.5 - 9.2*		-		*25*		-		-	
	Drinking water (WHO)		-		-		-		-		-		-		-		-	
Guideline values (marine)	***PNG ER***		-		-		-		-		-		-		-		*>5*	
	ANZECC/ARMCANZ		-		-		-		*8.0 - 8.4*		-		-		*>90*		-	

NOTE: ^ indicates estuarine sites where the more stringent of the freshwater or marine water trigger value is applied

Highlighted cells indicate exceedance of the guideline values, with highlighted color corresponding to guideline color at the bottom of table. Grey shading indicates exceedance of more than one guideline value.

*Additional sites opportunistically sampled during June-July 2016 survey.

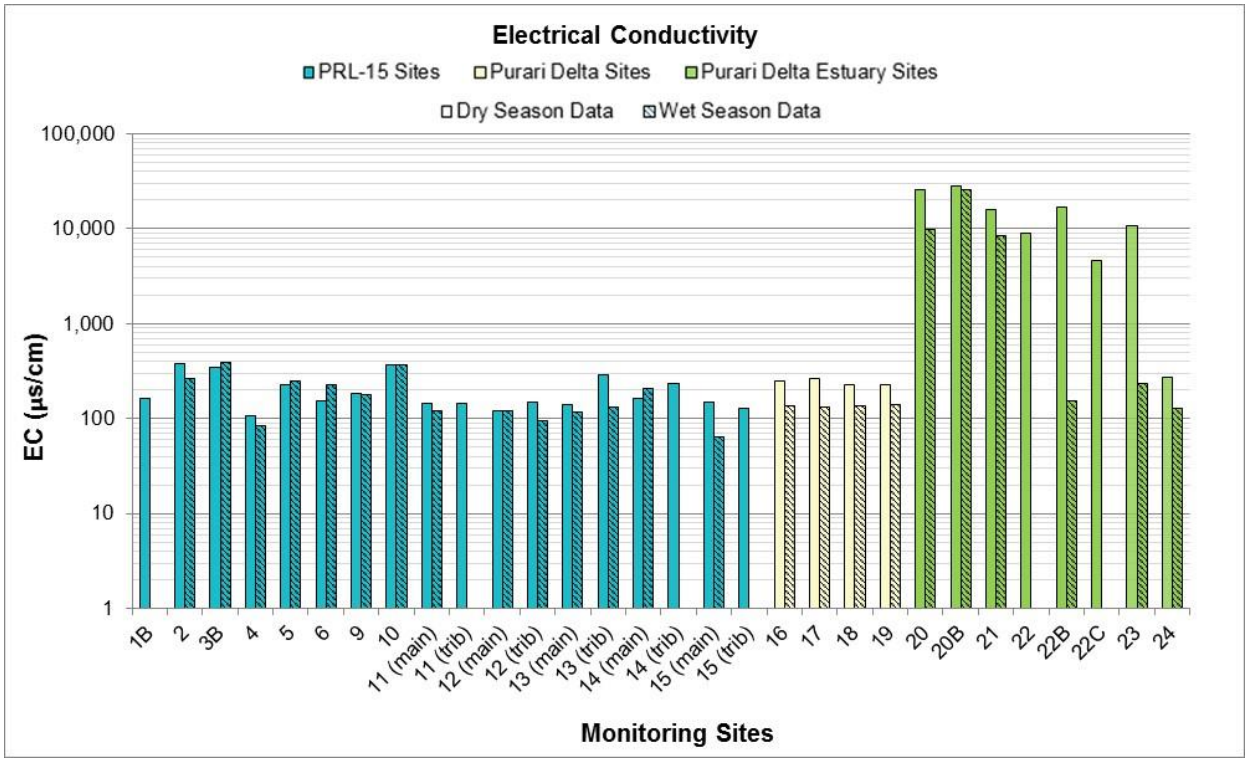


Figure 6-1 Electrical Conductivity Data

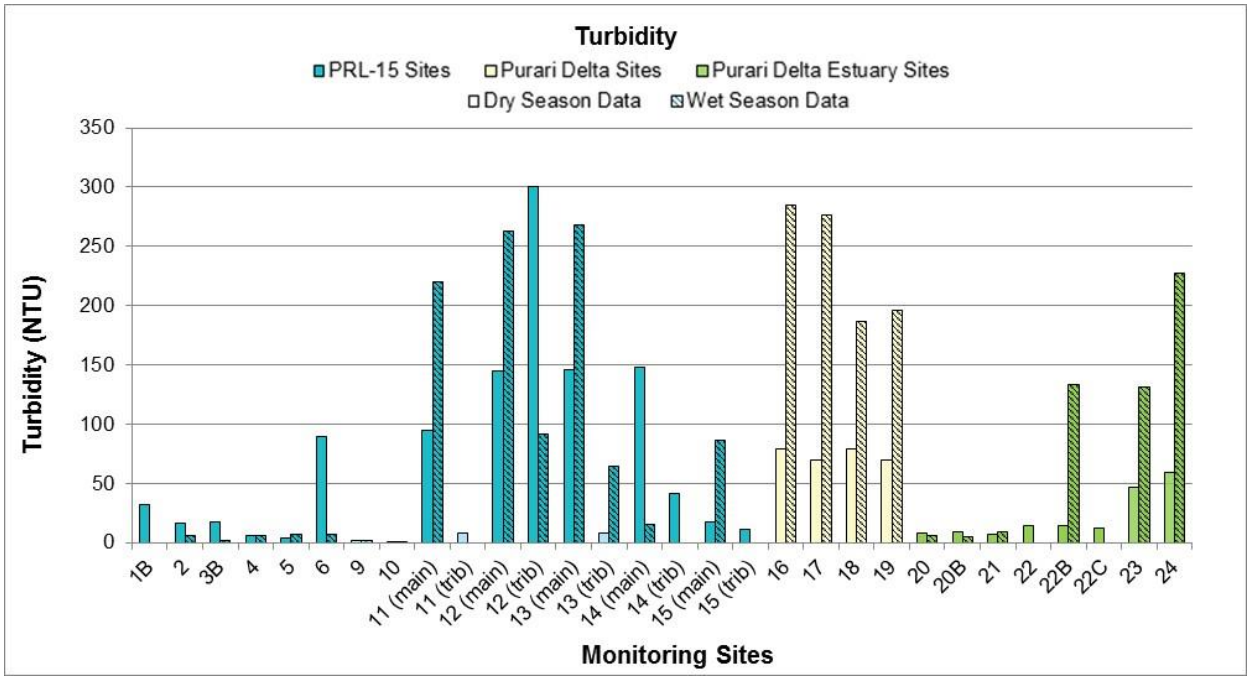


Figure 6-2 Turbidity Data

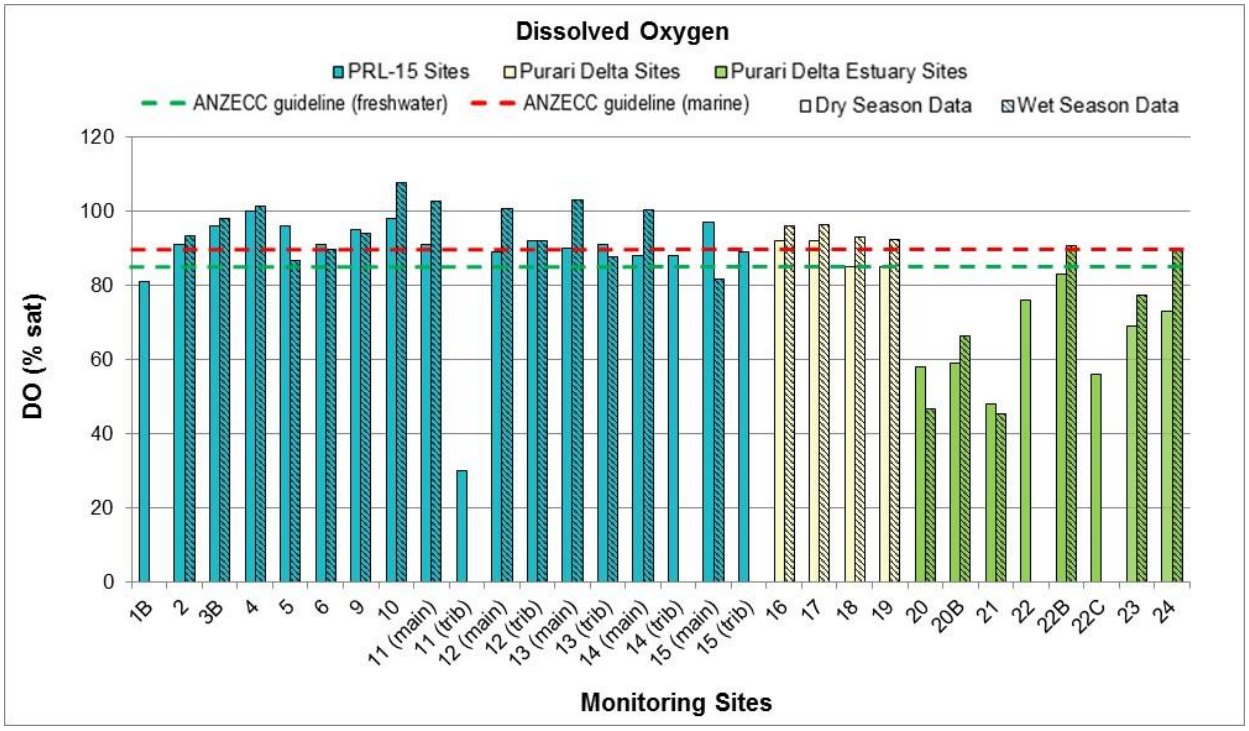


Figure 6-3 Dissolved Oxygen Data



Figure 6-4 Tannin-stained Water of Nea Creak (Site 11 tributary) at Confluence with Purari River During the Dry Season Survey

6.2.1.1 Previous Studies

Previous studies by DES (2008) recorded turbidity at sites within the Elk/Antelope gas field development area ranging between 3 and 400 NTU, with an average of 120 NTU. pH values recorded by DES (2008) ranged from pH 6.3 to 7.4. Temperature ranged from 23.5°C (Site 13A) to 26.3°C (Hou Creek), with an average temperature of 24.9°C.

GHD (2015a, 2015b, 2015c) performed in-situ measurements and collected water samples at sites within PRL-15 (refer to Section 4.1). The water temperature recorded at these sites ranged between 25.9°C to 28.3°C, and EC ranged between 38 and 156 µS/cm. The highest EC was recorded in Mena Creek, while the lowest EC was recorded in Boa Creek. pH readings recorded during the GHD (2015a, 2015b, 2015c) baseline survey were 6.99 to 7.66, while DO ranged from 102.1% to 127.6%. Turbidity levels between 29 NTU and 68 NTU were measured at sites 28, 29 and 30 (whereas other sites recorded turbidity of zero).

In comparing the results of the June-July 2016 and January/February 2017 surveys to previous studies, in-situ parameters from previous studies in PRL-15 were similar to those measured as part of the present surveys. The key difference was slightly lower pH (6.3 to 7.7) recorded in previous studies (DES, 2008; GHD, 2015a, 2015b, 2015c) compared to the present study (7.0 to 8.5). Also, GHD (2015a, 2015b, 2015c) and DES (2008) recorded higher turbidity (up to 400 NTU) at tributary sites in PRL-15, while the present study recorded lower turbidity values (0.1 to 90 NTU, with a median of 6 NTU) in tributary streams in PRL-15 (not including tributary stream locations at the confluence with the Purari River). These differences in pH and turbidity may be due to the range in seasonal conditions that occur depending on rainfall and runoff.

6.2.1.2 Water Quality Profiling

Water quality profiling (comprising in-situ measurements taken through the water column) was undertaken at the Purari delta and Purari delta estuary sites during the dry season and wet season surveys. The data is presented in Figure 6-5 to Figure 6-8 and indicates the following:

- At Purari delta sites, and some sites in the Purari delta estuary, pH decreased slightly with water depth during the wet season survey.
- Electrical conductivity was relatively consistent through the water column at sites in the Purari delta and Purari delta estuary. This indicates that there was no stratification at the time of sampling. The exception to this is EC at Site 22B during the wet season survey, which recorded low EC (~100 µS/cm) throughout most of the water column and much higher EC in the bottom layers of water (~20,000 µS/cm) - Figure 6-7.
- Electrical conductivity at sites in the Purari delta was between 100 and 300 µS/cm. Electrical conductivity at sites in the Purari River Estuary was variable, with low electrical conductivity at sites 22B (surface waters) and 24 (100 to 300 µS/cm) and higher electrical conductivity at sites 20, 20B and 21 (~15,000 to 40,000 µS/cm). Site 23 had much higher electrical conductivity during the dry season survey (~13,000 µS/cm) compared to the wet season survey (~200 µS/cm).
- Turbidity was relatively consistent through the water column at most sites, except Site 23 (Wame River estuary) during the dry season survey, which recorded a significant increase in turbidity with increasing depth. Turbidity at sites in the Purari delta was between approximately 75 NTU and

300 NTU, with turbidity at sites further upstream (sites 16 and 17) higher than sites further downstream (sites 18 and 19). Turbidity at sites in the Purari delta estuary was between approximately 10 and 600 NTU, with turbidity higher at sites in the main channel of the estuary (sites 22B, 23 and 24) compared to sites in tributaries (sites 20, 20 and 21) during the wet season survey.

- Dissolved oxygen was also consistent through the water column at most sites, except for sites 20 and 21 in the Purari River Estuary which both recorded increasing dissolved oxygen with increasing depth. This is most likely due to a slight stratification at these two sites at the time of sampling, with pH and electrical conductivity also lower in surface water (<2 m depth) compared to deeper water (>2 m depth) at these sites (Figure 6-7).

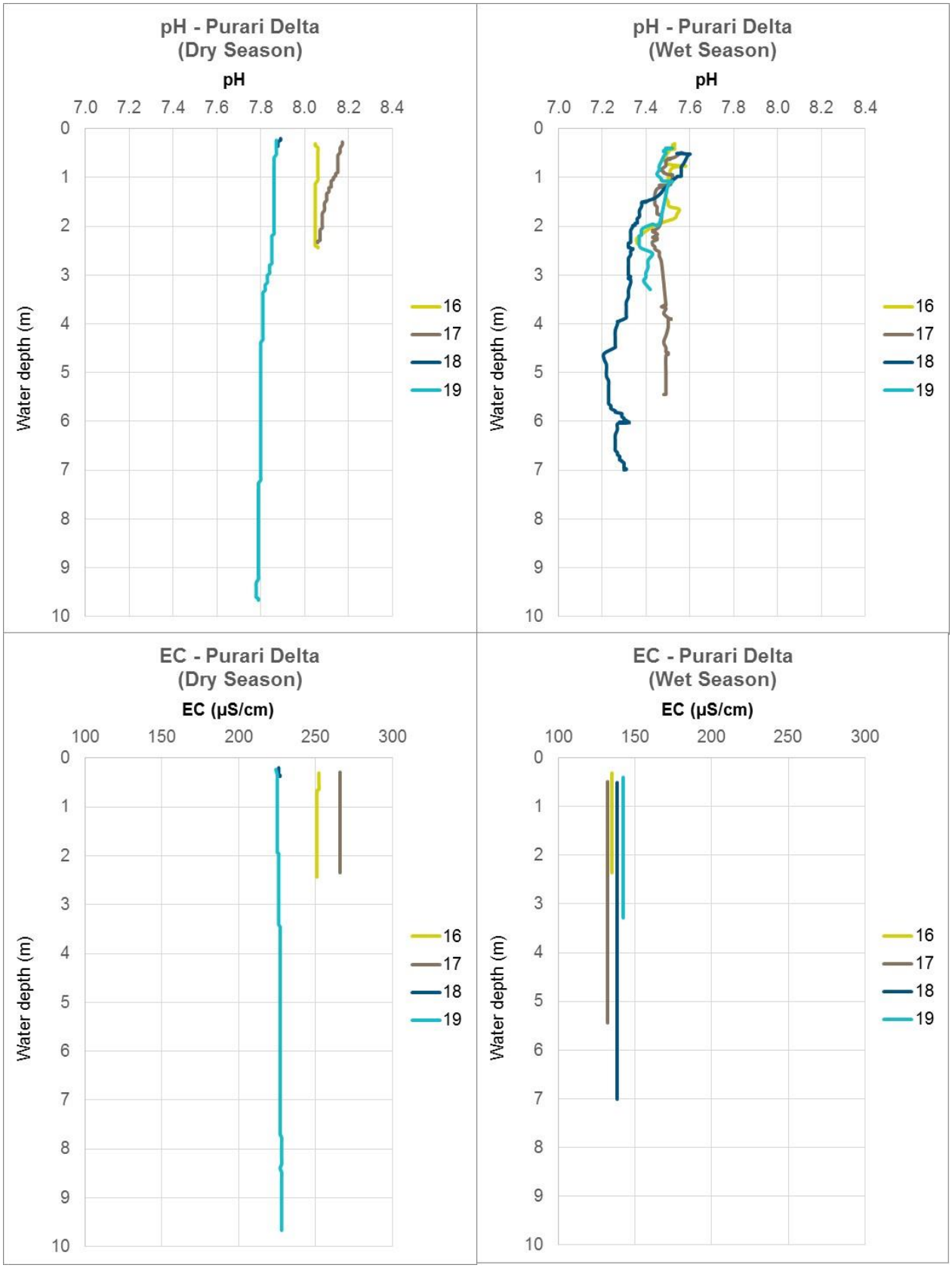


Figure 6-5 *In-situ* Water Quality Profiling Data – pH and EC - Purari Delta

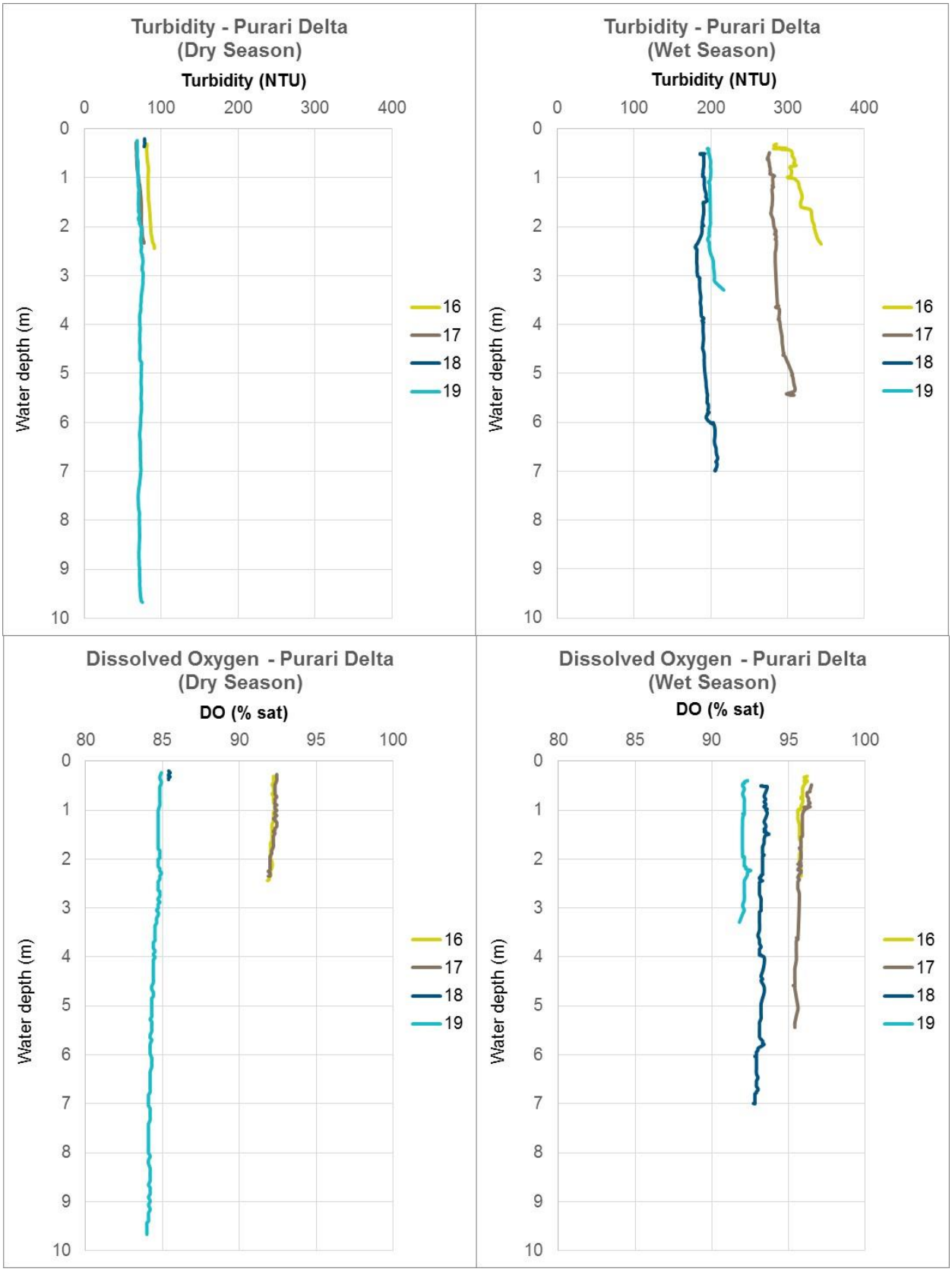


Figure 6-6 *In-situ* Water Quality Profiling Data – Turbidity and DO - Purari Delta

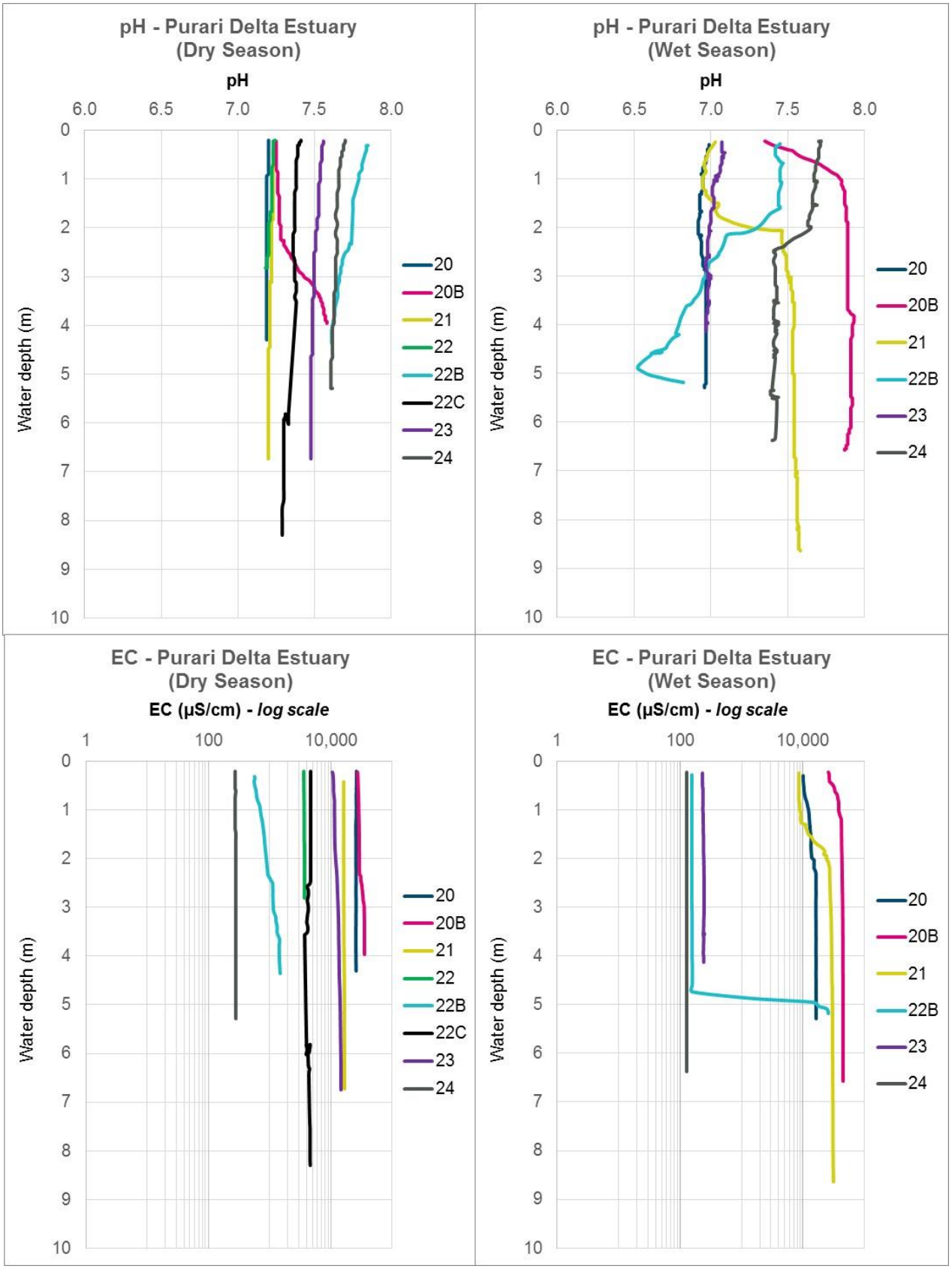


Figure 6-7 *In-situ* Water Quality Profiling Data – pH and EC - Purari Delta Estuary

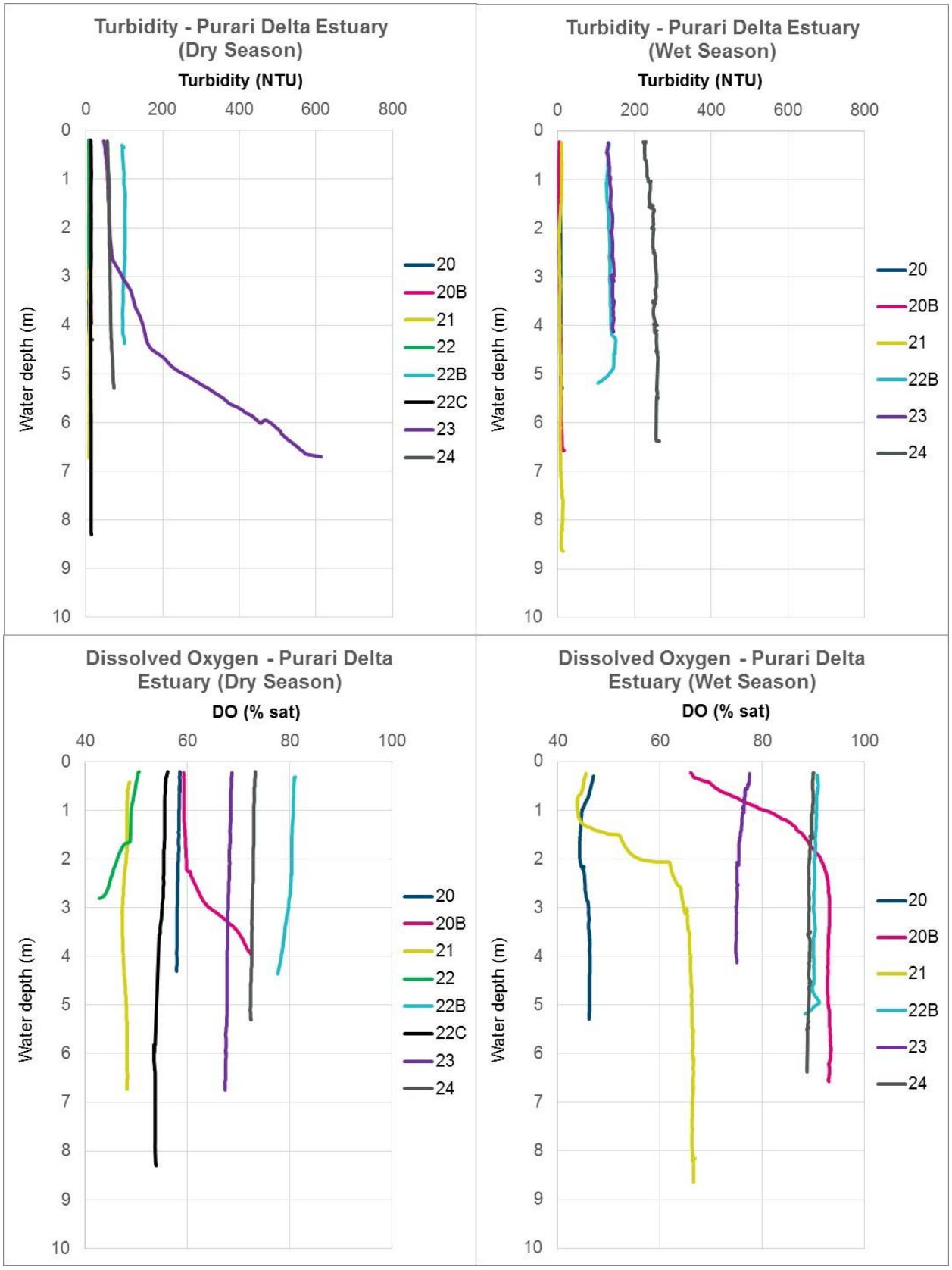


Figure 6-8 *In-situ* Water Quality Profiling Data – Turbidity and DO - Purari Delta Estuary

6.2.2 Continuous Water Quality Measurements

Continuous turbidity and water depth data was collected over a period of eight days in the Purari River at Herd Base during the wet season survey using instrumentation deployed approximately 0.5 to 4 m below the water surface (instrument was attached to the jetty at Herd Base and river level rose over the duration of deployment). The data are presented as a time-series plot in Figure 6-9. A summary of the turbidity data, including minimum, median and maximum values, is presented in Table 6-2.

The instrument data indicates that turbidity was around 200 to 400 NTU for much of the deployment period, with a few spikes in turbidity up to around 800 to 1,000 NTU.

The large spike in turbidity data around the 18 and 19 of February 2017 was associated with a large rainfall event, with increased turbidity most likely the result of localized runoff from areas around Herd Base (based on visual observations by field staff). Once the river began to rise as a result of the rainfall, the turbidity decreased for a brief period until a second spike in turbidity, likely due to suspended sediment from broader catchment runoff. A third spike in turbidity occurred around 21 February with an increase in river flow due to further rainfall and runoff in the catchment.

Table 6-2 Summary of Continuous Turbidity Data at Herd Base

Turbidity (NTU)	Purari River at Herd Base (wet season)
Minimum	129
Median	357
Maximum	1,225

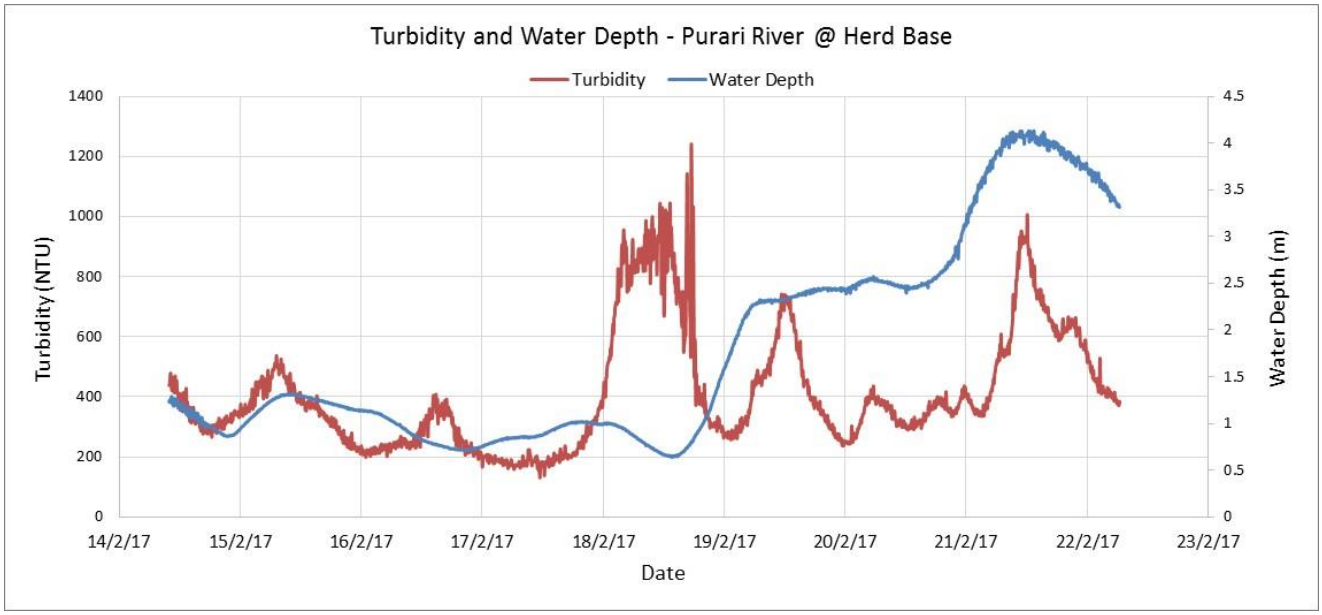


Figure 6-9 Wet Season Turbidity and Water Depth Data in Purari River at Herd Base

6.2.3 Laboratory Data

Laboratory results from samples collected by BMT WBM in June/July 2016 (dry season) and January/February 2017 (wet season) are presented in the following sections, and laboratory analysis reports are included in Appendix A.

6.2.3.1 Major Ions and Alkalinity

Major cations analyzed include magnesium (Mg^{2+}), calcium (Ca^{2+}), sodium (Na^{+}), and potassium (K^{+}), while major anions include chloride (Cl^{-}), sulfate (SO_4^{2-}), and alkalinity (expressed as $CaCO_3$ and including carbonate CO_3^{2-} and bicarbonate HCO^{3-}).

In freshwater environments, cations and anions can be used to determine the geochemical signature of water to indicate the geology and weathering in the contributing catchment. The data can also indicate the degree to which estuarine sites are influenced by marine waters. Major ions that are present in freshwaters are derived from two main sources: (i) input from rainfall, which have their origin from both marine salts and continental dust, and (ii) acquisition during weathering and water-rock interactions. In estuarine waters, a major source of major ions is from dissolved salts in marine waters.

Major ion data are presented in Table 6-3.

The results in Table 6-3 are all below the PNG ER guideline values for potassium and sulfate for the freshwater sites. In addition, the sulfate data for the freshwater sites are also below the Papua New Guinea drinking water quality guideline value for sulfate (250 mg/L – refer to Section 5.5). Potassium and sulfate at the Purari delta estuary sites are elevated above these guideline values due to the influence of marine waters, however these guideline values are only applicable to freshwaters.

Patterns in the ionic composition of waters at each site are presented in a Piper diagram shown in Figure 6-10. These results indicate that most of the monitoring sites had a similar chemical composition. Calcium was the dominant cation and carbonate (HCO_3 + CO_3) was the dominant anion at most sites. These sites can therefore be referred to as calcium-carbonate type waters. The exceptions to this were:

- During the dry season survey, Site 2 (Fly Camp C near CPF) and to a lesser extent Site 10 (tributary north of Herd Base) within PRL-15, which had high sulfate levels relative to other sites (Figure 6-10).
- Sites 20 and 21 (Purari delta estuary sites) during the wet season survey, where surface water was brackish at the time of sampling and therefore had much higher concentrations of major ions, especially sodium and chloride (Figure 6-10). Other Purari delta estuary sites (22B, 23 and 24) had low electrical conductivity in surface water at the time of sampling (Table 6-1) and consequently low major ion concentrations (Table 6-3).

Alkalinity, comprising specific anions (i.e. carbonate and bicarbonate), measures the total amount of base present in water and indicates the ability of water to resist large pH changes, i.e., 'buffering capacity'. Waters of low alkalinity (<20 mg $CaCO_3$/L) are poorly buffered, while waters with greater than 20 mg $CaCO_3$/L alkalinity have greater buffering capacity and prevent large fluctuations in pH. All of the monitoring sites had water with total alkalinity well above 20 mg $CaCO_3$/L (up to 168 mg

$CaCO_3$/L), indicating that the waters have good acid-buffering capacity. The total alkalinity was comprised predominantly of bicarbonate anions, and the high bicarbonate levels reflect the widespread presence of calcareous rocks in the catchment (Petr, 1983a and 1983b)

Previous Studies

Petr (1983a, 1983b) reported on major ion data collected at a number of locations along the Purari River and various tributaries. The most relevant data to this study was collected over a number of days at Wabo on the Purari River, which is located approximately 10 km upstream of Site 15 in Table 6-3 (location of Site 15 is shown in Figure 5-1). Petr (1983a, 1983b) reported the following:

- Alkalinity was recorded between 52 and 75 mg $CaCO_3$/L. This is similar to data collected at Site 15, with alkalinity of 41 to 83 mg $CaCO_3$/L (Table 6-3).
- Ca (16 to 20 mg/L), Mg (2 to 3 mg/L), Na (2 to 4 mg/L), and K (0.6 to 0.9 mg/L), Cl (1 to 2 mg/L) and SO_4 (4 to 5 mg/L) were all similar to data collected at Site 15 (Table 6-3).
- Water hardness was recorded between 50 and 75 mg/L. Again, this is similar to data collected at Site 15 (54 to 72 mg/L).

Data from other main channel Purari River sites in Table 6-3 (i.e. sites 11, 12, 13, and 14) had similar major ions data to Site 15 and is therefore also comparable to the Petr (1983a, 1983b) data.

Table 6-3 Major Ions and Alkalinity Data

Site	Date		Alkalinity ($CaCO_3$)								Major Ions													
			Hydroxide Alkalinity		Carbonate Alkalinity		Bi-carbonate Alkalinity		Total Alkalinity		Ca^{2+}		Mg^{2+}		K^{+}		Na^{+}		Cl^{-}		SO_4^{2-}		Water Hardness	
			mg $CaCO_3$/L		mg $CaCO_3$/L		mg $CaCO_3$/L		mg $CaCO_3$/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
PRL-15 Sites																								
1B	24/7/16	-	<1	<1	<1	<1	58	-	58	-	14	-	6	-	1	-	8	-	2	-	24	-	60	-
2	22/7/16	18/2/17	<1	<1	<1	<1	91	92	91	92	41	30	17	14	2	2	6	5	2	1	100	48	173	159
3B	24/7/16	15/2/17	<1	<1	<1	<1	134	168	134	168	32	41	10	12	2	2	20	29	5	9	42	35	121	199
4	25/7/16	16/2/17	<1	<1	<1	<1	38	32	38	32	8	8	3	3	<1	<1	4	1	<1	<1	12	10	32	40
5	25/7/16	17/2/17	<1	<1	<1	<1	83	99	83	99	25	30	8	9	1	1	8	8	1	2	31	30	95	146
6	25/7/16	18/2/17	<1	<1	<1	<1	66	68	66	68	16	18	5	5	1	<1	8	6	2	2	15	13	61	87
9	27/7/16	15/2/17	<1	<1	<1	<1	84	84	84	84	21	21	5	5	<1	1	8	8	1	1	11	10	73	99
10	26/7/16	18/2/17	<1	<1	<1	<1	104	131	104	131	31	32	16	18	2	2	19	24	5	6	74	55	143	177
11 (main channel)	23/7/16	21/2/17	<1	<1	<1	<1	78	66	78	66	22	21	3	2	<1	<1	3	<1	<1	<1	5	3	67	92
12 (main channel)	23/7/16	19/2/17	<1	<1	<1	<1	63	38	63	38	19	15	2	3	<1	<1	2	<1	<1	1	4	12	56	69
13 (main channel)	23/7/16	21/2/17	<1	<1	<1	<1	72	38	72	38	19	10	3	5	<1	1	3	6	<1	2	4	27	60	54
14 (main channel)	23/7/16	14/2/17	<1	<1	<1	<1	78	85	78	85	21	18	5	9	1	1	8	10	2	2	18	25	73	97
15 (main channel)	21/7/16	20/2/17	<1	<1	<1	<1	83	41	83	41	24	12	3	2	<1	<1	3	<1	<1	1	4	4	72	54
Purari Delta Sites																								
16	3/7/16	21/1/17	-	<1	-	<1	-	74	-	74	-	20	-	3	-	<1	-	3	-	<1	-	4	-	90
17	3/7/16	20/1/17	-	<1	-	<1	-	69	-	69	-	19	-	3	-	<1	-	3	-	<1	-	3	-	86
18	27/6/16	19/1/17	-	<1	-	<1	-	133	-	133	-	28	-	13	-	2	-	24	-	9	-	24	-	148
19	27/6/16	19/1/17	-	<1	-	<1	-	74	-	74	-	21	-	3	-	<1	-	3	-	<1	-	3	-	94
Purari Delta Estuary Sites																								
20^	29/6/16	17/1/17	-	<1	-	<1	-	119	-	119	-	77	-	201	-	63	-	1,680	-	3,080	-	365	-	820
21^	29/6/16	18/1/17	-	<1	-	<1	-	132	-	132	-	70	-	168	-	54	-	1,410	-	2,640	-	257	-	708

Site	Date		Alkalinity ($CaCO_3$)								Major Ions													
			Hydroxide Alkalinity		Carbonate Alkalinity		Bi-carbonate Alkalinity		Total Alkalinity		Ca^{2+}		Mg^{2+}		K^+		Na^+		Cl^-		SO_4^{2-}		Water Hardness	
			mg $CaCO_3$/L		mg $CaCO_3$/L		mg $CaCO_3$/L		mg $CaCO_3$/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
22B^	28/6/16	18/1/17	-	<1	-	<1	-	76	-	76	-	22	-	3	-	<1	-	5	-	4	-	4	-	98
23^	3/7/16	22/1/17	-	<1	-	<1	-	77	-	77	-	20	-	5	-	2	-	20	-	23	-	4	-	95
24	3/7/16	22/1/17	-	<1	-	<1	-	66	-	66	-	20	-	2	-	<1	-	3	-	<1	-	3	-	87
Laboratory LORs			0.1-1.0		0.1-1.0		0.1-1.0		0.1-1.0		1		1		1		1		0.1-1.0		0.1-1.0		1	
Guideline values (freshwater)	*PNG ER*		-		-		-		-		-		-		5		-		-		400			
	ANZECC		-		-		-		-		-		-		-		-		-		-			
	Drinking water (PNG PHR)		-		-		-		-		-		-		-		-		-		250			
	Drinking water (WHO)		-		-		-		-		-		-		-		-		-		-			
Guideline values (marine)	*PNG ER*		-		-		-		-		-		-		450		-		-		-			
	ANZECC		-		-		-		-		-		-		-		-		-		-			

NOTE: ^ indicates estuarine sites where the more stringent of the freshwater or marine water trigger value is applied.

Highlighted cells indicate exceedance of the guideline values, with highlighted color corresponding to guideline color at the bottom of table. Grey shading indicates exceedance of more than one guideline value.

Water samples collected at monitoring sites in the lower Purari River/estuary and Wame-Varoi estuary were not analyzed for major ions during the dry season survey

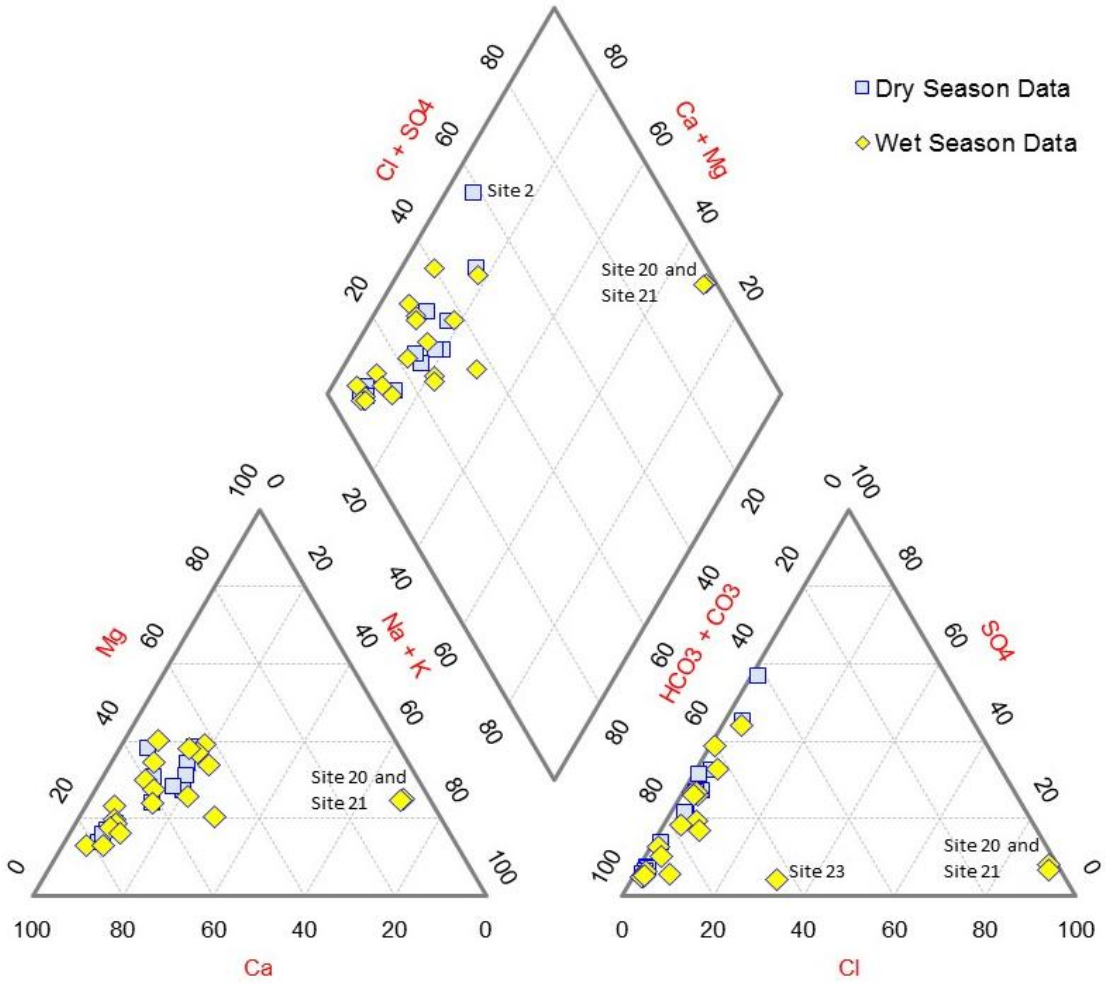


Figure 6-10 Piper Plot of Major Ions

Piper diagrams

Piper diagrams illustrate:

(i) dominant ions at each site at the time of sampling.

(ii) patterns in similarity (and dissimilarity) in the chemical composition among sites. Sites with similar ionic composition group together, whereas sites that are chemically distinct tend not to group with other sites.

6.2.3.2 Metals and Metalloids

Total and dissolved metals/metalloids data from samples collected in June/July 2016 (dry season) and January/February 2017 (wet season) are presented in Table 6-4 and Table 6-5, respectively.

Water quality criteria/guideline values for dissolved metals/metalloids are included at the bottom of Table 6-5, and dissolved concentrations that exceed the most stringent of these guideline values are highlighted. NOTE: As the guideline values are relevant to dissolved concentrations only[4], total concentrations in Table 6-4 (which are sometimes substantially higher than dissolved fractions) have not been compared to the guideline values.

The metals/metalloids results can be summarized as follows:

- Dissolved concentrations of all metals/metalloids were below all aquatic ecosystem protection guideline values at all sites during both surveys, with the exception of dissolved zinc at Site 4 (9 µg/L) during the dry season survey which slightly exceeded the ANZECC/ARMCANZ (2000) guideline value (8 µg/L). However, contamination of this sample during sample filtration or analysis is suspected since the total zinc concentration was less than the limit of reporting (<5 µg/L).
- Dissolved concentrations of all metals/metalloids were relatively consistent between sites, with most sites recording concentrations below the laboratory LOR. The notable exception to this was strontium (Sr), which had highest concentrations at estuarine sites, especially during the dry season survey. Strontium is naturally present in relatively high concentrations (approximately 8 mg/L) in seawater.
- Total concentrations of aluminum (Al), barium (Ba), cobalt (Co) copper (Cu) and iron (Fe) were all higher than dissolved concentrations, particularly Al and Fe.

In regards to drinking water quality guidelines for metals/metalloids (Section 5.5), these are similar to, or less stringent than, the PNG ER and ANZECC guidelines for protection of aquatic ecosystems. As such, compliance with the aquatic ecosystem guideline values also indicates compliance with the drinking water guidelines. The exception to this is arsenic (As) if using the latest WHO drinking water guidelines (WHO 2011), which specifies a more stringent guideline value for As (10 µg/L compared with the most stringent ecosystem protection guideline value of 24 µg/L). However, the dissolved As concentrations in Table 6-5 are all below the WHO (2011) drinking water guideline value.

[4] While drinking water guidelines apply to total metals concentrations, it is assumed that dissolved metals are more relevant as solids would be likely be removed prior to consumption

Table 6-4 Total Metals/Metalloids Data

Site	Date		Al		As		Ba		Cd		Cr		Co		Cu		Fe		Hg		Pb		Ni		Sr		Sn		V		Zn	
			µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
PRL-15 Sites																																
1B	24/7/16	-	10	-	<1	-	4	-	<0.1	-	<1	-	<1	-	<1	-	90	-	<0.1	-	<1	-	<1	-	125	-	<1	-	<10	-	<5	-
2	22/7/16	18/2/17	810	100	<1	<1	14	9	<0.1	<0.1	2	<1	<1	<1	2	<1	1,620	400	<0.1	<0.1	<1	<1	5	1	293	216	<1	<1	<10	<10	<5	<5
3B	24/7/16	15/2/17	990	70	<1	<1	6	6	<0.1	<0.1	2	<1	<1	<1	2	1	1,580	150	<0.1	<0.1	<1	<1	2	<1	256	298	<1	<1	<10	<10	<5	<5
4	25/7/16	16/2/17	370	420	<1	<1	23	3	<0.1	<0.1	<1	<1	<1	<1	1	<1	520	620	<0.1	<0.1	<1	<1	<1	<1	68	56	<1	<1	<10	<10	<5	<5
5	25/7/16	17/2/17	250	340	<1	1	4	4	<0.1	0.1	<1	<1	<1	<1	<1	1	370	650	<0.1	<0.1	<1	<1	<1	1	177	190	<1	<1	<10	<10	<5	6
6	25/7/16	18/2/17	4,880	1,020	2	<1	25	15	<0.1	<0.1	8	2	3	<1	7	2	8,170	1,780	<0.1	<0.1	2	<1	8	2	133	129	<1	<1	10	<10	16	<5
9	27/7/16	15/2/17	90	60	<1	<1	6	5	<0.1	<0.1	<1	<1	<1	<1	<1	<1	120	90	<0.1	<0.1	<1	<1	<1	<1	171	161	<1	<1	<10	<10	<5	<5
10	26/7/16	18/2/17	100	20	<1	<1	5	5	<0.1	<0.1	<1	<1	<1	<1	7	<1	150	<50	<0.1	<0.1	<1	<1	<1	<1	250	242	<1	<1	<10	<10	<5	<5
11 (main channel)	23/7/16	21/2/17	5,600	11,800	2	2	25	53	<0.1	<0.1	8	16	4	8	7	18	8,760	17,400	<0.1	<0.1	2	5	8	15	157	178	<1	<1	20	30	16	33
12 (main channel)	23/7/16	19/2/17	16,800	4,220	3	<1	74	21	<0.1	<0.1	21	7	9	3	21	8	19,600	6,500	<0.1	<0.1	5	2	22	6	184	99	<1	<1	40	10	35	14
13 (main channel)	23/7/16	21/2/17	9,760	2,120	3	<1	36	14	<0.1	<0.1	16	5	7	2	15	6	16,200	3,980	<0.1	<0.1	4	<1	18	5	161	90	<1	<1	30	<10	30	6
14 (main channel)	23/7/16	14/2/17	12,900	910	4	<1	42	9	<0.1	<0.1	21	2	9	<1	20	5	21,400	1,290	<0.1	<0.1	5	<1	22	2	164	147	<1	<1	40	<10	40	24
15 (main channel)	21/7/16	20/2/17	990	3,680	<1	1	11	17	<0.1	<0.1	1	6	<1	2	1	6	1,360	5,850	<0.1	<0.1	<1	1	<1	6	148	82	<1	<1	<10	10	<5	11
Purari Delta Sites																																
16	3/7/16	21/1/17	1,930	9,520	0.7	2	14.5	37	<0.05	<0.1	2.5	14	1.1	6	2.6	14	2,600	14,200	<0.1	<0.1	0.7	3	2.1	13	143	151	<0.2	<1	7.3	30	4	25
17	3/7/16	20/1/17	3,030	9,680	1	2	20.1	43	<0.05	<0.1	4	15	2	6	4.3	14	4,380	14,000	<0.1	<0.1	1.2	3	3.7	14	153	157	<0.2	<1	10.8	30	8	24
18	27/6/16	19/1/17	2,990	1,210	1.1	2	16.5	10	<0.05	<0.1	4.5	2	1.8	<1	5.1	3	4,270	2,590	<0.1	<0.1	1	<1	4	2	123	227	<0.2	<1	11	<10	9	<5
19	27/6/16	19/1/17	2,620	9,000	0.9	2	16.8	41	<0.05	<0.1	4	13	1.6	5	4.9	13	3,850	12,700	<0.1	<0.1	1	3	3.4	11	118	162	<0.2	<1	9.8	30	6	23
Purari Delta Estuary Sites																																
20	29/6/16	17/1/17	166	200	<0.5	1	16	13	<0.2	<0.1	<0.5	<1	0.4	<1	<1	<1	720	1,000	<0.1	<0.1	<0.2	<1	<0.5	<1	2,530	1,170	<5	<1	<0.5	<10	<5	<5
21	29/6/16	18/1/17	281	420	<0.5	1	18	18	<0.2	<0.1	<0.5	<1	0.4	<1	<1	2	789	710	<0.1	<0.1	<0.2	<1	<0.5	<1	1,560	999	<5	<1	1	<10	<5	<5
22B	28/6/16	18/1/17	1,510	4,740	0.7	1	10.2	25	<0.05	<0.1	2.4	7	1	2	3.2	7	2,370	6,370	<0.1	<0.1	0.6	2	2.2	6	119	146	<0.2	<1	6.7	20	4	10
23	3/7/16	22/1/17	1,210	5,460	<0.5	1	36	26	<0.2	<0.1	1.9	8	1.1	2	<1	8	2,330	7,070	<0.1	0.2	0.5	2	1.8	7	1,220	143	<5	<1	4.6	20	<5	13
24	3/7/16	22/1/17	1,610	8,690	0.8	2	13.4	35	<0.05	<0.1	2.4	11	1	4	2.8	10	2,420	11,400	<0.1	<0.1	0.6	2	2.1	9	125	136	<0.2	<1	7.2	20	4	20
Laboratory LORs			0.01		0.001		0.001		0.0001		0.001		0.001		0.001		0.05		0.0001		0.001		0.001		0.001		0.001		0.01		0.005	

Table 6-5 Dissolved Metals/Metalloids Data

Site	Date		Al		As		Ba		Cd		Cr		Co		Cu		Fe		Hg		Pb		Ni		Sr		Sn		V		Zn	
			µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
PRL-15 Sites																																
1B	24/7/16	-	<10	-	<1	-	4	-	<0.1	-	<1	-	<1	-	<1	-	80	-	<0.1	-	<1	-	<1	-	120	-	<1	-	<10	-	<5	-
2	22/7/16	18/2/17	<10	<10	<1	<1	11	8	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<50	60	<0.1	<0.1	<1	<1	1	1	275	197	<1	<1	<10	<10	<5	<5
3B	24/7/16	15/2/17	<10	<10	<1	<1	4	6	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<50	<50	<0.1	<0.1	<1	<1	<1	<1	236	282	<1	<1	<10	<10	<5	<5
4	25/7/16	16/2/17	10	20	<1	<1	6	2	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<50	<50	<0.1	<0.1	<1	<1	<1	<1	58	53	<1	<1	<10	<10	9	<5
5	25/7/16	17/2/17	<10	<10	<1	1	3	4	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<50	60	<0.1	<0.1	<1	<1	<1	<1	156	174	<1	<1	<10	<10	<5	<5
6	25/7/16	18/2/17	10	10	<1	<1	5	7	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<50	<50	<0.1	<0.1	<1	<1	<1	<1	111	114	<1	<1	<10	<10	<5	<5
9	27/7/16	15/2/17	<10	<10	<1	<1	5	5	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<50	<50	<0.1	<0.1	<1	<1	<1	<1	153	151	<1	<1	<10	<10	<5	<5
10	26/7/16	18/2/17	<10	<10	<1	<1	5	5	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<50	170	<0.1	<0.1	<1	<1	<1	1	225	234	<1	<1	<10	<10	8	<5
11 (main channel)	23/7/16	21/2/17	20	30	<1	<1	6	6	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<50	<50	<0.1	<0.1	<1	<1	<1	<1	129	112	<1	<1	<10	<10	<5	<5
12 (main channel)	23/7/16	19/2/17	40	30	<1	<1	4	6	<0.1	<0.1	<1	<1	<1	<1	<1	1	<50	110	<0.1	<0.1	<1	<1	<1	<1	105	91	<1	<1	<10	<10	<5	<5
13 (main channel)	23/7/16	21/2/17	20	20	<1	<1	6	7	<0.1	<0.1	<1	<1	<1	<1	<1	2	<50	180	<0.1	<0.1	<1	<1	<1	1	124	81	<1	<1	<10	<10	<5	<5
14 (main channel)	23/7/16	14/2/17	20	<10	<1	<1	7	5	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<50	130	<0.1	<0.1	<1	<1	<1	<1	124	128	<1	<1	<10	<10	<5	<5
15 (main channel)	21/7/16	20/2/17	10	20	<1	<1	6	5	<0.1	<0.1	<1	<1	<1	<1	<1	1	<50	90	<0.1	<0.1	<1	<1	<1	<1	134	65	<1	<1	<10	<10	<5	6
Purari Delta Sites																																
16	3/7/16	21/1/17	19	20	0.4	<1	6	5	<0.05	<0.1	<0.2	<1	<0.1	<1	0.5	<1	18	<50	<0.1	<0.1	<0.1	<1	<0.5	<1	127	126	<0.2	<1	1.9	<10	<1	<5
17	3/7/16	20/1/17	16	20	0.4	<1	6.2	5	<0.05	<0.1	<0.2	<1	<0.1	<1	0.5	<1	13	<50	<0.1	<0.1	<0.1	<1	<0.5	<1	130	123	<0.2	<1	1.8	<10	<1	<5
18	27/6/16	19/1/17	16	<10	0.5	<1	5.3	7	<0.05	<0.1	<0.2	<1	<0.1	<1	0.7	1	20	100	<0.1	<0.1	<0.1	<1	<0.5	<1	105	224	<0.2	<1	2.4	<10	<1	<5
19	27/6/16	19/1/17	18	20	0.4	<1	5.5	6	<0.05	<0.1	<0.2	<1	<0.1	<1	0.7	<1	28	<50	<0.1	<0.1	<0.1	<1	<0.5	<1	111	129	<0.2	<1	2.5	<10	<1	<5
Purari Delta Estuary Sites ^																																
20	29/6/16	17/1/17	<5	<10	<0.5	<1	17	12	<0.2	<0.1	<0.5	<1	<0.2	<1	<1	<1	12	<50	<0.1	<0.1	<0.2	<1	<0.5	<1	2,870	1170	<5	<1	<0.5	<10	<5	<5
21	29/6/16	18/1/17	<5	<10	<0.5	<1	20	17	<0.2	<0.1	<0.5	<1	<0.2	<1	<1	<1	21	<50	<0.1	<0.1	<0.2	<1	<0.5	<1	2,090	969	<5	<1	0.7	<10	<5	<5
22B	28/6/16	18/1/17	11	20	0.5	<1	5.9	6	<0.05	<0.1	<0.2	<1	<0.1	<1	0.8	<1	13	<50	<0.1	<0.1	<0.1	<1	<0.5	<1	140	131	<0.2	<1	2.4	<10	<1	<5
23	3/7/16	22/1/17	<5	<10	<0.5	<1	34	8	<0.2	<0.1	<0.5	<1	<0.2	<1	<1	<1	<5	<50	<0.1	<0.1	<0.2	<1	<0.5	<1	1,270	137	<5	<1	0.5	<10	<5	<5
24	3/7/16	22/1/17	9	20	0.5	<1	6.7	5	<0.05	<0.1	<0.2	<1	<0.1	<1	0.6	<1	17	<50	<0.1	<0.1	<0.1	<1	<0.5	<1	115	117	<0.2	<1	2.4	<10	<1	<5
Laboratory LORs			0.01		0.001		0.001		0.0001		0.001		0.001		0.001		0.05		0.0001		0.001		0.001		0.001		0.001		0.01		0.005	
Guideline Values (freshwater)	***PNG ER***		-		*50*		*1,000*		*10*		*50*		*1.0*		*1,000*		*1,000*		*0.2*		*5*		*1,000*		-		*500*		-		*5,000*	
	ANZECC		*55*		*24*		-		*0.2*		*1.0*		-		*1.4*		-		*0.06*		*3.4*		*11*		-		-		-		*8*	
	Drinking water (PNG PHR)		-		*50*		-		*10*		-		-		-		-		*1*		*100*		-		-		-		-		-	
	Drinking water (WHO)		-		*10*		-		*3*		*50*		-		*2,000*		-		*6*		*10*		*70*		-		-		-		-	
Guideline Values (marine)	***PNG ER***		-		*50*		*1,000*		*1.0*		*10*		*0.2*		*30*		*1,000*		*0.2*		*4*		*1,000*		-		*500*		-		*5,000*	
	ANZECC		-		-		-		*0.7*		*4.4*		*1.0*		*1.3*		-		*0.1*		*4.4*		*7*		-		-		*100*		*15*	

NOTE: Highlighted cells indicate exceedance of the guideline values, with highlighted color corresponding to guideline color at the bottom of table. Grey shading indicates exceedance of more than one guideline value.

^ indicates estuarine sites where more stringent of the freshwater or marine water trigger value is applied

Previous Studies

Similar to results from the present study, GHD (2015a, 2015b, 2015c, 2015d) found that most dissolved metals/metalloids were below the laboratory limits of reporting and all metals/metalloids were below guideline values.

In the gas field development area of the PNG LNG Project, Hydrobiology (2008) recorded low levels of metals/metalloids in water samples, with concentrations mostly below LORs.

6.2.3.3 Total Suspended Solids, Organic Carbon, Chlorophyll, Coliforms and Nutrients

Water samples collected in June/July 2016 (dry season) and January/February 2017 (wet season) were analyzed for a range of other parameters, including total suspended solids (TSS), total and dissolved organic carbon (TOC and DOC), chlorophyll-a, total coliforms and nutrients, including total nitrogen (TN), ammonia, nitrate and nitrite (NO_x), total Kjeldahl nitrogen (TKN), total phosphorus (TP) and filterable reactive phosphorus (FRP). The results are presented in Table 6-6 and can be summarized as follows:

- Total suspended solids results displayed similar patterns of spatial variability to turbidity data (Figure 6-2), with main channel Purari River sites in PRL-15 and Purari delta sites (during the wet season) having higher TSS than other sites. Note that, at sites 11, 12,13, 14 and 15, TSS samples were only collected in the main channel of the Purari River (and not the tributaries at these locations where in situ measurements only were performed). There was no consistent difference in TSS levels between seasons. Some sites had higher TSS during the wet season survey compared to the dry season survey, while other sites had lower TSS during the wet season survey (Figure 6-11).
- Total suspended solids data can be summarized based on the three main types of waterways in the study area, as follows:
    - Tributary streams in PRL-15 (sites 1B-10): median TSS of 7 mg/L, with a range of values between 1 and 130 mg/L
    - Freshwater reaches of Purari River (sites 11-19): median TSS of 84 mg/L, with a range of values between 21 and 484 mg/L
    - Estuarine reaches of Purari River (sites 20-24): median TSS of 45 mg/L, with a range of values between 8 and 228 mg/L
- Total and dissolved organic carbon concentrations were generally similar at all sites, with total and dissolved organic carbon concentrations ranging from 1 mg/L (sites 4 and 11 in PRL-15) up to 8 mg/L (Site 18 in Purari delta). Total and dissolved concentrations were similar at each site, indicating that the organic carbon present is mostly in the dissolved fraction.
- All PRL-15 sites during the dry season and wet season surveys had total coliform[5] concentrations of >80 CFU/100 mL (the laboratory advised that it could not quantify higher concentrations as samples were not permitted to be diluted in the laboratory to allow quantification of high coliform numbers due to quarantine restrictions). Therefore, it is not known whether actual concentrations

[5] Total coliform results should be considered indicative since it was not possible to meet the recommended sample holding time of 24 hours. However, it is not unusual for high coliforms to be found in PNG streams, due to both human contamination and natural sources.

were above the PNG ER guideline value of 200 CFU/100 mL. However, they are all above the Papua New Guinea drinking water guideline value of 3 CFU/100 mL and the WHO guideline of no detectable coliforms. Total coliform levels at sites in the Purari delta and Purari delta estuary during the wet season survey were well above guideline values, except for Site 21 in the Purari delta estuary which only slightly exceeded the Papua New Guinea drinking water guideline.

- All sites had low concentrations of nutrients, with similar concentrations during both surveys.
- Chlorophyll-a results analyzed at Purari delta and Purari delta estuary sites during the dry season survey were mostly less than 2 mg/L.
- Ammonia concentrations (which can have acute toxic effects on aquatic biota) at all sites were below the ANZECC/ARMCANZ (2000) ecosystem protection guideline value during both surveys.

Previous Studies

Petr (1983a, 1983b) reported on TSS data collected at three locations in the Purari River – at the lower end of Hathor Gorge, at Wabo camp, and about 1 km upstream of the delta. TSS data reported in Petr (1983a, 1983b) ranged from 29 to 778 mg/L, with an average value of 254 mg/L.

Further to this, Petr (1983a, 1983b) reported that TSS and nutrients data were collected over a number of days at Wabo on the Purari River. The data indicated that TSS ranged from 31 to 256 mg/L over the period, with a median of 103 mg/L. This is slightly higher than the median TSS of 84 mg/L for freshwater reaches of Purari River (sites 11 to 19) as discussed above. Petr (1983a, 1983b) reported that ammonia ranged from 0.008 to 0.086 mg/L, with a median of 0.03 mg/L. This is generally comparable to ammonia levels recorded in the Purari River sites in Table 6-6, with the exception of Site 11 which recorded elevated ammonia (but still below the guideline value) of 0.83 mg/L during the wet season survey.

Previous studies by DES (2008) recorded TSS at Era River tributary sites within the Elk/Antelope gas field development area ranging from 1 mg/L in Boa Creek tributary up to 600 mg/L in Mena Creek. Nitrate levels were less than 1 mg/L at all sites, while total phosphorus was less than 0.05 mg/L.

GHD (2015a, 2015b, 2015c, 2015d) collected water samples at sites in tributary streams within PRL-15. Total suspended solids was mostly below 5 mg/L, with one site recording TSS of 21 mg/L. This is similar to the median TSS value of 7 mg/L recorded in tributary streams in PRL-15 discussed above. GHD (2015a, 2015b, 2015c, 2015d) reported that NOx ranged from 0.006 to 0.008 mg/L, and ammonia was mostly below 0.005 mg/L. These values are lower than NOx and ammonia values in tributary streams in PRL-15 determined in the present study (see Table 6-6).

Table 6-6 TSS, Organic Carbon, Chlorophyll, Coliforms and Nutrients

Site	Date		TSS		Dissolved Organic Carbon		Total Organic Carbon		Chlorophyll a		Total Coliforms		Nutrients											
													Ammonia		Nitrate/Nitrite		Total Kjeldahl Nitrogen		Total Nitrogen		Total Phosphorus		Filterable Reactive Phosphorus	
			mg/L		mg/L		mg/L		mg/m^3		CFU/100mL		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
PRL-15 Sites																								
1B	24/7/16	-	43	-	3	-	2	-	-	-	>80	>80	0.06	-	0.02	-	0.2	-	0.2	-	0.07	-	<0.01	-
2	22/7/16	18/2/17	25	6	4	3	2	3	-	-	>80	>80	0.05	0.02	0.02	0.03	<0.1	<0.1	<0.1	<0.1	0.04	0.05	0.02	0.03
3B	24/7/16	15/2/17	27	3	3	6	3	5	-	-	>80	>80	0.06	0.03	0.02	0.02	0.1	0.1	0.1	0.1	0.04	0.04	0.01	0.02
4	25/7/16	16/2/17	7	10	2	2	1	2	-	-	>80	>80	0.05	<0.01	<0.01	<0.01	0.1	<0.1	0.1	<0.1	0.03	0.04	<0.01	<0.01
5	25/7/16	17/2/17	6	31	2	4	2	4	-	-	>80	>80	0.06	0.02	0.03	0.04	0.1	<0.1	0.1	<0.1	0.02	0.05	0.01	0.01
6	25/7/16	18/2/17	130	31	3	4	3	4	-	-	>80	>80	0.08	0.02	0.02	0.02	0.4	0.2	0.4	0.2	0.15	0.06	<0.01	0.01
9	27/7/16	15/2/17	2	2	2	3	2	2	-	-	>80	>80	0.02	0.03	0.03	0.02	<0.1	<0.1	<0.1	<0.1	0.02	0.03	<0.01	0.01
10	26/7/16	18/2/17	3	<1	3	4	2	3	-	-	>80	>80	0.08	0.03	0.06	0.05	<0.1	0.1	<0.1	0.2	0.05	0.06	0.03	0.04
11 (main channel)	23/7/16	21/2/17	177	428	2	3	1	3	-	-	>80	>80	0.01	0.83	0.02	0.04	0.4	1.5	0.4	1.5	0.21	0.4	0.02	0.02
12 (main channel)	23/7/16	19/2/17	175	94	3	5	2	4	-	-	>80	>80	0.06	0.01	0.01	0.04	0.6	0.4	0.6	0.4	0.33	0.15	0.02	0.01
13 (main channel)	23/7/16	21/2/17	394	50	2	6	2	5	-	-	>80	>80	0.02	0.03	0.02	0.04	0.5	0.4	0.5	0.4	0.26	0.14	0.02	0.01
14 (main channel)	23/7/16	14/2/17	158	21	3	5	2	3	-	-	>80	>80	0.04	0.06	0.02	<0.01	0.6	0.2	0.6	0.2	0.3	0.05	0.02	0.02
15 (main channel)	21/7/16	20/2/17	34	71	2	5	2	4	-	-	>80	>80	0.04	<0.01	0.02	<0.01	0.2	0.3	0.2	0.3	0.04	0.08	0.02	<0.01
Purari Delta Sites																								
16	3/7/16	21/1/17	55	333	-	2	-	2	<2	-	-	9,200	0.02	0.03	0.05	0.04	<0.5	0.3	<0.5	0.3	0.15	0.17	0.02	0.02
17	3/7/16	20/1/17	74	324	-	2	-	2	<2	-	-	1,600	0.02	0.02	0.07	0.04	<0.5	0.4	<0.5	0.4	0.11	0.2	0.02	0.02
18	27/6/16	19/1/17	62	35	-	8	-	7	<2	-	-	920	<0.01	0.05	0.05	0.01	<0.5	0.3	<0.5	0.3	0.05	0.08	0.02	0.02
19	27/6/16	19/1/17	66	222	-	2	-	2	<2	-	-	1,600	<0.01	0.02	0.04	0.04	<0.5	0.4	<0.5	0.4	0.1	0.24	0.02	0.02
Purari Delta Estuary Sites																								
20	29/6/16	17/1/17	8	10	-	6	-	6	2	-	-	350	0.04	0.1	0.01	0.03	<0.5	0.2	<0.5	0.2	<0.05	0.07	0.03	0.04
21	29/6/16	18/1/17	9	8	-	6	-	5	<1	-	-	17	0.04	0.05	0.03	0.03	<0.5	0.2	<0.5	0.2	0.06	0.08	0.07	0.06
22B	28/6/16	18/1/17	49	117	-	2	-	2	<2	-	-	3,500	0.02	0.04	0.04	0.05	<0.5	0.2	<0.5	0.2	<0.05	0.1	0.08	0.02
23	3/7/16	22/1/17	49	113	-	3	-	2	<2	-	-	5,400	0.07	0.04	0.12	0.05	<0.5	0.2	<0.5	0.2	<0.05	0.13	0.03	0.03
24	3/7/16	22/1/17	40	228	-	3	-	2	<2	-	-	16,000	0.02	0.02	0.03	0.04	<0.5	0.3	<0.5	0.3	<0.05	0.18	0.02	0.02
Laboratory LOR			*1*		*1*		*1*		*2*		*-*		*0.01*		*0.01*		*0.5*		*0.5*		*0.05*		*0.01*	
Guideline Values (freshwater)	***PNG ER***		-		-		-		-		*200*		*3.6*		-		-		-		-		-	
	ANZECC		-		-		-		-		-		*0.9*		-		-		-		-		-	
	Drinking water (PNG PHR)		*1,500*		-		-		-		*3*		-		-		-		-		-		-	
	Drinking water (WHO)		*600*		-		-		-		*0*		-		-		-		-		-		-	
Guideline Values (marine)	***PNG ER***		-		-		-		-		-		-		-		-		-		-		-	
	ANZECC		-		-		-		-		-		-		-		-		-		-		-	

NOTE: Highlighted cells indicate exceedance of the guideline values, with highlighted color corresponding to guideline color at the bottom of table. Grey shading indicates exceedance of more than one guideline value.

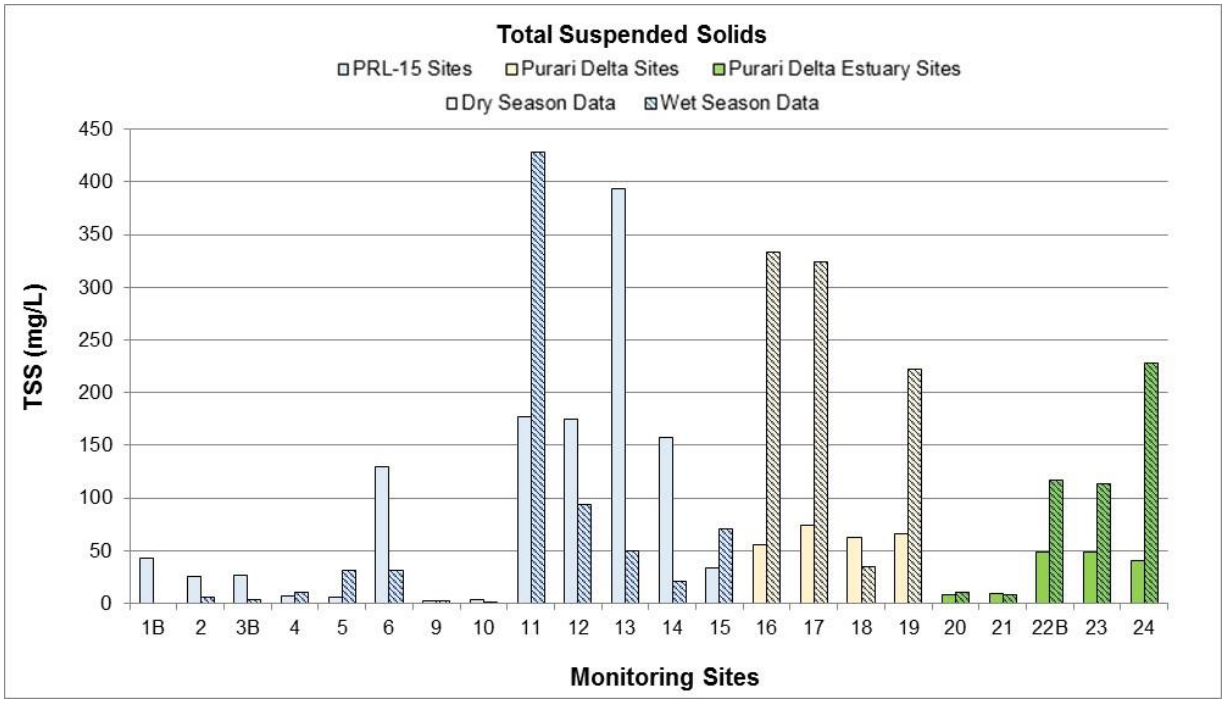


Figure 6-11 TSS Data

6.2.3.4 Hydrocarbons

The hydrocarbon data, including polycyclic aromatic hydrocarbons, total petroleum hydrocarbons, total recoverable hydrocarbons and BTEXN (benzene-toluene-ethylbenzene-xylene-naphthalene), are provided in Appendix C.

Results for all samples collected in June/July 2016 and January/February 2017 at all sites were below laboratory limits of reporting and below relevant ANZECC guideline values.

6.2.4 Vaihua River Estuary

The proposed site of the LNG facility occurs within the Vaihua River catchment adjacent Caution Bay. This catchment drains a relatively small area and features a low topography, relief and slope. The majority of the soils through this area are clay materials with evidence of poor drainage (Hydrobiology, 2009).

The Vaihua River at Caution Bay is considered estuarine up to the edge of the saltflats, immediately south-east of the existing PNG LNG facility. The river experiences highest flows between December and March with only low or intermittent flows in May to October which leave isolated pools of standing water (CNS, 2009). Most of the tributary streams of the river are ephemeral. As a result, freshwater inputs during the dry season are negligible but quite high during the wet season, leading to a transition between a ‘negative’ and a ‘positive’ estuary, and creating areas of hypersaline wetland in intertidal and supratidal flats (CNS, 2009).

Two sites were sampled (sites 28 and 29) during the 2016 and 2017 field surveys. The locations of these sites are shown in Figure 5-3.

The water quality data is presented in Table 6-7 to Table 6-10, with key observations as follows:

- Electrical conductivity and salinity in Vaihua River estuary is reflective of a marine environment, with EC around 55,000 µS/cm and salinity around 35 ppt.
- pH levels during the both surveys were slightly lower than the recommended guideline range (8.0 to 8.4) for marine waters in ANZECC.
- Turbidity was fairly low, with values between 1.9 and 8.3 NTU.
- Dissolved oxygen was slightly below the ANZECC and PNG ER guideline values at both sites during both surveys.
- Total coliforms at Site 29 during the wet season survey exceeded the freshwater PNG ER and PNG drinking water guideline values.
- Nutrients were mostly below laboratory limits of reporting.
- Dissolved metals/metalloids were mostly below guideline levels, except for dissolved copper at Site 29 (3 µg/L) which slightly exceeded the ANZECC guideline value (1.3 µg/L) during the wet season survey. However, the total copper concentration was less than the limit of reporting, (1 µg/L) indicating that contamination of the filtered dissolved sample has possibly occurred during either sampling or analysis.
- Potassium and sulfate are above the PNG ER freshwater guideline values and the Papua New Guinea drinking water quality guideline value for sulfate. However, these parameters are elevated due to the influence of marine waters, and therefore the marine guideline values are more applicable (which are not exceeded).

Previous Studies

Water quality data collected by Hydrobiology (2009) in Vaihua River estuary (sites VA11 – VA14) indicated that turbidity was 21 to 27 NTU, temperature was 26.5 to 28.3°C, and EC was approximately 57,000 µS/cm at the time of sampling.

Hydrobiology (2009) also reported that dissolved copper, lead, silver and zinc exceeded water quality guideline values (ANZECC and PNG ER).

Table 6-7 Physicochemical Data – Vaihua River Estuary

Site ID	Date		Temp		EC		Salinity		pH		ORP		Turbidity		Dissolved Oxygen			
			ºC		µS/cm		ppt		-		mV		NTU		% sat		mg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
28 ^	7/7/16	29/1/17	27.0	30.6	55,875	53,384	37.1	35.1	7.9	7.9	-	-	1.9	6.1	81	70	5.3	4.3
29 ^	7/7/16	29/1/17	27.0	30.6	56,706	51,702	37.7	33.8	7.7	7.5	-	-	2.0	8.3	73	57	4.7	3.6
Guideline values (freshwater)	*PNG ER*		-		-		-		-		-		-		-		*>6*	
	ANZECC/ARMCANZ		-		-		-		*6 - 8*		-		-		*85 - 120*		-	
	Drinking water (PNG PHR)		-		-		-		*6.5 - 9.2*		-		*25*		-		-	
	Drinking water (WHO)		-		-		-		-		-		-		-		-	
Guideline values (marine)	*PNG ER*		-		-		-		-		-		-		-		*>5*	
	ANZECC/ARMCANZ		-		-		-		*8.0-8.4*		-		-		*>90*		-	

NOTE: ^ indicates estuarine sites where the more stringent of the freshwater or marine water trigger value is applied.
Highlighted cells indicate exceedance of the guideline values, with highlighted color corresponding to guideline color at the bottom of table. Grey shading indicates exceedance of more than one guideline value.

Table 6-8 Major Ions Data – Vaihua River Estuary

Site	Date		Alkalinity (mg $CaCO_3$/L)								Major Ions											
			Hydroxide Alkalinity		Carbonate Alkalinity		Bi-carbonate Alkalinity		Total Alkalinity		Ca^{2+}		Mg^{2+}		K^{+}		Na^{+}		Cl^{-}		SO_4^{2-}	
			mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
28 ^	7/7/16	29/1/17	-	<1	-	<1	-	119	-	119	-	396	-	1,170	-	362	-	9,940	-	16,000	-	2,310
29 ^	7/7/16	29/1/17	-	<1	-	<1	-	119	-	119	-	346	-	1,020	-	326	-	8,840	-	14,100	-	2,000
Guideline values (freshwater)	*PNG ER*		-		-		-		-		-		-		5		-		-		400	
	ANZECC/ARMCANZ		-		-		-		-		-		-		-		-		-		-	
	Drinking water (PNG PHR)		-		-		-		-		-		-		-		-		-		250	
	Drinking water (WHO)		-		-		-		-		-		-		-		-		-		-	
Guideline values (marine)	*PNG ER*		-		-		-		-		-		-		450		-		-		-	
	ANZECC		-		-		-		-		-		-		-		-		-		-	

Note ^ indicates estuarine sites where the more stringent of the freshwater or marine water trigger value is applied.
Highlighted cells indicate exceedance of the guideline values, with highlighted color corresponding to guideline color at the bottom of table. Grey shading indicates exceedance of more than one guideline value.

Table 6-9 TSS, Organic Carbon, Chlorophyll, Coliforms and Nutrients Data – Vaihua River Estuary

Site	Date		TSS		Dissolved Organic Carbon		Total Organic Carbon		Chlorophyll a		Total Coliforms		Nutrients											
													Ammonia		NOx		TKN		TN		TP		FRP	
			mg/L		mg/L		mg/L		mg/m^3		CFU/100mL		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
28 ^	7/7/16	29/1/17	9	14	-	4	-	3	<1	-	-	7	0.16	0.11	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5	0.06	0.08	<0.01	<0.01
29 ^	7/7/16	29/1/17	10	6	-	4	-	6	4	-	-	920	0.14	0.08	<0.01	<0.01	<0.5	<0.5	<0.5	<0.5	<0.05	0.06	<0.01	<0.01
Guideline values (freshwater)	***PNG ER***		-		-		-		-		*200*		*3.6*		-		-		-		-		-	
	ANZECC/ARMCANZ		-		-		-		-		-		*0.9*		-		-		-		-		-	
	Drinking water (PNG PHR)		*1,500*		-		-		-		*10*		-		-		-		-		-		-	
	Drinking water (WHO)		*600*		-		-		-		-		-		-		-		-		-		-	
Guideline Values (marine)	***PNG ER***		-		-		-		-		-		-		-		-		-		-		-	
	ANZECC		-		-		-		-		-		-		-		-		-		-		-	

NOTE: ^ indicates estuarine sites where the more stringent of the freshwater or marine water trigger value is applied.

Highlighted cells indicate exceedance of the guideline values, with highlighted color corresponding to guideline color at the bottom of table. Grey shading indicates exceedance of more than one guideline value.

Table 6-10 Total and Dissolved Metals/Metalloids Data – Vaihua River Estuary

Site	Date		Al		As		Ba		Cd		Cr		Co		Cu		Fe	
			µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
Total metals/metalloids																		
28 ^	7/7/16	29/1/17	74	138	1.8	1.0	6	9	<0.2	<0.2	<0.5	<0.5	0.2	<0.2	<1	<1	112	160
29 ^	7/7/16	29/1/17	97	251	1.8	1.1	9	13	<0.2	<0.2	<0.5	0.7	0.3	0.3	2	<1	142	280
Dissolved metals/metalloids																		
28 ^	7/7/16	29/1/17	<5	<5	1.6	1.4	6	9	<0.2	<0.2	<0.5	<0.5	<0.2	0.2	<1	<1	6	<50
29 ^	7/7/16	29/1/17	7	<5	1.4	1.4	9	11	<0.2	<0.2	<0.5	<0.5	<0.2	0.2	<1	3	7	<50
Guideline values (freshwater)	***PNG ER***		-		*50*		*1,000*		*10*		*50*		*1.0*		*1,000*		*1,000*	
	ANZECC/ARMCANZ		*55*		*24*		-		*0.2*		*1.0*		-		*1.4*		-	
	Drinking water (PNG PHR)		-		*50*		-		*10*		-		-		-		-	
	Drinking water (WHO)		-		*10*		-		*3*		*50*		-		*2,000*		-	
Guideline Values (marine)	***PNG ER***		-		*50*		*1,000*		*1.0*		*10*		*0.2*		*30*		*1,000*	
	ANZECC		-		-		-		*0.7*		*4.4*		*1.0*		*1.3*		-	

NOTE: ^ indicates estuarine sites where the more stringent of the freshwater or marine water trigger value is applied.

Highlighted cells indicate exceedance of the guideline values, with highlighted color corresponding to guideline color at the bottom of table. Grey shading indicates exceedance of more than one guideline value.

Table 6-10 (continued) Total and Dissolved Metals/Metalloids Data – Vaihua River Estuary

Site	Date		Hg		Pb		Ni		Sr		Sn		V		Zn	
			µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
Total metals/metalloids																
28 ^	7/7/16	29/1/17	<0.1	<0.1	<0.2	<0.2	0.9	0.6	7,460	6,570	<5	<5	1.8	2.6	<5	<5
29 ^	7/7/16	29/1/17	<0.1	<0.1	<0.2	<0.2	1.3	0.8	7,660	5,740	<5	<5	2.3	3.0	<5	<5
Dissolved metals/metalloids																
28 ^	7/7/16	29/1/17	<0.1	<0.1	<0.2	<0.2	<0.5	<0.5	7,870	6,480	<5	<5	2.2	2.7	<5	<5
29 ^	7/7/16	29/1/17	<0.1	<0.1	<0.2	<0.2	<0.5	<0.5	8,010	5,640	<5	<5	1.9	3.4	<5	<5
Guideline values (freshwater)	***PNG ER***		*0.2*		*5*		*1,000*		*-*		*500*		*-*		*5,000*	
	ANZECC/ARMCANZ		*0.06*		*3.4*		*11*		*-*		*-*		*-*		*8*	
	Drinking water (PNG PHR)		*1*		*100*		*-*		*-*		*-*		*-*		*-*	
	Drinking water (WHO)		*6*		*10*		*70*		*-*		*-*		*-*		*-*	
Guideline Values (marine)	***PNG ER***		*0.2*		*4*		*1,000*		*-*		*500*		*-*		*5,000*	
	ANZECC		*0.1*		*4.4*		*7*		*-*		*-*		*100*		*15*	

NOTE: ^ indicates estuarine sites where the more stringent of the freshwater or marine water trigger value is applied.

Highlighted cells indicate exceedance of the guideline values, with highlighted color corresponding to guideline color at the bottom of table. Grey shading indicates exceedance of more than one guideline value.

6.3 Sediment Quality Conditions

6.3.1 Particle Size Distribution

Particle size distribution (PSD) results for sediment samples collected in June/July 2016 (dry season) are presented in Table 6-11 and Figure 6-12.

Table 6-11 Sediment Particle Size Distribution Data

Site	Clay (<2 µm)	Silt (2-60 µm)	Sand (0.06-2 mm)	Gravel (>2 mm)	Cobbles (>6 cm)
	%	%	%	%	%
PRL-15 Sites					
1B	7	7	86	<1	<1
2	5	4	68	23	<1
3B	18	25	29	15	13
4	16	39	41	4	<1
5	21	60	16	3	<1
6	16	55	26	3	<1
9	27	59	13	1	<1
10	18	34	35	13	<1
11 (main channel)	<1	<1	99	1	<1
12 (main channel)	16	40	44	<1	<1
13 (main channel)	12	35	53	<1	<1
14 (main channel)	14	47	39	<1	<1
15 (main channel)	3	2	65	30	<1
Purari Delta Sites					
16	10	48	42	<1	<1
17	<1	1	99	<1	<1
18	26	65	9	<1	<1
19	23	44	33	<1	<1
Purari Delta Estuary Sites					
20	1	2	97	<1	<1
21	1	2	97	<1	<1
22B	23	71	6	<1	<1
23	24	74	2	<1	<1
24	12	27	61	<1	<1

This data indicates that bed sediment composition at monitoring sites in the study area is variable. In PRL-15, sites 11, 15, 1B, 2 and 3B consisted predominantly of sand and gravel, while other sites in PRL-15 consisted predominantly of silts and clays.

In the section of the Purari River main channel within PRL-15, the furthest upstream site (Site 15) and the furthest downstream site (Site 11) were mostly sand and gravel, while sites in between (sites 12, 13 and 14) had approximately 50% sands/gravels and 50% silts/clays. The difference in sediment types in the Purari River sites was due to the local hydrodynamics at each site, with higher energy

environments (where coarser sediments typically occur) at sites 11 and 15, and depositional environments (where finer sediments typically occur) at sites 12, 13 and 14.

Sites on tributary streams of the Era and Purari rivers in PRL-15 (sites 4, 5, 6 and 9) were characterized by large proportions (55% to 85%) of silts and clays.

Sites in the Purari delta and Purari delta estuary were also variable, with sites 17, 20 and 21 dominated by sand and gravel, while sites 16, 18, 19 and 22B were dominated by silts and clays.

The downstream site in Wame River estuary (Site 23) was mostly silts and clays (98%) while the site further upstream (Site 24) had a lower proportion of silts and clays (39%) and a larger proportion of sand (61%).

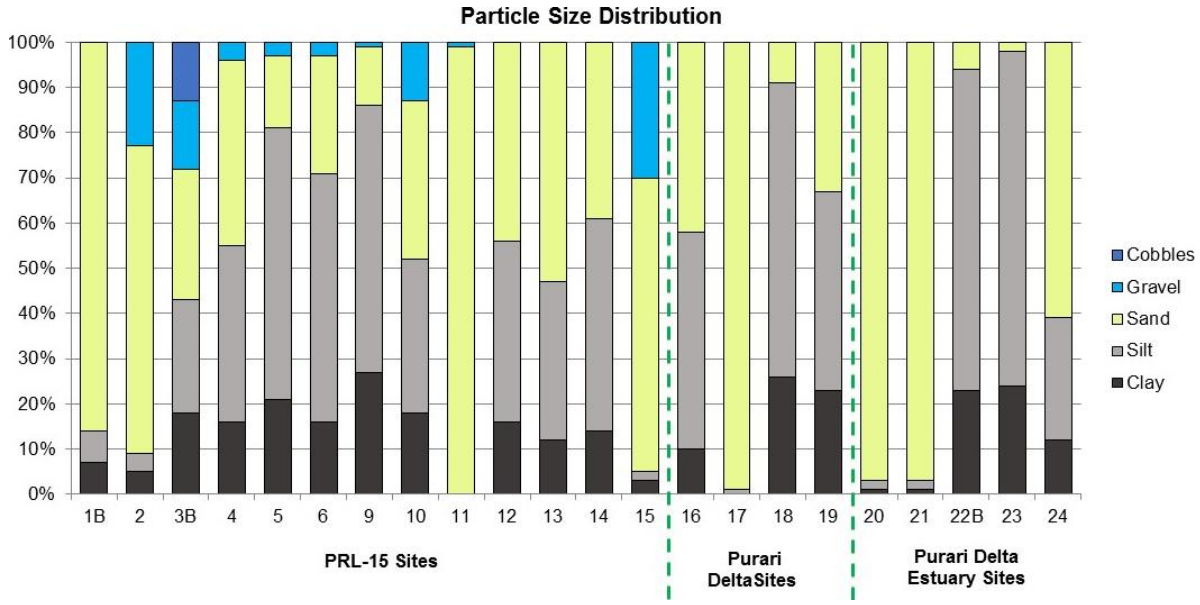


Figure 6-12 Sediment Particle Size Distributions

6.3.2 Metals and Metalloids

Metals/metalloids in whole sediment samples collected in June/July 2016 are presented in Table 6-12.

Total metal/metalloid concentrations are compared to Simpson *et al.* 2013 sediment quality guidelines as detailed in Section 5.5. These sediment guidelines give a low value (SQGV), below which ecotoxicological effects are unlikely to occur and a high value (SQG-high), above which ecotoxicological effects are possible.

Table 6-12 indicates that concentrations of metals/metalloids in sediment are relatively similar between monitoring sites (i.e. tributary streams and Purari River in PRL-15, Purari delta and Purari delta estuary). All concentrations were below sediment quality guideline values except nickel, which exceeded the SQGV at all sites, and also slightly exceeded the SQG-high at Site 9 in PRL-15. However, as found elsewhere in Papua New Guinea, it is not unusual for background nickel concentrations in sediment to exceed the guideline values, reflecting the natural catchment lithology.

Table 6-12 Total Metals/Metalloids in Sediment

Site	Sb	Al	As	Ba	Be	Cd	Cr	Co	Cu	Fe	Pb	Mn	Hg	Mo	Ni	Se	Ag	Sr	Th	Sn	V	Z
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
PRL-15 Sites																						
1B	-	17,000	6	40	-	<0.1	52.2	21.6	20.4	40,100	6.5	-	<0.1	-	44.4	-	-	37	-	22	66	66.3
2	-	11,800	<5	40	-	<0.1	36.5	16.7	15.1	26,200	4.1	-	<0.1	-	33.6	-	-	38	-	<5	46	42.9
3B	-	19,100	15	40	-	<0.1	46.2	24.1	34	55,600	11.6	-	<0.1	-	49.7	-	-	50	-	<5	67	85.5
4	-	20,500	12	40	-	<0.1	48.6	21	21.7	43,300	7.7	-	<0.1	-	45.3	-	-	28	-	<5	68	71.8
5	-	22,500	13	30	-	<0.1	47.5	21.1	33.4	52,000	10.3	-	<0.1	-	50.4	-	-	40	-	<5	65	89.9
6	-	20,200	14	80	-	<0.1	45.9	23.5	24.5	57,400	9.6	-	<0.1	-	48.7	-	-	36	-	<5	63	77.2
9	-	20,700	13	40	-	<0.1	43.1	21.2	37.9	55,300	10.7	-	<0.1	-	53.3	-	-	39	-	<5	58	94.1
10	-	20,100	7	30	-	<0.1	48.5	20	30.7	42,700	7.6	-	<0.1	-	44.8	-	-	41	-	<5	70	69.6
11 (main channel)	-	14,000	<5	50	-	<0.1	31.4	15.5	20.4	32,100	5.5	-	<0.1	-	37.5	-	-	106	-	<5	65	51.6
12 (main channel)	-	24,100	7	90	-	<0.1	55.7	25.8	41.8	49,500	10	-	<0.1	-	49.4	-	-	81	-	<5	92	85.2
13 (main channel)	-	23,900	7	90	-	<0.1	44.7	20.3	37.8	45,700	10	-	<0.1	-	39.3	-	-	90	-	<5	87	84.3
14 (main channel)	-	25,800	5	100	-	0.1	46.8	21	42.8	47,200	10.2	-	<0.1	-	42.7	-	-	102	-	<5	87	87.1
15 (main channel)	-	14,700	5	50	-	<0.1	30.6	14.7	22.7	32,700	6.1	-	<0.1	-	31	-	-	94	-	<5	65	56.7
Purari Delta Sites																						
16	<0.1	21,400	<5	80	0.5	<0.1	47.1	20.7	41.3	40,700	10.1	759	<0.1	0.3	43.4	<1	0.1	99	<0.1	<5	96	93.5
17	<0.1	15,900	<5	60	0.4	<0.1	45.8	20.6	23.1	37,400	6.1	676	<0.1	0.2	47.4	<1	<0.1	71	<0.1	<5	107	78.3
18	<0.1	27,900	5	100	0.6	<0.1	45.2	20	43.4	49,300	9.1	741	<0.1	0.3	40.7	<1	<0.1	90	<0.1	<5	90	87.2
19	<0.1	31,900	10	20	0.6	<0.1	59.6	20.8	43	52,600	8.6	793	<0.1	0.9	45	<1	<0.1	61	<0.1	<5	99	85.7
Purari Delta Estuary Sites																						
20	<0.1	21,800	6	10	0.3	<0.1	39.1	18	12.8	37,100	4	363	<0.1	0.1	32	<1	<0.1	22	<0.1	<5	62	61.1
21	<0.1	21,600	<5	20	0.3	<0.1	37	16.3	12.4	34,800	4.4	319	<0.1	0.1	29	<1	<0.1	18	<0.1	<5	73	57.6
22B	<0.1	33,800	9	80	0.7	0.1	49.9	22.4	58.6	56,900	10.8	800	<0.1	0.4	45.2	<1	<0.1	68	<0.1	<5	104	97
23	<0.1	33,500	8	70	0.7	<0.1	48.4	21	50	56,100	10.2	862	<0.1	0.3	44	<1	<0.1	62	<0.1	<5	99	94.9
24	<0.1	26,000	<5	100	0.6	<0.1	42.3	21.5	34.6	47,700	8.3	683	<0.1	0.2	42.9	<1	<0.1	70	<0.1	<5	93	79.4
LOR	*0.1*	*50*	*1*	*10*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*50*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*1*	*0.1*	*2*	*0.1*	*5*	*1*	*0.5*
PNG MPR	*2*	-	*20*	-	-	*1.5*	*80*	-	*65*	-	*50*	-	*0.15*	-	*21*	-	*1*	-	-	-	-	*200*
SQGV	*2*	-	*20*	-	-	*1.5*	*80*	-	*65*	-	*50*	-	*0.15*	-	*21*	-	*1*	-	-	-	-	*200*
SQG-High	*25*	-	*70*	-	-	*10*	*370*	-	*270*	-	*220*	-	*1*	-	*52*	-	*4*	-	-	-	-	*410*

NOTE: Yellow highlight indicates exceedance of the Guideline Value indicating possible ecotoxicological effects. Orange highlight indicates exceedance of the SQG-High guideline value indicating likely ecotoxicological effects.

6.3.3 Nutrients and Organic Material

Nutrient, organic matter and organic carbon concentrations in sediment samples collected in June/July 2016 are presented in Table 6-13.

Sites with higher amounts of organic matter/carbon also had higher concentrations of nutrients. These sites included sites 12, 13, 14 and 18 in the Purari River, Site 3B on Kuku Creek in PRL-15, and sites 18 and 19 in the Purari delta, and sites 22B and 23 in the Purari delta estuary. These sites also generally had relatively high proportions of silts and clays in bed sediments (Section 6.3.1). In general, sites with higher proportions of sands and gravels had lower concentrations of nutrients and organic material.

Table 6-13 Nutrients, Total Organic Matter and Total Organic Carbon in Sediment (mg/kg) – Dry Season (June/July 2016)

Site	Nutrients				Total Organic Matter	Total Organic Carbon
	NOx	TKN	TN	TP		
	mg/kg	mg/kg	mg/kg	mg/kg	%	%
PRL-15 Sites						
1B	<0.1	330	330	508	<0.5	<0.5
2	0.1	280	280	295	<0.5	<0.5
3B	<0.1	900	900	538	2.2	1.3
4	<0.1	410	410	508	0.5	<0.5
5	<0.1	510	510	885	0.9	<0.5
6	0.3	670	670	472	0.7	<0.5
9	<0.1	720	720	643	0.9	0.5
10	<0.1	710	710	445	1.5	0.9
11 (main channel)	0.2	160	160	587	<0.5	<0.5
12 (main channel)	0.2	1,120	1,120	576	2.9	1.7
13 (main channel)	0.1	1,100	1,100	530	2.8	1.6
14 (main channel)	0.2	1,210	1,210	586	3	1.7
15 (main channel)	0.3	230	230	565	<0.5	<0.5
Purari Delta Sites						
16	<0.1	590	590	534	1.1	0.6
17	0.1	220	220	771	<0.5	<0.5
18	<0.1	1,260	1,260	717	2.9	1.7
19	<0.1	870	870	482	5	2.9
Purari Delta Estuary Sites						
20	<0.1	210	210	511	0.6	<0.5
21	<0.1	140	140	589	0.6	<0.5
22B	<0.1	1,530	1,530	835	4	2.3
23	<0.1	1,560	1,560	908	3.5	2
24	<0.1	780	780	870	1.4	0.8

6.3.4 Hydrocarbons

The hydrocarbon data, including polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons and BTEXN, are included in Appendix D. All results were below the laboratory limits of reporting, and sediment quality guidelines (where available for the various parameters).

6.3.5 Comparison to Other Studies

As noted in Sections 4.1 and 4.2, aquatic studies have previously been undertaken in the study area. While no sediment quality data is available for PRL-15, there is some data for the gas field development area of the PNG LNG Project (located in the Southern Highlands and Western Province of Papua New Guinea).

In comparing the results of the June-July 2016 and January/February 2017 surveys to previous studies, higher concentrations of metals/metalloids were found in sediment collected from sites in the upstream area of the PNG LNG Project (Hydrobiology, 2008) compared to the present study. Nickel was the only metal/metalloid found in concentrations higher than guideline values in the present study, while arsenic, cadmium, chromium and nickel concentrations exceeded guideline values in stream bed sediment in the upstream area of the PNG LNG Project (Hydrobiology, 2008).

Furthermore, mercury was detected at some sites at the PNG LNG Project around an order of magnitude higher than the sediment quality guideline value, whereas mercury was below detection limits in the present study.

The difference in sediment quality may be reflective of different geology in the upstream PNG LNG project area compared to the PRL-15 study area.

6.4 Palustrine Wetlands

6.4.1 PRL-15 Oxbow Wetlands (Site 1)

The PRL-15 oxbow wetlands (shown in Figure 5-1) are an important palustrine wetland habitat located within PRL-15. This wetland habitat is hydraulically connected to both the Purari River and sub-catchments that drain potential infrastructure areas to the north.

The oxbow is a unique environmental feature within PRL-15. It represents the largest off-river water body in the area, and could possibly be part of an area of peat wetlands, which are not well documented in Papua New Guinea. Peat wetlands can support unique species that are sensitive to changes in water quality. However, it is not known whether this lake supports peat wetland.

Given the inaccessibility of this site, no surface water or sediment quality samples were able to be collected during the field surveys. However, an aerial survey was conducted of the oxbow wetlands during the dry season survey. Observations of water within the PRL-15 oxbow wetlands during the aerial survey were consistent with water observed in the tributary of the Purari River at Site 11 (which drains the oxbow lake) and suggest that tannin-stained waters in the wetlands have high dissolved organic carbon, low dissolved oxygen levels and potentially low pH levels.

6.4.2 Palustrine Wetlands Southwest of PRL-15

An aerial survey was also conducted of the swamp/wetland areas located in the southwest quadrant of PRL-15 and further downstream during the dry season survey. A network of small tannin-stained lakes was identified to the west of the southernmost section of PRL-15 during these aerial surveys (Figure 6-13). Approximate locations of these wetlands are shown in Figure 5-1.

The aerial survey indicated that previous mapping of swamp-dominated areas within the study area is reasonably accurate, but does not show the tannin-stained lakes located to the southwest of PRL-15. No drainage into or out of these lakes could be identified from the aerial survey – further investigation would need to be undertaken to establish any connectivity of these wetlands with surface streams.

Similar to the PRL-15 oxbow wetlands, there is the possibility that these wetlands are peat wetlands.



Figure 6-13 Palustrine Wetlands Immediately to the Southwest of PRL-15

7 Summary and Conclusions

The Papua LNG Project has the potential to affect surface water quality and sediment quality of tributary streams of the Era River and Purari River within PRL-15 and the Purari delta, and Vaihua River estuary at Caution Bay. Limited previous studies have been conducted in these areas, hence further surveys have been conducted to characterize the baseline environment for a future EIS/ESHIA. The key objective of these surveys was to characterize stream and estuarine water and sediment quality at areas identified as at potential risk from Project activities and comparative high value areas.

These further studies involved dry season and wet season surveys across the study area. The level of baseline data collection was extensive, and is considered sufficient to characterize the existing surface water and sediment environment.

The findings of the present study generally reflected the findings from previous studies in and adjacent to the study area. Furthermore, data collection for the present study was undertaken during fairly typical environmental conditions.

7.1.1 Summary of Water Quality Conditions

Overall

Water temperature was fairly consistent between sites and seasonal differences were minimal, with a temperature range of approximately 6°C (~24°C to 30°C). pH was slightly alkaline at all sites (pH between 7.0 and 8.4), with minimal seasonal variability indicated in the data.

Total alkalinity was comprised predominantly of bicarbonate anions, and the high bicarbonate levels reflect the widespread presence of calcareous rocks in the catchment.

Nutrients and metals/metalloids were found in low concentrations at all sites during the dry season and wet season surveys. The only exceedance of water quality guideline values was a slightly elevated concentration of dissolved zinc at one site in a tributary stream in PRL-15, and dissolved copper at one site in Vaihua River estuary during the wet season survey.

Total petroleum hydrocarbon, PAH and BTEXN concentrations were below laboratory limits of reporting at all sites.

Key characteristics of each broad study area are summarized briefly below.

Tributary Streams in PRL-15

Surface water quality at tributary stream sites within PRL-15 is characterized by low electrical conductivity (<400 µs/cm), with minimal seasonal variability. Water was well-oxygenated (85 to 120% saturation) at most tributary sites in PRL-15, except for one site located at a tie channel to the PRL-15 oxbow wetlands (30% saturation). The low dissolved oxygen level, and lower pH, at this site was most likely due to water outflow from the oxbow wetlands. Such water features typically have very low levels of dissolved oxygen and lower pH due to breakdown of organic material, and low pH. Tannin-stained waters observed entering the Purari River at this location during the field survey also provided evidence of such water.

Turbidity and TSS levels in tributary streams in PRL-15 were generally lower than other sites. Tributary streams in PRL-15 (sites 1B-10) had a median TSS of 7 mg/L (with a range of 1 to 130 mg/L) and a median turbidity of 6 NTU (with a range of 0.1 to 90 NTU). In comparison, the median TSS and turbidity at Purari River main channel sites (discussed below) was 84 mg/L and 91 NTU, respectively.

Slightly lower pH (pH 6.3 to 7.7) was recorded within the Elk/Antelope gas field development area in previous studies (DES, 2008; GHD, 2015a, 2015b, 2015c, 2015d) compared to the present study (pH 7.0 to 8.5). Also, GHD (2015a, 2015b, 2015c) and DES (2008) recorded higher turbidity (up to 400 NTU) at tributary sites in PRL-15. These differences in pH and turbidity may be due to the range in seasonal conditions that occur depending on rainfall and runoff.

The only exceedance of guideline values for dissolved metals/metalloids across the study area was dissolved zinc at Site 4 (9 µg/L) during the dry season survey, which slightly exceeded the ANZECC/ARMCANZ (2000) guideline value (8 µg/L). GHD (2015a, 2015b, 2015c) found similarly low levels of dissolved metals/metalloids (mostly below the laboratory limits of reporting) at Era River tributary sites in PRL-15, with all metals/metalloids below guideline values.

Purari River (PRL-15 and Purari Delta)

Electrical conductivity in the freshwater reaches of the Purari River (sites 11-19) was below 400 µS/cm, and generally lower during the wet season. Dissolved oxygen at these sites was generally within the acceptable guideline range of 85% to 120% saturation.

Spot measurements showed turbidity and TSS was variable between sites and seasons, with turbidity higher at main channel Purari River sites in PRL-15 and Purari delta sites than other sites. In general, turbidity in the Purari River main channel was higher during the northwest monsoon season than during the southeast trade wind season. The freshwater reaches of Purari River had a median TSS of 84 mg/L (with a range of 21 to 484 mg/L) and a median turbidity of 91 NTU (with a range of 8 to 300 NTU). This range in TSS levels is consistent with that reported in Petr (1983a, 1983b), which reported TSS ranging from 29 to 778 mg/L.

Continuous turbidity measurements (using a deployed water quality logger) in the Purari River at Herd Base were higher (around 200 to 400 NTU) compared to turbidity spot measurements described above (8 to 300 NTU). While turbidity was approximately 200 to 400 NTU for much of the deployment period, turbidity increased to about 1,000 NTU following rainfall events in the catchment when river flows increased.

Purari Delta Estuary

Electrical conductivity at the Purari delta estuary sites was highly variable (100 to 28,000 µS/cm), depending on proximity to the coast and the season, with EC generally lower during the wet season. Water profiling at the estuarine sites indicated that water quality was relatively consistent through the water column, indicating minimal stratification at the time of sampling. The exception to this was one site near the Purari River mouth during the wet season survey, which recorded low EC (~100 µS/cm) in surface layers and much higher EC in bottom layers (~20,000 µS/cm). This is indicative of a salt wedge (i.e. saline marine waters underlying fresh fluvial waters), which is typical of river mouth environments.

Dissolved oxygen was also generally lower in the Purari delta estuary sites compared to other sites. Low dissolved oxygen is typical in estuarine waters where stratification/poor water mixing and breakdown of organic matter depletes oxygen.

Estuarine reaches of the Purari delta (sites 20-24) had a median TSS concentration of 45 mg/L (with a range of 8 to 228 mg/L) and a median turbidity of 13 NTU (with a range of 5 to 227 NTU).

Vaihua River Estuary

Electrical conductivity and salinity in Vaihua River estuary is reflective of a marine environment, with electrical conductivity around 55,000 µS/cm and salinity around 35 ppt. pH levels during the both surveys were slightly lower than the ANZECC recommended guideline range for marine waters (pH 8.0 to 8.4), which is likely reflective of the estuarine waters. Turbidity ranged between 1.9 and 8.3 NTU, while TSS ranged between 6 and 14 mg/L.

Dissolved oxygen was slightly below the ANZECC and PNG ER guideline values at both sites during both surveys, while nutrients were mostly below laboratory limits of reporting.

Dissolved metals/metalloids were mostly below guideline levels, except for a slight exceedance of the ANZECC guideline value for dissolved copper at one site during the wet season survey.

7.1.2 Summary of Sediment Quality Conditions

Overall

Particle size of bed sediments was variable across the study area. Sites with higher proportions of silts and clays in bed sediments also had higher amounts of organic matter/carbon and higher concentrations of nutrients.

Concentrations of metals/metalloids in sediment were relatively consistent between monitoring sites (i.e. tributary streams and Purari River in PRL-15, Purari delta and Purari delta estuary). Concentrations were below sediment quality guideline values, except for nickel which exceeded the guideline value at all sites. However, as found elsewhere in Papua New Guinea, it is not unusual for background nickel concentrations in sediment to exceed the guideline values, reflecting the natural catchment lithology.

Total petroleum hydrocarbon, PAH and BTEXN concentrations were below laboratory limits of reporting at all sites.

Key characteristics of each broad study area are summarized below.

Tributary Streams in PRL-15

Tributary streams in PRL-15 were characterized by large proportions (55% to 85%) of silts and clays. Site 3B on Kuku Creek in PRL-15 had higher amounts of organic matter/carbon and also higher concentrations of nutrients.

While nickel exceeded the sediment quality guideline value at all sites, one tributary site in PRL-15 (Site 9) also exceeded the SQG-high guideline value.

Purari River (PRL-15 and Purari Delta)

In the section of the Purari River within PRL-15, the furthest upstream site and the furthest downstream site were mostly sand and gravel, while sites in between had approximately 50% sands/gravels and 50% silts/clays. The difference in sediment types in the Purari River sites was due to the local hydrodynamics at each site, with higher energy environments (where coarser sediments typically occur) at sites 11 and 15, and depositional environments (where finer sediments typically occur) at sites 12, 13 and 14.

Sites 12, 13, 14, 18 and 19 in the Purari River had higher amounts of organic matter/carbon and also higher concentrations of nutrients. These sites also generally had relatively high proportions of silts and clays in bed sediments, which typically bind with nutrients more readily than sands and gravels.

Purari Delta Estuary

Particle size of sediment within the estuarine reaches of the Purari River delta was variable, with some sites dominated by sand and gravel, while other sites were dominated by silts and clays. The downstream site in the Wame River estuary (Site 23) was mostly silts and clays (98%) while the site further upstream (Site 24) had a lower proportion of silts and clays (39%) and a larger proportion of sand (61%). The variability in bed sediment particle size is likely due to the local hydrodynamics of each sample site.

Sites 22B and 23 in the estuarine area of the Purari River delta had higher amounts of organic matter/carbon and also higher concentrations of nutrients, most likely due to the high proportion (>90%) of silts and clays at these sites.

8 Study Team

The study team responsible for the preparation of the Surface Water and Sediment Quality Baseline Report are listed in Table 8-1 below.

Table 8-1 Study team for ESBS Technical Report

Personnel	Role	Qualifications
Dr Darren Richardson	Project Director Environmental Lead	Bachelor of Applied Science Doctor of Philosophy
Brad Grant	Principal Water Quality Scientist	Bachelor of Science
Brad Hiles	Senior Water Quality Scientist & Aquatic Ecologist	Bachelor of Science, Bachelor of Education
Daniel Moran	Water Quality Scientist & Aquatic Ecologist	Bachelor of Science
Jeremy Visser	Project Coordinator Environmental Consultant	Bachelor of Laws, Bachelor of Environmental Management
Lyn Leger	Project Manager Principal Environmental Consultant	Bachelor of Laws, Bachelor of Science Master of Laws

9 Glossary and Abbreviations

Units of measurement		
% sat	Percentage saturation	Measure of dissolved oxygen
CFU/100mL	Colony forming unit per 100 milliliters	Bacteriological analysis measure
mg/kg	Milligrams per kilogram	Measure of concentration in sediment
mg/L	Milligrams per liter	Measure of concentration in liquid
µg/L	Micrograms per liter	Measure of concentration in liquid
µS/cm	MicroSiemens per centimeter	Measure of salinity/electrical conductivity
Abbreviations and terms		
ALS	Australian Laboratory Services	
ANZECC/ARMCANZ	Australian and New Zealand Environment and Conservation Council / Agriculture and Resource Management Council of Australia and New Zealand	
APHA	American Public Health Association	
BTEXN	Benzene-toluene-ethylbenzene-xylene-naphthalene	
CFU	Colony-forming unit	
CPF	Central processing facility	
CV AAS	Cold vapor atomic absorption spectrometry	
DES	Douglas Environmental Services	
DO	Dissolve oxygen	
DOC	Dissolved organic carbon	
EC	Electrical conductivity	
EIS	Environmental Impact Statement	
Elk/Antelope Gasfield Project	Gas extraction, transport and processing project proposed by InterOil. Involves operation of Elk-Antelope gasfields in Gulf Province and transport to a LNG Plant on Purari River, Gulf Province.	
ESBS	Environmental and Social Baseline Study	
ESHIA	Environment, Social and Health Impact Assessment	
FRP	Filterable reactive phosphorus	
GC-FID	Gas chromatography-flame ionization detector	
GC-MS	Gas chromatography-mass spectrometry	
GL-ENV/02/2004	*Guideline for Conduct of Environmental Impact Assessment & Preparation of Environmental Impact Statement*, prepared by (former) Department of Environment and Conservation (2004)	
GS EP ENV 120	*Environmental impact assessment of E&P activities*, General Specification prepared by Total E&P (2007)	
GS EP ENV 111	*Environmental Baseline and Monitoring Studies: Onshore Sites*, General Specification prepared by Total E&P (2012)	
GS EP ENV 112	*Environmental Baseline and Monitoring Studies: Offshore and Nearshore Sites*, General Specification prepared by Total E&P (2012)	
ICP/AES	Inductively coupled plasma/atomic emission spectrometry	
ICP/MS	Inductively coupled plasma/mass spectrometry	

ITCZ	Inter-Tropical Convergence Zone
LNG	Liquid natural gas
LOR	Limits of reporting
NOx	Nitrous oxides
NTU	Nephelometric turbidity units
Palustrine Wetland	Inland wetland that lacks flowing water, contains ocean-derived salts in concentrations of less than 0.5 ppt, and is non-tidal
Papua LNG	Gas extraction, transport and processing project proposed by TEP PNG. Involves operation of Elk-Antelope gasfields in Gulf Province, and onshore and subsea pipeline via Orokolo Bay to LNG Plant at Caution Bay, Central Province
PDL	Petroleum Development License
PL	Pipeline License
PNG94	Papua New Guinea 1994 datum
PNG ER	Environment (Water Quality Criteria) Regulation 2002 guidelines
PNG LNG	Gas extraction, transport and processing project operated by ExxonMobil. Involves operation of gasfields in Hela and Western Provinces, and onshore and subsea pipeline to LNG Plant at Caution Bay, Central Province
PNG MPR	Marine Pollution (Sea Dumping) Regulation 2014 guideline
PNG PHR	Public Health (Drinking Water) Regulation 1984 guideline
PPFL	Petroleum Processing Facilities License
PRL	Petroleum Retention License
Project	The Papua LNG Project
PSD	Particle size distribution
SQG-High	Concentrations in sediment above which effects to ecological life could occur
SQGV	Sediment quality guideline value; concentrations in sediment below which effects to ecological life are not expected to occur
Study Area	The area which is the focus of this ESBS report, consisting of the following subsets: **(i)** PRL-15 (ii) Purari delta **(iii)** Purari delta estuary **(iv)** Vaihua River estuary
TEP PNG	Total E&P PNG Limited
TKN	Total Kjeldahl nitrogen
TN	Total nitrogen
TOC	Total organic carbon
TP	Total phosphorus
TSS	Total suspended solids
USEPA	United States Environmental Protection Agency
UTM	Universal Trans Mercator
UXO	Unexploded ordnance
WHO	World Health Organization

10 References

Australian and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand (2000), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Paper No. 4 to National Water Quality Management Strategy

BMT WBM (2017a), *Papua LNG Project Upstream Hydrology and Meteorology Baseline Report*, prepared for ERIAS Group Pty Ltd and Total E&P PNG Limited

BMT WBM (2017b), *Papua LNG Project Upstream Freshwater and Estuarine Biodiversity Baseline Report*, prepared for ERIAS Group Pty Ltd and Total E&P PNG Limited

BMT WBM (2017c), *Papua LNG Project Physical Oceanography Baseline Report*, prepared for ERIAS Group Pty Ltd and Total E&P PNG Limited

BMT WBM (2017d), *Papua LNG Project Marine Water and Sediment Quality Baseline Report*, prepared for ERIAS Group Pty Ltd and Total E&P PNG Limited

Booyong Forest Science (2017), *Papua LNG Project Upstream Land and Natural Resources (Ecosystem Services – Provisioning) Baseline Report*, prepared for ERIAS Group Pty Ltd and Total E&P PNG Limited

Coffey Natural Systems (2009), *PNG LNG Project Environmental Impact Statement*, prepared for Esso Highlands Limited

Coffey Natural Systems (2015), *P'nyang Development Project Environmental Impact Statement*, prepared for Esso P'nyang PNG Limited

Douglas Environmental Services (2008), *Elk/Antelope Gasfield Project Environmental Impact Statement*, prepared for InterOil

ERIAS Group (2016), *Freshwater and Estuarine Studies Scope and Methods,* Papua LNG Project, prepared by ERIAS Group Pty Ltd for TEP PNG Limited, report 01215B_6-4_v4

ERIAS Group (2017), *Addendum to Freshwater and Estuarine Studies Scope and Methods,* Papua LNG Project, prepared by ERIAS Group Pty Ltd for TEP PNG Limited, report 01215B_6-13_v5

Evesson, DT (1983), The climate of the Purari River basin, Chapter 2 in Part I of Petr, T (ed.) *The Purari: tropical environment of a high rainfall river basin*, The Hague, Dr W Junk Publishers

Finlayson, M (2017), *Papua LNG Project Land and Natural Resources Use Baseline Report*, prepared for Total E&P PNG Limited

GHD (2015a), *Antelope-4 Environmental Impact Assessment and Environmental Management Plan*, prepared for InterOil SPI (208) Ltd

GHD (2015b), *Antelope-5 Environmental Impact Assessment and Environmental Management Plan*, prepared for InterOil SPI (208) Ltd

GHD (2015c), *Antelope-6 Environmental Impact Assessment and Environmental Management Plan*, prepared for InterOil SPI (208) Ltd

GHD (2015d), *Antelope South-1 Environmental Impact Assessment and Environmental Management Plan*, prepared for InterOil SPI (208) Ltd

Hydrobiology (2009), *PNG LNG Project: LNG Facilities, Water and Sediment Quality Baseline*, Appendix 15 in Coffey Natural Systems (2009) PNG LNG Project Environmental Impact Statement

International Finance Corporation (2012), *IFC Performance Standards on Environmental and Social Sustainability.*

McAlpine, JR, Keig, G and Falls, R (1983), *Climate of Papua New Guinea*, Commonwealth Scientific and Industrial Research Organization in association with Australian National University Press, Canberra

Simpson, SL, Batley, GE and Chariton, AA (2013), *Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines*, CSIRO Land and Water Science Report 08/07, prepared for Department of Sustainability, Environment, Water, Population and Communities

Petr, T (1983a), Limnology of the Purari basin. Part 1. The catchment above the delta, Chapter 9 in Part I of Petr, T (ed.) *The Purari: tropical environment of a high rainfall river basin*, Dr W Junk Publishers, The Hague

Petr, T (1983b), Limnology of the Purari basin. Part 2. The delta, Chapter 10 in Part I of Petr, T (ed.) *The Purari: tropical environment of a high rainfall river basin*, Dr W Junk Publishers, The Hague

Pickup, G and Chewings, VH (1983), The hydrology of the Purari and its environmental implications, Chapter 8 in Part I of Petr, T (ed.) *The Purari: tropical environment of a high rainfall river basin*, Dr W Junk Publishers, The Hague

Shearman, P (2010), *Recent Change in the Extent of Mangroves in the Northern Gulf of Papua, Papua New Guinea, AMBIO* in *A Journal of the Human Environment* **39**:181-189

World Health Organization (WHO) (2011), *Guidelines for drinking-water quality, fourth edition*.

Appendix A Photos of Sampling Sites



Site 1B (PRL-15) (July 2016)



Site 2 (PRL-15) (July 2016)



Site 3B (PRL-15) (July 2016)



Site 4 (PRL-15) (July 2016)



Site 5 (PRL-15) (July 2016)



Site 6 (PRL-15) (July 2016)



Site 9 (PRL-15) (July 2016)



Site 10 (PRL-15) (July 2016)



Site 11 (Purari River freshwater) (July 2016)



Site 12 (Purari River freshwater) (July 2016)



Site 13 (Purari River freshwater) (July 2016)



Site 14 (Purari River freshwater) (July 2016)



Site 15 (Purari River freshwater) (July 2016)



Site 16 (Purari River freshwater) (January 2017)



Site 17 (Purari River freshwater) (January 2017)



Site 18 (Purari River freshwater) (January 2017)



Site 19 (Purari River freshwater) (January 2017)



Site 20 (Purari River estuarine) (January 2017)



Site 21 (Purari River estuarine) (June 2016)



Site 22B (Purari River estuarine) (June 2016)



Site 23 (Wame-Varoi River estuarine) (January 2017)



Site 24 (Wame-Varoi River estuarine) (January 2017)



Site 28 (Vaihua River estuarine) (January 2017)



Site 29 (Vaihua River estuarine) (January 2017)

Appendix B Laboratory Data

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1617705**	Page	: 1 of 27
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: John Pickering
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61 7 3552 8634
Project	: B21414 Elk	Date Samples Received	: 11-Jul-2016 12:05
Order number	: ----	Date Analysis Commenced	: 11-Jul-2016
C-O-C number	: ----	Issue Date	: 27-Jul-2016 14:54
Sampler	: CONOR JONES, DANIEL MORAN		
Site	: ----		
Quote number	: ----		
No. of samples received	: 31		
No. of samples analysed	: 27		

NATA Accredited Laboratory 825
Accredited for compliance with ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

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
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Acid Sulfate Soils Supervisor	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.
~ = Indicates an estimated value.

- EP071: The LOR's for particular samples have been raised due to high moisture content.
- EG020T (Total Metals): Some Method Blanks are above LOR but are not considered significant compared to analyte levels in the samples.
- EP080: Sample EB1617705_022 shows poor matrix spike recovery due to high moisture content.
- EP075(SIM): High LCS recovery deemed acceptable as all associated analyte results are less than LOR
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M6	M3	M9	M10	M4
				Client sampling date / time	25-Jun-2016 08:40	25-Jun-2016 10:40	25-Jun-2016 12:08	25-Jun-2016 13:00	25-Jun-2016 14:00
Compound	CAS Number	LOR	Unit		EB1617705-001	EB1617705-002	EB1617705-003	EB1617705-004	EB1617705-005
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		48.2	64.2	66.6	61.8	66.1
EA150: Particle Sizing									
+75µm	----	1	%		<1	2	3	3	<1
+150µm	----	1	%		<1	<1	1	<1	<1
+300µm	----	1	%		<1	<1	<1	<1	<1
+425µm	----	1	%		<1	<1	<1	<1	<1
+600µm	----	1	%		<1	<1	<1	<1	<1
+1180µm	----	1	%		<1	<1	<1	<1	<1
+2.36mm	----	1	%		<1	<1	<1	<1	<1
+4.75mm	----	1	%		<1	<1	<1	<1	<1
+9.5mm	----	1	%		<1	<1	<1	<1	<1
+19.0mm	----	1	%		<1	<1	<1	<1	<1
+37.5mm	----	1	%		<1	<1	<1	<1	<1
+75.0mm	----	1	%		<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		27	39	42	33	45
Silt (2-60 µm)	----	1	%		71	56	53	61	52
Sand (0.06-2.00 mm)	----	1	%		2	5	5	6	3
Gravel (>2mm)	----	1	%		<1	<1	<1	<1	<1
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	<1
EA152: Soil Particle Density									
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.66	2.66	2.60	2.67	2.58
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		34400	37900	40600	40000	39400
Arsenic	7440-38-2	5	mg/kg		10	10	11	11	14
Barium	7440-39-3	10	mg/kg		20	10	10	20	20
Iron	7439-89-6	50	mg/kg		54300	55800	55600	57800	56200
Strontium	7440-24-6	2	mg/kg		35	50	52	53	51
Tin	7440-31-5	5	mg/kg		<5	<5	<5	<5	<5
EG020T: Total Metals by ICP-MS									
Selenium	7782-49-2	1	mg/kg		<1	<1	<1	<1	<1
Silver	7440-22-4	0.1	mg/kg		0.1	0.6	0.6	0.2	0.4
Thallium	7440-28-0	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	7440-41-7	0.1	mg/kg		0.6	0.7	0.8	0.7	0.7

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M6	M3	M9	M10	M4
				Client sampling date / time	25-Jun-2016 08:40	25-Jun-2016 10:40	25-Jun-2016 12:08	25-Jun-2016 13:00	25-Jun-2016 14:00
Compound	CAS Number	LOR	Unit		EB1617705-001	EB1617705-002	EB1617705-003	EB1617705-004	EB1617705-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg		21.8	21.5	21.3	23.5	21.8
Chromium	7440-47-3	0.1	mg/kg		63.7	67.7	64.4	71.0	68.6
Copper	7440-50-8	0.1	mg/kg		39.4	61.5	64.6	59.3	60.8
Manganese	7439-96-5	0.1	mg/kg		708	708	736	817	869
Molybdenum	7439-98-7	0.1	mg/kg		0.3	0.6	0.5	0.6	0.5
Nickel	7440-02-0	0.1	mg/kg		47.6	51.2	49.6	51.5	51.6
Lead	7439-92-1	0.1	mg/kg		8.4	11.2	11.8	10.5	11.2
Antimony	7440-36-0	0.1	mg/kg		<0.1	0.1	0.1	<0.1	<0.1
Zinc	7440-66-6	0.5	mg/kg		87.9	95.6	95.7	92.2	94.6
Vanadium	7440-62-2	1	mg/kg		100	108	108	112	112
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		930	1840	1940	1810	1810
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		930	1840	1940	1810	1810
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		580	608	661	683	619
EP004: Organic Matter									
Organic Matter	----	0.5	%		3.1	7.2	5.9	6.2	5.8
Total Organic Carbon	----	0.5	%		1.8	4.2	3.4	3.6	3.4
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M6	M3	M9	M10	M4
				Client sampling date / time	25-Jun-2016 08:40	25-Jun-2016 10:40	25-Jun-2016 12:08	25-Jun-2016 13:00	25-Jun-2016 14:00
Compound	CAS Number	LOR	Unit		EB1617705-001	EB1617705-002	EB1617705-003	EB1617705-004	EB1617705-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
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	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	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		----	----	----	----	----
^ >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	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M6	M3	M9	M10	M4
				Client sampling date / time	25-Jun-2016 08:40	25-Jun-2016 10:40	25-Jun-2016 12:08	25-Jun-2016 13:00	25-Jun-2016 14:00
Compound	CAS Number	LOR	Unit		EB1617705-001	EB1617705-002	EB1617705-003	EB1617705-004	EB1617705-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**113**	**98.9**	**112**	**116**	**156**
Anthracene-d10	1719-06-8	0.5	%		**84.1**	**71.0**	**84.5**	**85.7**	**120**
4-Terphenyl-d14	1718-51-0	0.5	%		**109**	**94.1**	**107**	**108**	**155**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**99.7**	**87.1**	**79.6**	**85.3**	**83.2**
Toluene-D8	2037-26-5	0.2	%		**97.9**	**83.8**	**78.2**	**88.0**	**84.5**
4-Bromofluorobenzene	460-00-4	0.2	%		**115**	**96.6**	**96.8**	**102**	**95.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M12	M11	M2	M8	M5
				Client sampling date / time	25-Jun-2016 14:55	25-Jun-2016 15:55	25-Jun-2016 16:45	26-Jun-2016 08:40	26-Jun-2016 10:45
Compound	CAS Number	LOR	Unit		EB1617705-006	EB1617705-007	EB1617705-008	EB1617705-009	EB1617705-010
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		62.2	63.1	62.2	44.6	42.9
EA150: Particle Sizing									
+75µm	----	1	%		<1	<1	<1	2	2
+150µm	----	1	%		<1	<1	<1	<1	<1
+300µm	----	1	%		<1	<1	<1	<1	<1
+425µm	----	1	%		<1	<1	<1	<1	<1
+600µm	----	1	%		<1	<1	<1	<1	<1
+1180µm	----	1	%		<1	<1	<1	<1	<1
+2.36mm	----	1	%		<1	<1	<1	<1	<1
+4.75mm	----	1	%		<1	<1	<1	<1	<1
+9.5mm	----	1	%		<1	<1	<1	<1	<1
+19.0mm	----	1	%		<1	<1	<1	<1	<1
+37.5mm	----	1	%		<1	<1	<1	<1	<1
+75.0mm	----	1	%		<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		49	39	45	27	21
Silt (2-60 µm)	----	1	%		49	58	52	64	73
Sand (0.06-2.00 mm)	----	1	%		2	3	3	9	6
Gravel (>2mm)	----	1	%		<1	<1	<1	<1	<1
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	<1
EA152: Soil Particle Density									
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.76	2.91	2.72	2.88	2.67
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		39800	35800	35300	30500	30100
Arsenic	7440-38-2	5	mg/kg		12	12	11	6	6
Barium	7440-39-3	10	mg/kg		20	20	10	10	10
Iron	7439-89-6	50	mg/kg		59000	55600	54200	48700	48100
Strontium	7440-24-6	2	mg/kg		55	60	53	32	28
Tin	7440-31-5	5	mg/kg		<5	<5	<5	<5	<5
EG020T: Total Metals by ICP-MS									
Selenium	7782-49-2	1	mg/kg		<1	<1	<1	<1	<1
Silver	7440-22-4	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Thallium	7440-28-0	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	7440-41-7	0.1	mg/kg		0.8	0.7	0.7	0.5	0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M12	M11	M2	M8	M5
				Client sampling date / time	25-Jun-2016 14:55	25-Jun-2016 15:55	25-Jun-2016 16:45	26-Jun-2016 08:40	26-Jun-2016 10:45
Compound	CAS Number	LOR	Unit		EB1617705-006	EB1617705-007	EB1617705-008	EB1617705-009	EB1617705-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg		21.6	19.9	19.2	19.9	19.7
Chromium	7440-47-3	0.1	mg/kg		63.0	54.7	53.5	57.6	57.6
Copper	7440-50-8	0.1	mg/kg		53.3	54.9	51.9	37.0	36.4
Manganese	7439-96-5	0.1	mg/kg		810	1080	640	658	661
Molybdenum	7439-98-7	0.1	mg/kg		0.4	0.4	0.4	0.2	0.3
Nickel	7440-02-0	0.1	mg/kg		50.8	46.0	45.5	42.6	41.3
Lead	7439-92-1	0.1	mg/kg		11.5	11.1	10.7	7.8	7.3
Antimony	7440-36-0	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.5	mg/kg		99.7	95.1	93.2	79.4	79.1
Vanadium	7440-62-2	1	mg/kg		108	100	94	90	89
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.1	<0.1	<0.1	<0.1	0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		1420	1610	1590	850	870
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		1420	1610	1590	850	870
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		714	773	744	583	564
EP004: Organic Matter									
Organic Matter	----	0.5	%		3.9	3.9	3.6	2.4	2.5
Total Organic Carbon	----	0.5	%		2.3	2.2	2.1	1.4	1.4
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M12	M11	M2	M8	M5
				Client sampling date / time	25-Jun-2016 14:55	25-Jun-2016 15:55	25-Jun-2016 16:45	26-Jun-2016 08:40	26-Jun-2016 10:45
Compound	CAS Number	LOR	Unit		EB1617705-006	EB1617705-007	EB1617705-008	EB1617705-009	EB1617705-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
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	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	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		----	----	----	----	----
^ >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	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M12	M11	M2	M8	M5
				Client sampling date / time	25-Jun-2016 14:55	25-Jun-2016 15:55	25-Jun-2016 16:45	26-Jun-2016 08:40	26-Jun-2016 10:45
Compound	CAS Number	LOR	Unit		EB1617705-006	EB1617705-007	EB1617705-008	EB1617705-009	EB1617705-010
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**119**	**134**	**128**	**114**	**118**
Anthracene-d10	1719-06-8	0.5	%		**86.4**	**101**	**82.9**	**82.0**	**86.6**
4-Terphenyl-d14	1718-51-0	0.5	%		**116**	**129**	**115**	**114**	**111**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**92.1**	**94.4**	**88.2**	**93.2**	**94.9**
Toluene-D8	2037-26-5	0.2	%		**87.4**	**93.4**	**89.7**	**93.0**	**94.0**
4-Bromofluorobenzene	460-00-4	0.2	%		**104**	**109**	**107**	**110**	**110**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M1	M7	18	19	21
				Client sampling date / time	26-Jun-2016 12:00	26-Jun-2016 13:15	27-Jun-2016 09:00	27-Jun-2016 13:30	28-Jun-2016 09:00
Compound	CAS Number	LOR	Unit		EB1617705-011	EB1617705-012	EB1617705-013	EB1617705-014	EB1617705-015
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		48.1	25.8	45.7	46.9	27.4
EA150: Particle Sizing									
+75µm	----	1	%		<1	43	4	27	97
+150µm	----	1	%		<1	<1	<1	5	80
+300µm	----	1	%		<1	<1	<1	<1	2
+425µm	----	1	%		<1	<1	<1	<1	<1
+600µm	----	1	%		<1	<1	<1	<1	<1
+1180µm	----	1	%		<1	<1	<1	<1	<1
+2.36mm	----	1	%		<1	<1	<1	<1	<1
+4.75mm	----	1	%		<1	<1	<1	<1	<1
+9.5mm	----	1	%		<1	<1	<1	<1	<1
+19.0mm	----	1	%		<1	<1	<1	<1	<1
+37.5mm	----	1	%		<1	<1	<1	<1	<1
+75.0mm	----	1	%		<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		28	20	26	23	1
Silt (2-60 µm)	----	1	%		66	25	65	44	2
Sand (0.06-2.00 mm)	----	1	%		6	55	9	33	97
Gravel (>2mm)	----	1	%		<1	<1	<1	<1	<1
Cobbles (>6cm)	----	1	%		<1	<1	<1	<1	<1
EA152: Soil Particle Density									
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.67	2.72	2.59	2.67	2.71
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		32600	22200	27900	31900	21600
Arsenic	7440-38-2	5	mg/kg		11	6	5	10	<5
Barium	7440-39-3	10	mg/kg		20	10	100	20	20
Iron	7439-89-6	50	mg/kg		51600	41500	49300	52600	34800
Strontium	7440-24-6	2	mg/kg		35	10	90	61	18
Tin	7440-31-5	5	mg/kg		<5	<5	<5	<5	<5
EG020T: Total Metals by ICP-MS									
Selenium	7782-49-2	1	mg/kg		<1	<1	<1	<1	<1
Silver	7440-22-4	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Thallium	7440-28-0	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	7440-41-7	0.1	mg/kg		0.6	0.4	0.6	0.6	0.3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	M1	M7	18	19	21
			Client sampling date / time	26-Jun-2016 12:00	26-Jun-2016 13:15	27-Jun-2016 09:00	27-Jun-2016 13:30	28-Jun-2016 09:00
Compound	CAS Number	LOR	Unit	EB1617705-011	EB1617705-012	EB1617705-013	EB1617705-014	EB1617705-015
				Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	**20.1**	**16.9**	**20.0**	**20.8**	**16.3**
Chromium	7440-47-3	0.1	mg/kg	**59.1**	**46.8**	**45.2**	**59.6**	**37.0**
Copper	7440-50-8	0.1	mg/kg	**43.8**	**18.6**	**43.4**	**43.0**	**12.4**
Manganese	7439-96-5	0.1	mg/kg	**742**	**553**	**741**	**793**	**319**
Molybdenum	7439-98-7	0.1	mg/kg	**0.3**	**0.1**	**0.3**	**0.9**	**0.1**
Nickel	7440-02-0	0.1	mg/kg	**44.8**	**34.4**	**40.7**	**45.0**	**29.0**
Lead	7439-92-1	0.1	mg/kg	**8.0**	**6.0**	**9.1**	**8.6**	**4.4**
Antimony	7440-36-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.5	mg/kg	**84.3**	**69.0**	**87.2**	**85.7**	**57.6**
Vanadium	7440-62-2	1	mg/kg	**94**	**81**	**90**	**99**	**73**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	**0.2**	<0.1	<0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	**1080**	**350**	**1260**	**870**	**140**
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	**1080**	**350**	**1260**	**870**	**140**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	**613**	**478**	**717**	**482**	**589**
EP004: Organic Matter								
Organic Matter	----	0.5	%	**3.1**	**0.8**	**2.9**	**5.0**	**0.6**
Total Organic Carbon	----	0.5	%	**1.8**	<0.5	**1.7**	**2.9**	<0.5
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M1	M7	18	19	21
				Client sampling date / time	26-Jun-2016 12:00	26-Jun-2016 13:15	27-Jun-2016 09:00	27-Jun-2016 13:30	28-Jun-2016 09:00
Compound	CAS Number	LOR	Unit		EB1617705-011	EB1617705-012	EB1617705-013	EB1617705-014	EB1617705-015
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
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	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	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		----	----	----	----	----
^ >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	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M1	M7	18	19	21
				Client sampling date / time	26-Jun-2016 12:00	26-Jun-2016 13:15	27-Jun-2016 09:00	27-Jun-2016 13:30	28-Jun-2016 09:00
Compound	CAS Number	LOR	Unit		EB1617705-011	EB1617705-012	EB1617705-013	EB1617705-014	EB1617705-015
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**114**	**118**	**119**	**113**	**104**
Anthracene-d10	1719-06-8	0.5	%		**77.9**	**82.2**	**86.7**	**78.9**	**74.3**
4-Terphenyl-d14	1718-51-0	0.5	%		**107**	**107**	**106**	**102**	**94.3**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**91.0**	**99.4**	**94.8**	**99.0**	**101**
Toluene-D8	2037-26-5	0.2	%		**88.5**	**101**	**91.3**	**97.7**	**100**
4-Bromofluorobenzene	460-00-4	0.2	%		**106**	**124**	**110**	**122**	**122**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	22	20	23b	24b	DUP1
			Client sampling date / time	28-Jun-2016 14:00	29-Jun-2016 09:00	02-Jul-2016 09:00	02-Jul-2016 14:00	[02-Jul-2016]
Compound	CAS Number	LOR	Unit	EB1617705-016	EB1617705-017	EB1617705-018	EB1617705-019	EB1617705-020
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	54.2	29.0	54.6	38.8	53.9
EA150: Particle Sizing								
+75µm	----	1	%	3	96	1	59	----
+150µm	----	1	%	<1	75	<1	58	----
+300µm	----	1	%	<1	6	<1	19	----
+425µm	----	1	%	<1	1	<1	2	----
+600µm	----	1	%	<1	<1	<1	<1	----
+1180µm	----	1	%	<1	<1	<1	<1	----
+2.36mm	----	1	%	<1	<1	<1	<1	----
+4.75mm	----	1	%	<1	<1	<1	<1	----
+9.5mm	----	1	%	<1	<1	<1	<1	----
+19.0mm	----	1	%	<1	<1	<1	<1	----
+37.5mm	----	1	%	<1	<1	<1	<1	----
+75.0mm	----	1	%	<1	<1	<1	<1	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	23	1	24	12	----
Silt (2-60 µm)	----	1	%	71	2	74	27	----
Sand (0.06-2.00 mm)	----	1	%	6	97	2	61	----
Gravel (>2mm)	----	1	%	<1	<1	<1	<1	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.67	2.72	2.66	2.69	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	33800	21800	33500	26000	35100
Arsenic	7440-38-2	5	mg/kg	9	6	8	<5	10
Barium	7440-39-3	10	mg/kg	80	10	70	100	20
Iron	7439-89-6	50	mg/kg	56900	37100	56100	47700	53300
Strontium	7440-24-6	2	mg/kg	68	22	62	70	36
Tin	7440-31-5	5	mg/kg	<5	<5	<5	<5	<5
EG020T: Total Metals by ICP-MS								
Selenium	7782-49-2	1	mg/kg	<1	<1	<1	<1	<1
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Thallium	7440-28-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	7440-41-7	0.1	mg/kg	0.7	0.3	0.7	0.6	0.6

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	22	20	23b	24b	DUP1
			Client sampling date / time	28-Jun-2016 14:00	29-Jun-2016 09:00	02-Jul-2016 09:00	02-Jul-2016 14:00	[02-Jul-2016]
Compound	CAS Number	LOR	Unit	EB1617705-016	EB1617705-017	EB1617705-018	EB1617705-019	EB1617705-020
				Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued								
Cadmium	7440-43-9	0.1	mg/kg	**0.1**	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	**22.4**	**18.0**	**21.0**	**21.5**	**20.6**
Chromium	7440-47-3	0.1	mg/kg	**49.9**	**39.1**	**48.4**	**42.3**	**63.8**
Copper	7440-50-8	0.1	mg/kg	**58.6**	**12.8**	**50.0**	**34.6**	**48.6**
Manganese	7439-96-5	0.1	mg/kg	**800**	**363**	**862**	**683**	**789**
Molybdenum	7439-98-7	0.1	mg/kg	**0.4**	**0.1**	**0.3**	**0.2**	**0.4**
Nickel	7440-02-0	0.1	mg/kg	**45.2**	**32.0**	**44.0**	**42.9**	**46.4**
Lead	7439-92-1	0.1	mg/kg	**10.8**	**4.0**	**10.2**	**8.3**	**8.1**
Antimony	7440-36-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.5	mg/kg	**97.0**	**61.1**	**94.9**	**79.4**	**86.0**
Vanadium	7440-62-2	1	mg/kg	**104**	**62**	**99**	**93**	**102**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	**1530**	**210**	**1560**	**780**	**1320**
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	**1530**	**210**	**1560**	**780**	**1320**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	**835**	**511**	**908**	**870**	**662**
EP004: Organic Matter								
Organic Matter	----	0.5	%	**4.0**	**0.6**	**3.5**	**1.4**	**4.2**
Total Organic Carbon	----	0.5	%	**2.3**	<0.5	**2.0**	**0.8**	**2.4**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	22	20	23b	24b	DUP1
				Client sampling date / time	28-Jun-2016 14:00	29-Jun-2016 09:00	02-Jul-2016 09:00	02-Jul-2016 14:00	[02-Jul-2016]
Compound	CAS Number	LOR	Unit		EB1617705-016	EB1617705-017	EB1617705-018	EB1617705-019	EB1617705-020
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
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	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	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		----	----	----	----	----
^ >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	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	22	20	23b	24b	DUP1
				Client sampling date / time	28-Jun-2016 14:00	29-Jun-2016 09:00	02-Jul-2016 09:00	02-Jul-2016 14:00	[02-Jul-2016]
Compound	CAS Number	LOR	Unit		EB1617705-016	EB1617705-017	EB1617705-018	EB1617705-019	EB1617705-020
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**92.0**	**121**	**102**	**113**	**114**
Anthracene-d10	1719-06-8	0.5	%		**70.2**	**88.9**	**74.1**	**75.3**	**78.7**
4-Terphenyl-d14	1718-51-0	0.5	%		**83.0**	**109**	**98.6**	**100**	**100**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**93.8**	**105**	**91.9**	**94.0**	**81.8**
Toluene-D8	2037-26-5	0.2	%		**94.7**	**98.5**	**88.6**	**89.7**	**79.7**
4-Bromofluorobenzene	460-00-4	0.2	%		**117**	**119**	**110**	**107**	**95.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	DUP2	TRIP1	TRIP BLANK	M25	M31
			Client sampling date / time	[02-Jul-2016]	[02-Jul-2016]	[02-Jul-2016]	04-Jul-2016 14:30	05-Jul-2016 12:00
Compound	CAS Number	LOR	Unit	EB1617705-021	EB1617705-022	EB1617705-023	EB1617705-024	EB1617705-025
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	29.7	43.4	<1.0	64.2	67.9
EA150: Particle Sizing								
+75µm	----	1	%	----	----	----	----	<1
+150µm	----	1	%	----	----	----	----	<1
+300µm	----	1	%	----	----	----	----	<1
+425µm	----	1	%	----	----	----	----	<1
+600µm	----	1	%	----	----	----	----	<1
+1180µm	----	1	%	----	----	----	----	<1
+2.36mm	----	1	%	----	----	----	----	<1
+4.75mm	----	1	%	----	----	----	----	<1
+9.5mm	----	1	%	----	----	----	----	<1
+19.0mm	----	1	%	----	----	----	----	<1
+37.5mm	----	1	%	----	----	----	----	<1
+75.0mm	----	1	%	----	----	----	----	<1
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	----	----	52
Silt (2-60 µm)	----	1	%	----	----	----	----	43
Sand (0.06-2.00 mm)	----	1	%	----	----	----	----	5
Gravel (>2mm)	----	1	%	----	----	----	----	<1
Cobbles (>6cm)	----	1	%	----	----	----	----	<1
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	----	----	----	----	2.67
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	25200	33100	190	39300	41000
Arsenic	7440-38-2	5	mg/kg	6	7	<5	11	8
Barium	7440-39-3	10	mg/kg	10	20	<10	10	20
Iron	7439-89-6	50	mg/kg	43400	48600	100	55300	56400
Strontium	7440-24-6	2	mg/kg	18	30	<2	50	74
Tin	7440-31-5	5	mg/kg	<5	<5	<5	<5	<5
EG020T: Total Metals by ICP-MS								
Selenium	7782-49-2	1	mg/kg	<1	<1	<1	<1	<1
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Thallium	7440-28-0	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Beryllium	7440-41-7	0.1	mg/kg	0.4	0.5	<0.1	0.8	0.8

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	DUP2	TRIP1	TRIP BLANK	M25	M31
			Client sampling date / time	[02-Jul-2016]	[02-Jul-2016]	[02-Jul-2016]	04-Jul-2016 14:30	05-Jul-2016 12:00
Compound	CAS Number	LOR	Unit	EB1617705-021	EB1617705-022	EB1617705-023	EB1617705-024	EB1617705-025
				Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	**17.5**	**20.1**	<0.1	**20.0**	**18.8**
Chromium	7440-47-3	0.1	mg/kg	**49.3**	**57.6**	**0.3**	**59.2**	**58.3**
Copper	7440-50-8	0.1	mg/kg	**18.1**	**36.4**	**0.2**	**46.4**	**33.7**
Manganese	7439-96-5	0.1	mg/kg	**556**	**657**	**0.2**	**698**	**756**
Molybdenum	7439-98-7	0.1	mg/kg	**0.1**	**0.2**	<0.1	**0.4**	**0.3**
Nickel	7440-02-0	0.1	mg/kg	**34.8**	**41.5**	<0.1	**47.4**	**50.0**
Lead	7439-92-1	0.1	mg/kg	**6.6**	**7.1**	<0.1	**11.4**	**12.5**
Antimony	7440-36-0	0.1	mg/kg	<0.1	<0.1	<0.1	**0.1**	**0.2**
Zinc	7440-66-6	0.5	mg/kg	**70.7**	**79.7**	<0.5	**97.2**	**97.4**
Vanadium	7440-62-2	1	mg/kg	**83**	**91**	<1	**96**	**88**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	**290**	**820**	<20	**1600**	**1560**
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	**290**	**820**	<20	**1600**	**1560**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	**546**	**681**	<2	**804**	**869**
EP004: Organic Matter								
Organic Matter	----	0.5	%	**0.5**	**2.4**	<0.5	**4.0**	**2.7**
Total Organic Carbon	----	0.5	%	<0.5	**1.4**	<0.5	**2.3**	**1.5**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	DUP2	TRIP1	TRIP BLANK	M25	M31
				Client sampling date / time	[02-Jul-2016]	[02-Jul-2016]	[02-Jul-2016]	04-Jul-2016 14:30	05-Jul-2016 12:00
Compound	CAS Number	LOR	Unit		EB1617705-021	EB1617705-022	EB1617705-023	EB1617705-024	EB1617705-025
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<70	<70
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	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<60	<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
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	DUP2	TRIP1	TRIP BLANK	M25	M31
				Client sampling date / time	[02-Jul-2016]	[02-Jul-2016]	[02-Jul-2016]	04-Jul-2016 14:30	05-Jul-2016 12:00
Compound	CAS Number	LOR	Unit		EB1617705-021	EB1617705-022	EB1617705-023	EB1617705-024	EB1617705-025
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**126**	**119**	**122**	**121**	**123**
Anthracene-d10	1719-06-8	0.5	%		**96.4**	**90.8**	**93.4**	**91.8**	**92.7**
4-Terphenyl-d14	1718-51-0	0.5	%		**131**	**124**	**126**	**126**	**128**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**80.1**	**79.5**	**93.7**	**76.1**	**74.2**
Toluene-D8	2037-26-5	0.2	%		**78.9**	**77.4**	**85.8**	**76.9**	**71.9**
4-Bromofluorobenzene	460-00-4	0.2	%		**80.9**	**77.0**	**86.6**	**74.5**	**71.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M37	M43	----	----	----
				Client sampling date / time	05-Jul-2016 17:00	[06-Jul-2016]	----	----	----
Compound	CAS Number	LOR	Unit		EB1617705-026	EB1617705-027	--------	--------	--------
					Result	Result	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		43.4	61.8	----	----	----
EA150: Particle Sizing									
+75µm	----	1	%		64	2	----	----	----
+150µm	----	1	%		55	<1	----	----	----
+300µm	----	1	%		21	<1	----	----	----
+425µm	----	1	%		14	<1	----	----	----
+600µm	----	1	%		<1	<1	----	----	----
+1180µm	----	1	%		<1	<1	----	----	----
+2.36mm	----	1	%		<1	<1	----	----	----
+4.75mm	----	1	%		<1	<1	----	----	----
+9.5mm	----	1	%		<1	<1	----	----	----
+19.0mm	----	1	%		<1	<1	----	----	----
+37.5mm	----	1	%		<1	<1	----	----	----
+75.0mm	----	1	%		<1	<1	----	----	----
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		22	41	----	----	----
Silt (2-60 µm)	----	1	%		12	55	----	----	----
Sand (0.06-2.00 mm)	----	1	%		66	4	----	----	----
Gravel (>2mm)	----	1	%		<1	<1	----	----	----
Cobbles (>6cm)	----	1	%		<1	<1	----	----	----
EA152: Soil Particle Density									
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.69	2.71	----	----	----
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		25200	35900	----	----	----
Arsenic	7440-38-2	5	mg/kg		22	19	----	----	----
Barium	7440-39-3	10	mg/kg		20	30	----	----	----
Iron	7439-89-6	50	mg/kg		44000	52800	----	----	----
Strontium	7440-24-6	2	mg/kg		370	170	----	----	----
Tin	7440-31-5	5	mg/kg		<5	<5	----	----	----
EG020T: Total Metals by ICP-MS									
Selenium	7782-49-2	1	mg/kg		<1	<1	----	----	----
Silver	7440-22-4	0.1	mg/kg		<0.1	<0.1	----	----	----
Thallium	7440-28-0	0.1	mg/kg		<0.1	<0.1	----	----	----
Beryllium	7440-41-7	0.1	mg/kg		0.7	0.7	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	M37	M43	----	----	----
			Client sampling date / time	05-Jul-2016 17:00	[06-Jul-2016]	----	----	----
Compound	CAS Number	LOR	Unit	EB1617705-026	EB1617705-027	--------	--------	--------
				Result	Result	----	----	----
EG020T: Total Metals by ICP-MS - Continued								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	----	----	----
Cobalt	7440-48-4	0.1	mg/kg	**14.4**	**17.6**	----	----	----
Chromium	7440-47-3	0.1	mg/kg	**49.8**	**61.2**	----	----	----
Copper	7440-50-8	0.1	mg/kg	**19.0**	**35.6**	----	----	----
Manganese	7439-96-5	0.1	mg/kg	**675**	**1030**	----	----	----
Molybdenum	7439-98-7	0.1	mg/kg	**0.3**	**0.4**	----	----	----
Nickel	7440-02-0	0.1	mg/kg	**38.2**	**44.7**	----	----	----
Lead	7439-92-1	0.1	mg/kg	**8.7**	**15.3**	----	----	----
Antimony	7440-36-0	0.1	mg/kg	**0.3**	**0.4**	----	----	----
Zinc	7440-66-6	0.5	mg/kg	**62.2**	**87.5**	----	----	----
Vanadium	7440-62-2	1	mg/kg	**61**	**78**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	**0.1**	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	**720**	**1650**	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	**720**	**1650**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	**697**	**887**	----	----	----
EP004: Organic Matter								
Organic Matter	----	0.5	%	**1.1**	**1.0**	----	----	----
Total Organic Carbon	----	0.5	%	**0.6**	**0.6**	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M37	M43	----	----	----
				Client sampling date / time	05-Jul-2016 17:00	[06-Jul-2016]	----	----	----
Compound	CAS Number	LOR	Unit		EB1617705-026	EB1617705-027	--------	--------	--------
					Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**0.6**	**0.6**	----	----	----
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.2**	**1.2**	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	<50	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M37	M43	----	----	----
				Client sampling date / time	05-Jul-2016 17:00	[06-Jul-2016]	----	----	----
Compound	CAS Number	LOR	Unit		EB1617705-026	EB1617705-027	--------	--------	--------
					Result	Result	----	----	----
EP080: BTEXN - Continued									
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	----	----	----
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**97.1**	**45.5**	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**90.8**	**84.2**	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**126**	**116**	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**75.3**	**70.6**	----	----	----
Toluene-D8	2037-26-5	0.2	%		**73.3**	**63.9**	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**71.4**	**63.2**	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	34	157
Anthracene-d10	1719-06-8	37	153
4-Terphenyl-d14	1718-51-0	42	172
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	53	134
Toluene-D8	2037-26-5	60	131
4-Bromofluorobenzene	460-00-4	59	127

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB1617705**	Page	: 1 of 14
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: John Pickering
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61 7 3552 8634
Project	: B21414 Elk	Date Samples Received	: 11-Jul-2016
Order number	: ----	Date Analysis Commenced	: 11-Jul-2016
C-O-C number	: ----	Issue Date	: 27-Jul-2016
Sampler	: CONOR JONES, DANIEL MORAN		
Site	: ----		
Quote number	: ----		
No. of samples received	: 31		
No. of samples analysed	: 27		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Acid Sulfate Soils Supervisor	Brisbane Acid Sulphate Soils, Stafford, QLD

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

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: 514337)									
EB1617705-001	M6	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	48.2	48.1	0.348	0% - 20%
EB1617705-011	M1	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	48.1	46.6	3.11	0% - 20%
EA055: Moisture Content (QC Lot: 514846)									
EB1617705-021	DUP2	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	29.7	30.4	2.34	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 514842)									
EB1617705-021	DUP2	EG005T: Barium	7440-39-3	10	mg/kg	10	10	0.00	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	18	18	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	5	17.6	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	25200	25100	0.377	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	43400	43300	0.174	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 514937)									
EB1617705-001	M6	EG005T: Barium	7440-39-3	10	mg/kg	20	20	0.00	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	35	33	6.50	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	10	10	0.00	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	34400	32800	5.00	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	54300	50600	7.03	0% - 20%
EB1617705-011	M1	EG005T: Barium	7440-39-3	10	mg/kg	20	20	0.00	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	35	35	0.00	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	11	10	10.0	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	32600	33600	3.24	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	51600	53800	4.30	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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 514839)									
EB1617705-021	DUP2	EG020X-T: Copper	7440-50-8	0.1	mg/kg	18.1	18.0	0.654	0% - 20%
EB1617705-021	DUP2	EG020X-T: Beryllium	7440-41-7	0.1	mg/kg	0.4	0.4	0.00	No Limit
		EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	17.5	17.8	1.44	0% - 20%
		EG020X-T: Chromium	7440-47-3	0.1	mg/kg	49.3	49.8	1.16	0% - 20%
		EG020X-T: Manganese	7439-96-5	0.1	mg/kg	556	554	0.239	0% - 20%
		EG020X-T: Molybdenum	7439-98-7	0.1	mg/kg	0.1	0.1	0.00	No Limit
		EG020X-T: Nickel	7440-02-0	0.1	mg/kg	34.8	35.6	2.02	0% - 20%
		EG020X-T: Lead	7439-92-1	0.1	mg/kg	6.6	6.4	3.12	0% - 20%
		EG020X-T: Antimony	7440-36-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020X-T: Zinc	7440-66-6	0.5	mg/kg	70.7	72.2	2.14	0% - 20%
		EG020X-T: Vanadium	7440-62-2	1	mg/kg	83	84	1.51	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 514840)									
EB1617705-021	DUP2	EG020Y-T: Thallium	7440-28-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	<1	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 514939)									
EB1617705-001	M6	EG020X-T: Copper	7440-50-8	0.1	mg/kg	39.4	40.2	2.14	0% - 20%
EB1617705-011	M1	EG020X-T: Copper	7440-50-8	0.1	mg/kg	43.8	43.3	1.18	0% - 20%
EB1617705-001	M6	EG020X-T: Beryllium	7440-41-7	0.1	mg/kg	0.6	0.6	0.00	No Limit
		EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	21.8	19.7	10.0	0% - 20%
		EG020X-T: Chromium	7440-47-3	0.1	mg/kg	63.7	58.8	7.99	0% - 20%
		EG020X-T: Manganese	7439-96-5	0.1	mg/kg	708	662	6.71	0% - 20%
		EG020X-T: Molybdenum	7439-98-7	0.1	mg/kg	0.3	0.3	0.00	No Limit
		EG020X-T: Nickel	7440-02-0	0.1	mg/kg	47.6	43.2	9.70	0% - 20%
		EG020X-T: Lead	7439-92-1	0.1	mg/kg	8.4	7.9	6.09	0% - 20%
		EG020X-T: Antimony	7440-36-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020X-T: Zinc	7440-66-6	0.5	mg/kg	87.9	80.4	8.95	0% - 20%
		EG020X-T: Vanadium	7440-62-2	1	mg/kg	100	92	8.60	0% - 20%
EB1617705-011	M1	EG020X-T: Beryllium	7440-41-7	0.1	mg/kg	0.6	0.6	0.00	No Limit
		EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	20.1	20.6	2.49	0% - 20%
		EG020X-T: Chromium	7440-47-3	0.1	mg/kg	59.1	60.1	1.81	0% - 20%
		EG020X-T: Manganese	7439-96-5	0.1	mg/kg	742	765	2.97	0% - 20%
		EG020X-T: Molybdenum	7439-98-7	0.1	mg/kg	0.3	0.3	0.00	No Limit
		EG020X-T: Nickel	7440-02-0	0.1	mg/kg	44.8	45.4	1.48	0% - 20%
		EG020X-T: Lead	7439-92-1	0.1	mg/kg	8.0	8.3	3.48	0% - 20%
		EG020X-T: Antimony	7440-36-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020X-T: Zinc	7440-66-6	0.5	mg/kg	84.3	86.4	2.50	0% - 20%
		EG020X-T: Vanadium	7440-62-2	1	mg/kg	94	96	2.26	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 514940)									
EB1617705-001	M6	EG020Y-T: Thallium	7440-28-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 514940) - continued									
EB1617705-001	M6	EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	<1	0.00	No Limit
EB1617705-011	M1	EG020Y-T: Thallium	7440-28-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	<1	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 516045)									
EB1617705-001	M6	EG020Z-T: Silver	7440-22-4	0.1	mg/kg	0.1	0.2	0.00	No Limit
EB1617705-011	M1	EG020Z-T: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 516046)									
EB1617705-021	DUP2	EG020Z-T: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 514841)									
EB1617705-021	DUP2	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 514938)									
EB1617705-001	M6	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EB1617705-011	M1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 514945)									
EB1617705-001	M6	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EB1617705-011	M1	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	0.1	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 514946)									
EB1617705-021	DUP2	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 514942)									
EB1617705-001	M6	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	930	960	3.30	0% - 20%
EB1617705-011	M1	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	1080	1100	1.85	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 514943)									
EB1617705-021	DUP2	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	290	300	0.00	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 514941)									
EB1617705-001	M6	EK067G: Total Phosphorus as P	----	2	mg/kg	580	583	0.500	0% - 20%
EB1617705-011	M1	EK067G: Total Phosphorus as P	----	2	mg/kg	613	658	7.20	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 514944)									
EB1617705-021	DUP2	EK067G: Total Phosphorus as P	----	2	mg/kg	546	538	1.31	0% - 20%
EP004: Organic Matter (QC Lot: 514477)									
EB1617705-001	M6	EP004: Organic Matter	----	0.5	%	3.1	3.1	0.00	No Limit
		EP004: Total Organic Carbon	----	0.5	%	1.8	1.8	0.00	No Limit
EB1617705-010	M5	EP004: Organic Matter	----	0.5	%	2.5	2.5	0.00	No Limit
		EP004: Total Organic Carbon	----	0.5	%	1.4	1.4	0.00	No Limit
EP004: Organic Matter (QC Lot: 514480)									
EB1617705-021	DUP2	EP004: Organic Matter	----	0.5	%	0.5	0.5	0.00	No Limit
		EP004: Total Organic Carbon	----	0.5	%	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 514335)									
EB1617705-001	M6	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EB1617705-011	M1	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 514845)									
EB1617705-021	DUP2	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 514845) - continued									
EB1617705-021	DUP2	EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 514334)									
EB1617705-001	M6	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EB1617705-011	M1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 514336)									
EB1617705-001	M6	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
EB1617705-011	M1	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 Petroleum Hydrocarbons (QC Lot: 514843)									
EB1617705-021	DUP2	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 514844)									
EB1617705-021	DUP2	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: 514334)									
EB1617705-001	M6	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EB1617705-011	M1	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: 514336)									
EB1617705-001	M6	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	----	50	mg/kg	<50	<50	0.00	No Limit
EB1617705-011	M1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 514336) - continued									
EB1617705-011	M1	EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 514843)									
EB1617705-021	DUP2	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: 514844)									
EB1617705-021	DUP2	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	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 514334)									
EB1617705-001	M6	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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
EB1617705-011	M1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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
EP080: BTEXN (QC Lot: 514843)									
EB1617705-021	DUP2	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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

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 Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 514842)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	118.9 mg/kg	99.7	84	123
EG005T: Barium	7440-39-3	10	mg/kg	<10	105.1967 mg/kg	94.8	89	129
EG005T: Iron	7439-89-6	50	mg/kg	<50	34900 mg/kg	103	70	120
EG005T: Strontium	7440-24-6	2	mg/kg	<2	44.50816 mg/kg	99.8	83	117
EG005T: Tin	7440-31-5	5	mg/kg	<5	5.7 mg/kg	87.2	75	130
EG005T: Total Metals by ICP-AES (QCLot: 514937)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	118.9 mg/kg	106	84	123
EG005T: Barium	7440-39-3	10	mg/kg	<10	105.1967 mg/kg	93.6	89	129
EG005T: Iron	7439-89-6	50	mg/kg	<50	34900 mg/kg	101	70	120
EG005T: Strontium	7440-24-6	2	mg/kg	<2	44.50816 mg/kg	88.2	83	117
EG005T: Tin	7440-31-5	5	mg/kg	<5	5.7 mg/kg	99.0	75	130
EG020T: Total Metals by ICP-MS (QCLot: 514839)								
EG020X-T: Beryllium	7440-41-7	0.1	mg/kg	<0.1	0.64 mg/kg	117	79	130
EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	<0.1	11.6 mg/kg	100	88	129
EG020X-T: Chromium	7440-47-3	0.1	mg/kg	<0.1	22.9 mg/kg	93.0	75	130
EG020X-T: Copper	7440-50-8	0.1	mg/kg	<0.1	52.9 mg/kg	103	84	120
EG020X-T: Manganese	7439-96-5	0.1	mg/kg	<0.1	592 mg/kg	103	86	130
EG020X-T: Molybdenum	7439-98-7	0.1	mg/kg	<0.1	2 mg/kg	98.3	82	118
EG020X-T: Nickel	7440-02-0	0.1	mg/kg	<0.1	16.1 mg/kg	95.0	89	127
EG020X-T: Lead	7439-92-1	0.1	mg/kg	<0.1	66.3 mg/kg	# 124	85	117
EG020X-T: Antimony	7440-36-0	0.1	mg/kg	<0.1	----	----	----	----
EG020X-T: Zinc	7440-66-6	0.5	mg/kg	<0.5	187 mg/kg	103	71	130
EG020X-T: Vanadium	7440-62-2	1	mg/kg	<1	67.8 mg/kg	104	86	130
EG020T: Total Metals by ICP-MS (QCLot: 514840)								
EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	----	----	----	----
EG020Y-T: Thallium	7440-28-0	0.1	mg/kg	<0.1	----	----	----	----
EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	1.43 mg/kg	105	81	121
EG020T: Total Metals by ICP-MS (QCLot: 514939)								
EG020X-T: Beryllium	7440-41-7	0.1	mg/kg	<0.1	0.64 mg/kg	102	79	130
EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	<0.1	11.6 mg/kg	103	88	129
EG020X-T: Chromium	7440-47-3	0.1	mg/kg	<0.1	22.9 mg/kg	95.8	75	130
EG020X-T: Copper	7440-50-8	0.1	mg/kg	<0.1	52.9 mg/kg	102	84	120

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 514939) - continued								
EG020X-T: Manganese	7439-96-5	0.1	mg/kg	# 0.1	592 mg/kg	102	86	130
EG020X-T: Molybdenum	7439-98-7	0.1	mg/kg	<0.1	2 mg/kg	101	82	118
EG020X-T: Nickel	7440-02-0	0.1	mg/kg	<0.1	16.1 mg/kg	97.7	89	127
EG020X-T: Lead	7439-92-1	0.1	mg/kg	<0.1	66.3 mg/kg	102	85	117
EG020X-T: Antimony	7440-36-0	0.1	mg/kg	<0.1	----	----	----	----
EG020X-T: Zinc	7440-66-6	0.5	mg/kg	<0.5	187 mg/kg	106	71	130
EG020X-T: Vanadium	7440-62-2	1	mg/kg	<1	67.8 mg/kg	105	86	130
EG020T: Total Metals by ICP-MS (QCLot: 514940)								
EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	----	----	----	----
EG020Y-T: Thallium	7440-28-0	0.1	mg/kg	<0.1	----	----	----	----
EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	1.43 mg/kg	98.0	81	121
EG020T: Total Metals by ICP-MS (QCLot: 516045)								
EG020Z-T: Silver	7440-22-4	0.1	mg/kg	<0.1	3.16 mg/kg	92.7	72	120
EG020T: Total Metals by ICP-MS (QCLot: 516046)								
EG020Z-T: Silver	7440-22-4	0.1	mg/kg	<0.1	3.16 mg/kg	92.7	72	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 514841)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.09821 mg/kg	122	78	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 514938)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.09821 mg/kg	110	78	122
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 514945)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	99.0	86	115
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 514946)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	96.9	86	115
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 514942)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	877 mg/kg	92.0	70	110
				<20	3644 mg/kg	75.4	70	110
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 514943)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	877 mg/kg	91.9	70	110
				<20	3644 mg/kg	74.3	70	110
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 514941)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	766 mg/kg	78.0	70	110
				<2	1200 mg/kg	86.3	70	110
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 514944)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	766 mg/kg	82.3	70	110
				<2	1200 mg/kg	94.3	70	110
EP004: Organic Matter (QCLot: 514477)								
EP004: Organic Matter	----	0.5	%	<0.5	2.3 %	88.8	83	115

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP004: Organic Matter (QCLot: 514477) - continued								
EP004: Total Organic Carbon	----	0.5	%	<0.5	1.3 %	88.7	85	115
EP004: Organic Matter (QCLot: 514480)								
EP004: Organic Matter	----	0.5	%	<0.5	2.3 %	88.8	83	115
EP004: Total Organic Carbon	----	0.5	%	<0.5	1.3 %	88.7	85	115
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 514335)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	109	74	119
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	89.5	74	118
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	103	83	121
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	101	81	116
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	109	72	117
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	109	72	115
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	97.6	70	116
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	98.7	70	134
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	71.5	64	120
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	116	66	119
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	1.5 mg/kg	98.1	59	129
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	1.5 mg/kg	106	70	129
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	87.9	76	121
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	86.8	53	135
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	90.7	45	134
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	97.2	64	131
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 514845)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	114	74	119
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	108	74	118
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	113	83	121
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	# 123	81	116
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	# 144	72	117
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	# 126	72	115
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	# 124	70	116
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	122	70	134
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	111	64	120
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	112	66	119
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	1.5 mg/kg	105	59	129
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	1.5 mg/kg	125	70	129
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	97.6	76	121
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	102	53	135

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 514845) - continued								
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	104	45	134
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	101	64	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 514334)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	16 mg/kg	91.2	66	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 514336)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	318 mg/kg	112	79	123
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	531 mg/kg	99.4	77	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 514843)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	16 mg/kg	102	66	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 514844)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	318 mg/kg	115	79	123
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	531 mg/kg	103	77	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 514334)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	18.5 mg/kg	88.7	66	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 514336)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	428 mg/kg	110	81	122
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	395 mg/kg	95.0	74	122
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 514843)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	18.5 mg/kg	102	66	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 514844)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	428 mg/kg	112	81	122
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	395 mg/kg	101	74	122
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080: BTEXN (QCLot: 514334)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	93.0	73	105
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	99.3	73	105
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	99.6	67	104
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	104	66	106
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	101	68	105
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	100	72	115
EP080: BTEXN (QCLot: 514843)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	85.5	73	105
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	90.6	73	105

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080: BTEXN (QCLot: 514843) - continued								
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	91.9	67	104
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	89.9	66	106
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	91.2	68	105
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	102	72	115

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	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 514842)							
EB1617705-022	TRIP1	EG005T: Arsenic	7440-38-2	50 mg/kg	98.4	70	130
		EG005T: Barium	7440-39-3	50 mg/kg	112	70	130
EG005T: Total Metals by ICP-AES (QCLot: 514937)							
EB1617705-002	M3	EG005T: Arsenic	7440-38-2	50 mg/kg	99.4	70	130
		EG005T: Barium	7440-39-3	50 mg/kg	106	70	130
EG020T: Total Metals by ICP-MS (QCLot: 514839)							
EB1617705-022	TRIP1	EG020X-T: Copper	7440-50-8	50 mg/kg	100	70	130
EB1617705-022	TRIP1	EG020X-T: Beryllium	7440-41-7	5 mg/kg	96.1	70	130
		EG020X-T: Cobalt	7440-48-4	50 mg/kg	98.3	70	130
		EG020X-T: Chromium	7440-47-3	50 mg/kg	102	70	130
		EG020X-T: Manganese	7439-96-5	50 mg/kg	# Not Determined	70	130
		EG020X-T: Nickel	7440-02-0	50 mg/kg	99.2	70	130
		EG020X-T: Lead	7439-92-1	50 mg/kg	96.2	70	130
		EG020X-T: Zinc	7440-66-6	50 mg/kg	100	70	130
		EG020X-T: Vanadium	7440-62-2	50 mg/kg	98.8	70	130
EG020T: Total Metals by ICP-MS (QCLot: 514840)							
EB1617705-022	TRIP1	EG020Y-T: Cadmium	7440-43-9	25 mg/kg	94.8	70	130
EG020T: Total Metals by ICP-MS (QCLot: 514939)							
EB1617705-002	M3	EG020X-T: Copper	7440-50-8	50 mg/kg	102	70	130
EB1617705-002	M3	EG020X-T: Beryllium	7440-41-7	5 mg/kg	88.2	70	130
		EG020X-T: Cobalt	7440-48-4	50 mg/kg	100.0	70	130
		EG020X-T: Chromium	7440-47-3	50 mg/kg	96.5	70	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 514939) - continued							
EB1617705-002	M3	EG020X-T: Manganese	7439-96-5	50 mg/kg	# Not Determined	70	130
		EG020X-T: Nickel	7440-02-0	50 mg/kg	96.5	70	130
		EG020X-T: Lead	7439-92-1	50 mg/kg	91.1	70	130
		EG020X-T: Zinc	7440-66-6	50 mg/kg	93.6	70	130
		EG020X-T: Vanadium	7440-62-2	50 mg/kg	96.7	70	130
EG020T: Total Metals by ICP-MS (QCLot: 514940)							
EB1617705-002	M3	EG020Y-T: Cadmium	7440-43-9	25 mg/kg	92.3	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 514841)							
EB1617705-022	TRIP1	EG035T: Mercury	7439-97-6	2.5 mg/kg	102	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 514938)							
EB1617705-002	M3	EG035T: Mercury	7439-97-6	2.5 mg/kg	104	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 514945)							
EB1617705-002	M3	EK059G: Nitrite + Nitrate as N (Sol.)	----	2 mg/kg	95.5	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 514946)							
EB1617705-022	TRIP1	EK059G: Nitrite + Nitrate as N (Sol.)	----	2 mg/kg	98.9	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 514942)							
EB1617705-002	M3	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	83.1	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 514943)							
EB1617705-022	TRIP1	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	102	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 514941)							
EB1617705-002	M3	EK067G: Total Phosphorus as P	----	100 mg/kg	92.3	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 514944)							
EB1617705-022	TRIP1	EK067G: Total Phosphorus as P	----	100 mg/kg	96.2	70	130
EP004: Organic Matter (QCLot: 514477)							
EB1617705-002	M3	EP004: Organic Matter	----	1.84 %	83.0	70	130
		EP004: Total Organic Carbon	----	1.04 %	83.0	70	130
EP004: Organic Matter (QCLot: 514480)							
EB1617705-022	TRIP1	EP004: Organic Matter	----	1.84 %	83.0	70	130
		EP004: Total Organic Carbon	----	1.04 %	83.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 514335)							
EB1617705-002	M3	EP075(SIM): Acenaphthene	83-32-9	1.5 mg/kg	106	70	130
		EP075(SIM): Pyrene	129-00-0	1.5 mg/kg	108	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 514845)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 514845) - continued							
EB1617705-022	TRIP1	EP075(SIM): Acenaphthene	83-32-9	1.5 mg/kg	111	70	130
		EP075(SIM): Pyrene	129-00-0	1.5 mg/kg	118	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 514334)							
EB1617705-002	M3	EP080: C6 - C9 Fraction	----	8 mg/kg	75.3	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 514336)							
EB1617705-002	M3	EP071: C10 - C14 Fraction	----	318 mg/kg	114	70	130
		EP071: C15 - C28 Fraction	----	531 mg/kg	102	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 514843)							
EB1617705-022	TRIP1	EP080: C6 - C9 Fraction	----	8 mg/kg	77.3	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 514844)							
EB1617705-022	TRIP1	EP071: C10 - C14 Fraction	----	318 mg/kg	110	70	130
		EP071: C15 - C28 Fraction	----	531 mg/kg	100	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 514334)							
EB1617705-002	M3	EP080: C6 - C10 Fraction	C6_C10	8 mg/kg	77.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 514336)							
EB1617705-002	M3	EP071: >C10 - C16 Fraction	----	428 mg/kg	113	70	130
		EP071: >C16 - C34 Fraction	----	395 mg/kg	96.8	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 514843)							
EB1617705-022	TRIP1	EP080: C6 - C10 Fraction	C6_C10	8 mg/kg	79.5	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 514844)							
EB1617705-022	TRIP1	EP071: >C10 - C16 Fraction	----	428 mg/kg	109	70	130
		EP071: >C16 - C34 Fraction	----	395 mg/kg	97.4	70	130
EP080: BTEXN (QCLot: 514334)							
EB1617705-002	M3	EP080: Benzene	71-43-2	2 mg/kg	77.4	70	130
		EP080: Toluene	108-88-3	2 mg/kg	72.8	70	130
EP080: BTEXN (QCLot: 514843)							
EB1617705-022	TRIP1	EP080: Benzene	71-43-2	2 mg/kg	# 63.6	70	130
		EP080: Toluene	108-88-3	2 mg/kg	# 63.6	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB1617705**	Page	: 1 of 25
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Telephone	: +61 7 3552 8634
Project	: B21414 Elk	Date Samples Received	: 11-Jul-2016
Site	: ----	Issue Date	: 27-Jul-2016
Sampler	: CONOR JONES, DANIEL MORAN	No. of samples received	: 31
Order number	: ----	No. of samples analysed	: 27

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 Duplicate outliers occur.**
- **Method Blank value outliers exist - please see following pages for full details.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **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: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Method Blank (MB) Values							
EG020T: Total Metals by ICP-MS	QC-MRG4-51493700	----	**Manganese**	7439-96-5	0.1 mg/kg	0.1 mg/kg	**Blank result exceeds permitted value**
Laboratory Control Spike (LCS) Recoveries							
EG020T: Total Metals by ICP-MS	QC-MRG4-51483900	----	**Lead**	7439-92-1	124 %	85-117%	**Recovery greater than upper control limit**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	QC-514845-002	----	**Fluorene**	86-73-7	123 %	81-116%	**Recovery greater than upper control limit**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	QC-514845-002	----	**Phenanthrene**	85-01-8	144 %	72-117%	**Recovery greater than upper control limit**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	QC-514845-002	----	**Anthracene**	120-12-7	126 %	72-115%	**Recovery greater than upper control limit**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	QC-514845-002	----	**Fluoranthene**	206-44-0	124 %	70-116%	**Recovery greater than upper control limit**
Matrix Spike (MS) Recoveries							
EG020T: Total Metals by ICP-MS	EB1617705--022	TRIP1	**Manganese**	7439-96-5	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020T: Total Metals by ICP-MS	EB1617705--002	M3	**Manganese**	7439-96-5	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080: BTEXN	EB1617705--022	TRIP1	**Benzene**	71-43-2	63.6 %	70-130%	**Recovery less than lower data quality objective**
EP080: BTEXN	EB1617705--022	TRIP1	**Toluene**	108-88-3	63.6 %	70-130%	**Recovery less than lower data quality objective**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content							
Soil Glass Jar - Unpreserved							
M6,	M3,	----	----	----	11-Jul-2016	09-Jul-2016	**2**
M9,	M10,						
M4,	M12,						
M11,	M2						
Soil Glass Jar - Unpreserved							
M8,	M5,	----	----	----	11-Jul-2016	10-Jul-2016	**1**
M1,	M7						
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Analysis Holding Time Compliance						
Soil Glass Jar - Unpreserved						
M6, M3, M9, M10, M4, M12, M11, M2	11-Jul-2016	09-Jul-2016	**2**	----	----	----
Soil Glass Jar - Unpreserved						
M8, M5, M1, M7	11-Jul-2016	10-Jul-2016	**1**	----	----	----
EP080/071: Total Petroleum Hydrocarbons						
Soil Glass Jar - Unpreserved						
M6, M3, M9, M10, M4, M12, M11, M2	11-Jul-2016	09-Jul-2016	**2**	----	----	----
Soil Glass Jar - Unpreserved						
M6, M3, M9, M10, M4, M12, M11, M2	11-Jul-2016	09-Jul-2016	**2**	14-Jul-2016	09-Jul-2016	**5**
Soil Glass Jar - Unpreserved						
M8, M5, M1, M7	11-Jul-2016	10-Jul-2016	**1**	----	----	----
Soil Glass Jar - Unpreserved						
M8, M5, M1, M7	11-Jul-2016	10-Jul-2016	**1**	14-Jul-2016	10-Jul-2016	**4**
Soil Glass Jar - Unpreserved						
18, 19	----	----	----	14-Jul-2016	11-Jul-2016	**3**
Soil Glass Jar - Unpreserved						
21, 22	----	----	----	14-Jul-2016	12-Jul-2016	**2**
Soil Glass Jar - Unpreserved						
20	----	----	----	14-Jul-2016	13-Jul-2016	**1**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions						
Soil Glass Jar - Unpreserved						
M6, M3, M9, M10, M4, M12, M11, M2	11-Jul-2016	09-Jul-2016	**2**	----	----	----

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Analysis Holding Time						
Soil Glass Jar - Unpreserved M6, M3, M9, M10, M4, M12, M11, M2	11-Jul-2016	09-Jul-2016	**2**	14-Jul-2016	09-Jul-2016	**5**
Soil Glass Jar - Unpreserved M8, M5, M1, M7	11-Jul-2016	10-Jul-2016	**1**	----	----	----
Soil Glass Jar - Unpreserved M8, M5, M1, M7	11-Jul-2016	10-Jul-2016	**1**	14-Jul-2016	10-Jul-2016	**4**
Soil Glass Jar - Unpreserved 18, 19	----	----	----	14-Jul-2016	11-Jul-2016	**3**
Soil Glass Jar - Unpreserved 21, 22	----	----	----	14-Jul-2016	12-Jul-2016	**2**
Soil Glass Jar - Unpreserved 20	----	----	----	14-Jul-2016	13-Jul-2016	**1**
EP080: BTEXN						
Soil Glass Jar - Unpreserved M6, M3, M9, M10, M4, M12, M11, M2	11-Jul-2016	09-Jul-2016	**2**	14-Jul-2016	09-Jul-2016	**5**
Soil Glass Jar - Unpreserved M8, M5, M1, M7	11-Jul-2016	10-Jul-2016	**1**	14-Jul-2016	10-Jul-2016	**4**
Soil Glass Jar - Unpreserved 18, 19	----	----	----	14-Jul-2016	11-Jul-2016	**3**
Soil Glass Jar - Unpreserved 21, 22	----	----	----	14-Jul-2016	12-Jul-2016	**2**
Soil Glass Jar - Unpreserved 20	----	----	----	14-Jul-2016	13-Jul-2016	**1**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type / Method	Count: QC	Count: Regular	Rate (%): Actual	Rate (%): Expected	Quality Control Specification
Matrix Spikes (MS)					
Total Metals by ICP-MS - Suite Z	0	27	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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 / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103) 23b, 24b, DUP1	**02-Jul-2016**	**----**	----	----	**11-Jul-2016**	16-Jul-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**----**	----	----	**12-Jul-2016**	16-Jul-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) M25	**04-Jul-2016**	**----**	----	----	**12-Jul-2016**	18-Jul-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) M31, M37	**05-Jul-2016**	**----**	----	----	**12-Jul-2016**	19-Jul-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) M43	**06-Jul-2016**	**----**	----	----	**12-Jul-2016**	20-Jul-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**----**	----	----	**11-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EA055-103) M8, M5, M1, M7	**26-Jun-2016**	**----**	----	----	**11-Jul-2016**	10-Jul-2016	×
Soil Glass Jar - Unpreserved (EA055-103) 18, 19	**27-Jun-2016**	**----**	----	----	**11-Jul-2016**	11-Jul-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) 21, 22	**28-Jun-2016**	**----**	----	----	**11-Jul-2016**	12-Jul-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) 20	**29-Jun-2016**	**----**	----	----	**11-Jul-2016**	13-Jul-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA150: Particle Sizing							
Soil Glass Jar - Unpreserved (EA150H)							
23b, 24b	**02-Jul-2016**	**----**	----	----	**26-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA150H)							
M31, M37	**05-Jul-2016**	**----**	----	----	**26-Jul-2016**	01-Jan-2017	✓
Soil Glass Jar - Unpreserved (EA150H)							
M43	**06-Jul-2016**	**----**	----	----	**26-Jul-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EA150H)							
M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**----**	----	----	**26-Jul-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA150H)							
M8, M5, M1, M7	**26-Jun-2016**	**----**	----	----	**26-Jul-2016**	23-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA150H)							
18, 19	**27-Jun-2016**	**----**	----	----	**26-Jul-2016**	24-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA150H)							
21, 22	**28-Jun-2016**	**----**	----	----	**26-Jul-2016**	25-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA150H)							
20	**29-Jun-2016**	**----**	----	----	**26-Jul-2016**	26-Dec-2016	✓
EA150: Soil Classification based on Particle Size							
Soil Glass Jar - Unpreserved (EA150H)							
23b, 24b	**02-Jul-2016**	**----**	----	----	**26-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA150H)							
M31, M37	**05-Jul-2016**	**----**	----	----	**26-Jul-2016**	01-Jan-2017	✓
Soil Glass Jar - Unpreserved (EA150H)							
M43	**06-Jul-2016**	**----**	----	----	**26-Jul-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EA150H)							
M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**----**	----	----	**26-Jul-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA150H)							
M8, M5, M1, M7	**26-Jun-2016**	**----**	----	----	**26-Jul-2016**	23-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA150H)							
18, 19	**27-Jun-2016**	**----**	----	----	**26-Jul-2016**	24-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA150H)							
21, 22	**28-Jun-2016**	**----**	----	----	**26-Jul-2016**	25-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA150H)							
20	**29-Jun-2016**	**----**	----	----	**26-Jul-2016**	26-Dec-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA152: Soil Particle Density							
Soil Glass Jar - Unpreserved (EA152)							
23b, 24b	**02-Jul-2016**	**----**	----	----	**26-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA152)							
M31, M37	**05-Jul-2016**	**----**	----	----	**26-Jul-2016**	01-Jan-2017	✓
Soil Glass Jar - Unpreserved (EA152)							
M43	**06-Jul-2016**	**----**	----	----	**26-Jul-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EA152)							
M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**----**	----	----	**26-Jul-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA152)							
M8, M5, M1, M7	**26-Jun-2016**	**----**	----	----	**26-Jul-2016**	23-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA152)							
18, 19	**27-Jun-2016**	**----**	----	----	**26-Jul-2016**	24-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA152)							
21, 22	**28-Jun-2016**	**----**	----	----	**26-Jul-2016**	25-Dec-2016	✓
Soil Glass Jar - Unpreserved (EA152)							
20	**29-Jun-2016**	**----**	----	----	**26-Jul-2016**	26-Dec-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**12-Jul-2016**	29-Dec-2016	✓	**13-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG005T) 23b, 24b, DUP1	**02-Jul-2016**	**13-Jul-2016**	29-Dec-2016	✓	**13-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG005T) M25	**04-Jul-2016**	**12-Jul-2016**	31-Dec-2016	✓	**13-Jul-2016**	31-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG005T) M31, M37	**05-Jul-2016**	**12-Jul-2016**	01-Jan-2017	✓	**13-Jul-2016**	01-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG005T) M43	**06-Jul-2016**	**12-Jul-2016**	02-Jan-2017	✓	**13-Jul-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG005T) M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**13-Jul-2016**	22-Dec-2016	✓	**13-Jul-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG005T) M8, M5, M1, M7	**26-Jun-2016**	**13-Jul-2016**	23-Dec-2016	✓	**13-Jul-2016**	23-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG005T) 18, 19	**27-Jun-2016**	**13-Jul-2016**	24-Dec-2016	✓	**13-Jul-2016**	24-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG005T) 21, 22	**28-Jun-2016**	**13-Jul-2016**	25-Dec-2016	✓	**13-Jul-2016**	25-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG005T) 20	**29-Jun-2016**	**13-Jul-2016**	26-Dec-2016	✓	**13-Jul-2016**	26-Dec-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Soil Glass Jar - Unpreserved (EG020Y-T) DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**12-Jul-2016**	29-Dec-2016	✓	**13-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Y-T) 23b, 24b, DUP1	**02-Jul-2016**	**13-Jul-2016**	29-Dec-2016	✓	**13-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Z-T) 23b, 24b, DUP1, DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**15-Jul-2016**	29-Dec-2016	✓	**15-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Y-T) M25	**04-Jul-2016**	**12-Jul-2016**	31-Dec-2016	✓	**13-Jul-2016**	31-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Z-T) M25	**04-Jul-2016**	**15-Jul-2016**	31-Dec-2016	✓	**15-Jul-2016**	31-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Y-T) M31, M37	**05-Jul-2016**	**12-Jul-2016**	01-Jan-2017	✓	**13-Jul-2016**	01-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG020Z-T) M31, M37	**05-Jul-2016**	**15-Jul-2016**	01-Jan-2017	✓	**15-Jul-2016**	01-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG020Y-T) M43	**06-Jul-2016**	**12-Jul-2016**	02-Jan-2017	✓	**13-Jul-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG020Z-T) M43	**06-Jul-2016**	**15-Jul-2016**	02-Jan-2017	✓	**15-Jul-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG020Y-T) M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**13-Jul-2016**	22-Dec-2016	✓	**13-Jul-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Z-T) M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**15-Jul-2016**	22-Dec-2016	✓	**15-Jul-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Y-T) M8, M5, M1, M7	**26-Jun-2016**	**13-Jul-2016**	23-Dec-2016	✓	**13-Jul-2016**	23-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Z-T) M8, M5, M1, M7	**26-Jun-2016**	**15-Jul-2016**	23-Dec-2016	✓	**15-Jul-2016**	23-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Y-T) 18, 19	**27-Jun-2016**	**13-Jul-2016**	24-Dec-2016	✓	**13-Jul-2016**	24-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Z-T) 18, 19	**27-Jun-2016**	**15-Jul-2016**	24-Dec-2016	✓	**15-Jul-2016**	24-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Y-T) 21, 22	**28-Jun-2016**	**13-Jul-2016**	25-Dec-2016	✓	**13-Jul-2016**	25-Dec-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS - Continued							
Soil Glass Jar - Unpreserved (EG020Z-T)							
21, 22	**28-Jun-2016**	**15-Jul-2016**	25-Dec-2016	✓	**15-Jul-2016**	25-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Y-T)							
20	**29-Jun-2016**	**13-Jul-2016**	26-Dec-2016	✓	**13-Jul-2016**	26-Dec-2016	✓
Soil Glass Jar - Unpreserved (EG020Z-T)							
20	**29-Jun-2016**	**15-Jul-2016**	26-Dec-2016	✓	**15-Jul-2016**	26-Dec-2016	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**12-Jul-2016**	30-Jul-2016	✓	**13-Jul-2016**	30-Jul-2016	✓
Soil Glass Jar - Unpreserved (EG035T)							
23b, 24b, DUP1	**02-Jul-2016**	**13-Jul-2016**	30-Jul-2016	✓	**13-Jul-2016**	30-Jul-2016	✓
Soil Glass Jar - Unpreserved (EG035T)							
M25	**04-Jul-2016**	**12-Jul-2016**	01-Aug-2016	✓	**13-Jul-2016**	01-Aug-2016	✓
Soil Glass Jar - Unpreserved (EG035T)							
M31, M37	**05-Jul-2016**	**12-Jul-2016**	02-Aug-2016	✓	**13-Jul-2016**	02-Aug-2016	✓
Soil Glass Jar - Unpreserved (EG035T)							
M43	**06-Jul-2016**	**12-Jul-2016**	03-Aug-2016	✓	**13-Jul-2016**	03-Aug-2016	✓
Soil Glass Jar - Unpreserved (EG035T)							
M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**13-Jul-2016**	23-Jul-2016	✓	**13-Jul-2016**	23-Jul-2016	✓
Soil Glass Jar - Unpreserved (EG035T)							
M8, M5, M1, M7	**26-Jun-2016**	**13-Jul-2016**	24-Jul-2016	✓	**13-Jul-2016**	24-Jul-2016	✓
Soil Glass Jar - Unpreserved (EG035T)							
18, 19	**27-Jun-2016**	**13-Jul-2016**	25-Jul-2016	✓	**13-Jul-2016**	25-Jul-2016	✓
Soil Glass Jar - Unpreserved (EG035T)							
21, 22	**28-Jun-2016**	**13-Jul-2016**	26-Jul-2016	✓	**13-Jul-2016**	26-Jul-2016	✓
Soil Glass Jar - Unpreserved (EG035T)							
20	**29-Jun-2016**	**13-Jul-2016**	27-Jul-2016	✓	**13-Jul-2016**	27-Jul-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK059G)							
23b, 24b, DUP1, DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**13-Jul-2016**	29-Dec-2016	✓	**13-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK059G)							
M25	**04-Jul-2016**	**13-Jul-2016**	31-Dec-2016	✓	**13-Jul-2016**	31-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK059G)							
M31, M37	**05-Jul-2016**	**13-Jul-2016**	01-Jan-2017	✓	**13-Jul-2016**	01-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK059G)							
M43	**06-Jul-2016**	**13-Jul-2016**	02-Jan-2017	✓	**13-Jul-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK059G)							
M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**13-Jul-2016**	22-Dec-2016	✓	**13-Jul-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK059G)							
M8, M5, M1, M7	**26-Jun-2016**	**13-Jul-2016**	23-Dec-2016	✓	**13-Jul-2016**	23-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK059G)							
18, 19	**27-Jun-2016**	**13-Jul-2016**	24-Dec-2016	✓	**13-Jul-2016**	24-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK059G)							
21, 22	**28-Jun-2016**	**13-Jul-2016**	25-Dec-2016	✓	**13-Jul-2016**	25-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK059G)							
20	**29-Jun-2016**	**13-Jul-2016**	26-Dec-2016	✓	**13-Jul-2016**	26-Dec-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Soil Glass Jar - Unpreserved (EK061G) 23b, 24b, DUP1, DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**14-Jul-2016**	29-Dec-2016	✓	**14-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK061G) M25	**04-Jul-2016**	**14-Jul-2016**	31-Dec-2016	✓	**14-Jul-2016**	31-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK061G) M31, M37	**05-Jul-2016**	**14-Jul-2016**	01-Jan-2017	✓	**14-Jul-2016**	01-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK061G) M43	**06-Jul-2016**	**14-Jul-2016**	02-Jan-2017	✓	**14-Jul-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK061G) M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**14-Jul-2016**	22-Dec-2016	✓	**14-Jul-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK061G) M8, M5, M1, M7	**26-Jun-2016**	**14-Jul-2016**	23-Dec-2016	✓	**14-Jul-2016**	23-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK061G) 18, 19	**27-Jun-2016**	**14-Jul-2016**	24-Dec-2016	✓	**14-Jul-2016**	24-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK061G) 21, 22	**28-Jun-2016**	**14-Jul-2016**	25-Dec-2016	✓	**14-Jul-2016**	25-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK061G) 20	**29-Jun-2016**	**14-Jul-2016**	26-Dec-2016	✓	**14-Jul-2016**	26-Dec-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067G: Total Phosphorus as P by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK067G)							
23b, 24b, DUP1, DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**14-Jul-2016**	29-Dec-2016	✓	**14-Jul-2016**	29-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK067G)							
M25	**04-Jul-2016**	**14-Jul-2016**	31-Dec-2016	✓	**14-Jul-2016**	31-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK067G)							
M31, M37	**05-Jul-2016**	**14-Jul-2016**	01-Jan-2017	✓	**14-Jul-2016**	01-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK067G)							
M43	**06-Jul-2016**	**14-Jul-2016**	02-Jan-2017	✓	**14-Jul-2016**	02-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK067G)							
M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**14-Jul-2016**	22-Dec-2016	✓	**14-Jul-2016**	22-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK067G)							
M8, M5, M1, M7	**26-Jun-2016**	**14-Jul-2016**	23-Dec-2016	✓	**14-Jul-2016**	23-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK067G)							
18, 19	**27-Jun-2016**	**14-Jul-2016**	24-Dec-2016	✓	**14-Jul-2016**	24-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK067G)							
21, 22	**28-Jun-2016**	**14-Jul-2016**	25-Dec-2016	✓	**14-Jul-2016**	25-Dec-2016	✓
Soil Glass Jar - Unpreserved (EK067G)							
20	**29-Jun-2016**	**14-Jul-2016**	26-Dec-2016	✓	**14-Jul-2016**	26-Dec-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP004: Organic Matter							
Soil Glass Jar - Unpreserved (EP004) 23b, 24b, DUP1, DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**12-Jul-2016**	30-Jul-2016	✓	**18-Jul-2016**	30-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP004) M25	**04-Jul-2016**	**12-Jul-2016**	01-Aug-2016	✓	**18-Jul-2016**	01-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP004) M31, M37	**05-Jul-2016**	**12-Jul-2016**	02-Aug-2016	✓	**18-Jul-2016**	02-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP004) M43	**06-Jul-2016**	**12-Jul-2016**	03-Aug-2016	✓	**18-Jul-2016**	03-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP004) M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**12-Jul-2016**	23-Jul-2016	✓	**18-Jul-2016**	23-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP004) M8, M5, M1, M7	**26-Jun-2016**	**12-Jul-2016**	24-Jul-2016	✓	**18-Jul-2016**	24-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP004) 18, 19	**27-Jun-2016**	**12-Jul-2016**	25-Jul-2016	✓	**18-Jul-2016**	25-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP004) 21, 22	**28-Jun-2016**	**12-Jul-2016**	26-Jul-2016	✓	**18-Jul-2016**	26-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP004) 20	**29-Jun-2016**	**12-Jul-2016**	27-Jul-2016	✓	**18-Jul-2016**	27-Jul-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) 23b, 24b, DUP1	**02-Jul-2016**	**11-Jul-2016**	16-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**13-Jul-2016**	16-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) M25	**04-Jul-2016**	**13-Jul-2016**	18-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) M31, M37	**05-Jul-2016**	**13-Jul-2016**	19-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) M43	**06-Jul-2016**	**13-Jul-2016**	20-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) M8, M5, M1, M7	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) 18, 19	**27-Jun-2016**	**11-Jul-2016**	11-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) 21, 22	**28-Jun-2016**	**11-Jul-2016**	12-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) 20	**29-Jun-2016**	**11-Jul-2016**	13-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071) 23b, 24b, DUP1	**02-Jul-2016**	**11-Jul-2016**	16-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 23b, 24b, DUP1	**02-Jul-2016**	**11-Jul-2016**	16-Jul-2016	✓	**14-Jul-2016**	16-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP080) DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**12-Jul-2016**	16-Jul-2016	✓	**13-Jul-2016**	16-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP071) DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**13-Jul-2016**	16-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M25	**04-Jul-2016**	**12-Jul-2016**	18-Jul-2016	✓	**13-Jul-2016**	18-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP071) M25	**04-Jul-2016**	**13-Jul-2016**	18-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M31, M37	**05-Jul-2016**	**12-Jul-2016**	19-Jul-2016	✓	**13-Jul-2016**	19-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP071) M31, M37	**05-Jul-2016**	**13-Jul-2016**	19-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M43	**06-Jul-2016**	**12-Jul-2016**	20-Jul-2016	✓	**13-Jul-2016**	20-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP071) M43	**06-Jul-2016**	**13-Jul-2016**	20-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) M6	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M6	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M3	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M3	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M9	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M9	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M10	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M10	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M4	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M4	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071)							

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons - Continued							
M12	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M12	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M11	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M11	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M2	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M2	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M8	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M8	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**14-Jul-2016**	10-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M5	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M5	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**14-Jul-2016**	10-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M1	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M1	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**14-Jul-2016**	10-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M7	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M7	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**14-Jul-2016**	10-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 18	**27-Jun-2016**	**11-Jul-2016**	11-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 18	**27-Jun-2016**	**11-Jul-2016**	11-Jul-2016	✓	**14-Jul-2016**	11-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 19	**27-Jun-2016**	**11-Jul-2016**	11-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 19	**27-Jun-2016**	**11-Jul-2016**	11-Jul-2016	✓	**14-Jul-2016**	11-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 21	**28-Jun-2016**	**11-Jul-2016**	12-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 21	**28-Jun-2016**	**11-Jul-2016**	12-Jul-2016	✓	**14-Jul-2016**	12-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 22	**28-Jun-2016**	**11-Jul-2016**	12-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 22	**28-Jun-2016**	**11-Jul-2016**	12-Jul-2016	✓	**14-Jul-2016**	12-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 20	**29-Jun-2016**	**11-Jul-2016**	13-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons - Continued							
Soil Glass Jar - Unpreserved (EP080)							
20	**29-Jun-2016**	**11-Jul-2016**	13-Jul-2016	✓	**14-Jul-2016**	13-Jul-2016	×

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071) 23b, 24b, DUP1	**02-Jul-2016**	**11-Jul-2016**	16-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 23b, 24b, DUP1	**02-Jul-2016**	**11-Jul-2016**	16-Jul-2016	✓	**14-Jul-2016**	16-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP080) DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**12-Jul-2016**	16-Jul-2016	✓	**13-Jul-2016**	16-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP071) DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**13-Jul-2016**	16-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M25	**04-Jul-2016**	**12-Jul-2016**	18-Jul-2016	✓	**13-Jul-2016**	18-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP071) M25	**04-Jul-2016**	**13-Jul-2016**	18-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M31, M37	**05-Jul-2016**	**12-Jul-2016**	19-Jul-2016	✓	**13-Jul-2016**	19-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP071) M31, M37	**05-Jul-2016**	**13-Jul-2016**	19-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M43	**06-Jul-2016**	**12-Jul-2016**	20-Jul-2016	✓	**13-Jul-2016**	20-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP071) M43	**06-Jul-2016**	**13-Jul-2016**	20-Jul-2016	✓	**14-Jul-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) M6	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M6	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M3	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M3	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M9	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M9	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M10	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M10	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M4	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M4	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071)							

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued							
M12	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M12	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M11	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M11	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M2	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M2	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M8	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M8	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**14-Jul-2016**	10-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M5	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M5	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**14-Jul-2016**	10-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M1	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M1	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**14-Jul-2016**	10-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) M7	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) M7	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**14-Jul-2016**	10-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 18	**27-Jun-2016**	**11-Jul-2016**	11-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 18	**27-Jun-2016**	**11-Jul-2016**	11-Jul-2016	✓	**14-Jul-2016**	11-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 19	**27-Jun-2016**	**11-Jul-2016**	11-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 19	**27-Jun-2016**	**11-Jul-2016**	11-Jul-2016	✓	**14-Jul-2016**	11-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 21	**28-Jun-2016**	**11-Jul-2016**	12-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 21	**28-Jun-2016**	**11-Jul-2016**	12-Jul-2016	✓	**14-Jul-2016**	12-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 22	**28-Jun-2016**	**11-Jul-2016**	12-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 22	**28-Jun-2016**	**11-Jul-2016**	12-Jul-2016	✓	**14-Jul-2016**	12-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 20	**29-Jun-2016**	**11-Jul-2016**	13-Jul-2016	✓	**12-Jul-2016**	20-Aug-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued							
Soil Glass Jar - Unpreserved (EP080) 20	**29-Jun-2016**	**11-Jul-2016**	13-Jul-2016	✓	**14-Jul-2016**	13-Jul-2016	×
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) 23b, 24b, DUP1	**02-Jul-2016**	**11-Jul-2016**	16-Jul-2016	✓	**14-Jul-2016**	16-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP080) DUP2, TRIP1, TRIP BLANK	**02-Jul-2016**	**12-Jul-2016**	16-Jul-2016	✓	**13-Jul-2016**	16-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP080) M25	**04-Jul-2016**	**12-Jul-2016**	18-Jul-2016	✓	**13-Jul-2016**	18-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP080) M31, M37	**05-Jul-2016**	**12-Jul-2016**	19-Jul-2016	✓	**13-Jul-2016**	19-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP080) M43	**06-Jul-2016**	**12-Jul-2016**	20-Jul-2016	✓	**13-Jul-2016**	20-Jul-2016	✓
Soil Glass Jar - Unpreserved (EP080) M6, M3, M9, M10, M4, M12, M11, M2	**25-Jun-2016**	**11-Jul-2016**	09-Jul-2016	×	**14-Jul-2016**	09-Jul-2016	×
Soil Glass Jar - Unpreserved (EP080) M8, M5, M1, M7	**26-Jun-2016**	**11-Jul-2016**	10-Jul-2016	×	**14-Jul-2016**	10-Jul-2016	×
Soil Glass Jar - Unpreserved (EP080) 18, 19	**27-Jun-2016**	**11-Jul-2016**	11-Jul-2016	✓	**14-Jul-2016**	11-Jul-2016	×
Soil Glass Jar - Unpreserved (EP080) 21, 22	**28-Jun-2016**	**11-Jul-2016**	12-Jul-2016	✓	**14-Jul-2016**	12-Jul-2016	×
Soil Glass Jar - Unpreserved (EP080) 20	**29-Jun-2016**	**11-Jul-2016**	13-Jul-2016	✓	**14-Jul-2016**	13-Jul-2016	×

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	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	6	27	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Z	EG020Z-T	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	27	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	4	27	**14.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	4	27	**14.81**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Z	EG020Z-T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	4	27	**14.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite X	EG020X-T	4	27	**14.81**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Z	EG020Z-T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	4	27	**14.81**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Z	EG020Z-T	0	27	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	27	**7.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Soil Particle Density	EA152	SOIL	Soil Particle Density by AS 1289.3.5.1-2006 : Methods of testing soils for engineering purposes - Soil classification tests - Determination of the soil particle density of a soil - Standard method
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-MS - Suite X	EG020X-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite Y	EG020Y-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite Z	EG020Z-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by Chemical Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	In house: Referenced to APHA 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Nitrogen as N (TKN + NOx) By Discrete Analyser	EK062G	SOIL	In house: Referenced to APHA 4500 Norg/NO3- Total Nitrogen is determined as the sum of TKN and Oxidised Nitrrogen, each determined seperately as N.
Total Phosporus By Discrete Analyser	EK067G	SOIL	In house: Referenced to APHA 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.
Organic Matter	EP004	SOIL	In house: Referenced to AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to 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.

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	In house: Referenced to APHA 4500 Norg- D; APHA 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Organic Matter	EP004-PR	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to 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.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1618953**	Page	: 1 of 19
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: John Pickering
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61 7 3552 8634
Project	: B21414 Elk FW1	Date Samples Received	: 27-Jul-2016 11:35
Order number	: ----	Date Analysis Commenced	: 27-Jul-2016
C-O-C number	: ----	Issue Date	: 12-Aug-2016 17:40
Sampler	: BRAD HILES, DANIEL MORAN		
Site	: ----		
Quote number	: ----		
No. of samples received	: 18		
No. of samples analysed	: 18		

NATA Accredited Laboratory 825
Accredited for compliance with ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

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
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane External Subcontracting, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Peter Keyte	Newcastle Manager	Newcastle - Inorganics, Mayfield West, NSW

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.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.
~ = Indicates an estimated value.

- It is recognised that EP005 (Total Organic Carbon) is less than EP002 (Dissolved Organic Carbon) for some samples. However, the difference is within experimental variation of the methods.
- EP080: Poor matrix spike recovery due to matrix interference (high moisture).
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	15	14	13	02	11
			Client sampling date / time	20-Jul-2016 10:30	21-Jul-2016 09:00	21-Jul-2016 12:15	22-Jul-2016 11:00	23-Jul-2016 09:22
Compound	CAS Number	LOR	Unit	EB1618953-001	EB1618953-002	EB1618953-003	EB1618953-004	EB1618953-005
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	25.6	45.4	45.2	23.5	24.0
EA150: Particle Sizing								
+75µm	----	1	%	94	29	42	90	100
+150µm	----	1	%	84	3	11	87	98
+300µm	----	1	%	43	<1	1	75	53
+425µm	----	1	%	32	<1	<1	46	15
+600µm	----	1	%	30	<1	<1	43	4
+1180µm	----	1	%	30	<1	<1	28	1
+2.36mm	----	1	%	30	<1	<1	21	1
+4.75mm	----	1	%	30	<1	<1	16	<1
+9.5mm	----	1	%	30	<1	<1	9	<1
+19.0mm	----	1	%	23	<1	<1	2	<1
+37.5mm	----	1	%	<1	<1	<1	<1	<1
+75.0mm	----	1	%	<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	3	14	12	5	<1
Silt (2-60 µm)	----	1	%	2	47	35	4	<1
Sand (0.06-2.00 mm)	----	1	%	65	39	53	68	99
Gravel (>2mm)	----	1	%	30	<1	<1	23	1
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.74	2.64	2.67	2.70	2.74
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	14700	25800	23900	11800	14000
Arsenic	7440-38-2	5	mg/kg	5	5	7	<5	<5
Barium	7440-39-3	10	mg/kg	50	100	90	40	50
Iron	7439-89-6	50	mg/kg	32700	47200	45700	26200	32100
Strontium	7440-24-6	2	mg/kg	94	102	90	38	106
Tin	7440-31-5	5	mg/kg	<5	<5	<5	<5	<5
EG020T: Total Metals by ICP-MS								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg	14.7	21.0	20.3	16.7	15.5
Chromium	7440-47-3	0.1	mg/kg	30.6	46.8	44.7	36.5	31.4
Copper	7440-50-8	0.1	mg/kg	22.7	42.8	37.8	15.1	20.4

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	15	14	13	02	11
				Client sampling date / time	20-Jul-2016 10:30	21-Jul-2016 09:00	21-Jul-2016 12:15	22-Jul-2016 11:00	23-Jul-2016 09:22
Compound	CAS Number	LOR	Unit		EB1618953-001	EB1618953-002	EB1618953-003	EB1618953-004	EB1618953-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.1	mg/kg		31.0	42.7	39.3	33.6	37.5
Lead	7439-92-1	0.1	mg/kg		6.1	10.2	10.0	4.1	5.5
Zinc	7440-66-6	0.5	mg/kg		56.7	87.1	84.3	42.9	51.6
Vanadium	7440-62-2	1	mg/kg		65	87	87	46	65
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.3	0.2	0.1	0.1	0.2
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		230	1210	1100	280	160
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		230	1210	1100	280	160
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		565	586	530	295	587
EP004: Organic Matter									
Organic Matter	----	0.5	%		<0.5	3.0	2.8	<0.5	<0.5
Total Organic Carbon	----	0.5	%		<0.5	1.7	1.6	<0.5	<0.5
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	15	14	13	02	11
				Client sampling date / time	20-Jul-2016 10:30	21-Jul-2016 09:00	21-Jul-2016 12:15	22-Jul-2016 11:00	23-Jul-2016 09:22
Compound	CAS Number	LOR	Unit		EB1618953-001	EB1618953-002	EB1618953-003	EB1618953-004	EB1618953-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
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	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	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	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**100**	**101**	**104**	**98.7**	**96.1**
2-Chlorophenol-D4	93951-73-6	0.5	%		**96.0**	**97.2**	**99.4**	**92.3**	**84.9**
2.4.6-Tribromophenol	118-79-6	0.5	%		**75.3**	**79.0**	**84.5**	**71.3**	**49.9**
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	15	14	13	02	11
				Client sampling date / time	20-Jul-2016 10:30	21-Jul-2016 09:00	21-Jul-2016 12:15	22-Jul-2016 11:00	23-Jul-2016 09:22
Compound	CAS Number	LOR	Unit		EB1618953-001	EB1618953-002	EB1618953-003	EB1618953-004	EB1618953-005
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		109	111	109	108	108
Anthracene-d10	1719-06-8	0.5	%		100	102	102	97.2	96.5
4-Terphenyl-d14	1718-51-0	0.5	%		119	112	118	115	126
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		78.1	64.9	72.7	72.3	75.0
Toluene-D8	2037-26-5	0.2	%		78.9	71.0	76.9	76.6	76.4
4-Bromofluorobenzene	460-00-4	0.2	%		79.2	70.8	76.8	79.5	76.4

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	12	1B	3B	1D	----
			Client sampling date / time	23-Jul-2016 11:45	24-Jul-2016 08:43	24-Jul-2016 12:14	24-Jul-2016 08:00	----
Compound	CAS Number	LOR	Unit	EB1618953-006	EB1618953-007	EB1618953-008	EB1618953-009	--------
				Result	Result	Result	Result	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	47.0	28.0	34.6	27.6	----
EA150: Particle Sizing								
+75µm	----	1	%	40	83	53	83	----
+150µm	----	1	%	31	62	46	63	----
+300µm	----	1	%	14	6	39	6	----
+425µm	----	1	%	4	<1	35	<1	----
+600µm	----	1	%	1	<1	35	<1	----
+1180µm	----	1	%	<1	<1	31	<1	----
+2.36mm	----	1	%	<1	<1	27	<1	----
+4.75mm	----	1	%	<1	<1	25	<1	----
+9.5mm	----	1	%	<1	<1	24	<1	----
+19.0mm	----	1	%	<1	<1	24	<1	----
+37.5mm	----	1	%	<1	<1	16	<1	----
+75.0mm	----	1	%	<1	<1	<1	<1	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	16	7	18	8	----
Silt (2-60 µm)	----	1	%	40	7	25	4	----
Sand (0.06-2.00 mm)	----	1	%	44	86	29	88	----
Gravel (>2mm)	----	1	%	<1	<1	15	<1	----
Cobbles (>6cm)	----	1	%	<1	<1	13	<1	----
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.65	2.72	2.71	2.71	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	24100	17000	19100	15700	----
Arsenic	7440-38-2	5	mg/kg	7	6	15	6	----
Barium	7440-39-3	10	mg/kg	90	40	40	40	----
Iron	7439-89-6	50	mg/kg	49500	40100	55600	37500	----
Strontium	7440-24-6	2	mg/kg	81	37	50	31	----
Tin	7440-31-5	5	mg/kg	<5	22	<5	<5	----
EG020T: Total Metals by ICP-MS								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
Cobalt	7440-48-4	0.1	mg/kg	25.8	21.6	24.1	20.3	----
Chromium	7440-47-3	0.1	mg/kg	55.7	52.2	46.2	48.4	----
Copper	7440-50-8	0.1	mg/kg	41.8	20.4	34.0	19.0	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	12	1B	3B	1D	----
				Client sampling date / time	23-Jul-2016 11:45	24-Jul-2016 08:43	24-Jul-2016 12:14	24-Jul-2016 08:00	----
Compound	CAS Number	LOR	Unit		EB1618953-006	EB1618953-007	EB1618953-008	EB1618953-009	--------
					Result	Result	Result	Result	----
EG020T: Total Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.1	mg/kg		49.4	44.4	49.7	41.6	----
Lead	7439-92-1	0.1	mg/kg		10.0	6.5	11.6	6.3	----
Zinc	7440-66-6	0.5	mg/kg		85.2	66.3	85.5	63.1	----
Vanadium	7440-62-2	1	mg/kg		92	66	67	61	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.2	<0.1	<0.1	0.1	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		1120	330	900	280	----
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		1120	330	900	280	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		576	508	538	485	----
EP004: Organic Matter									
Organic Matter	----	0.5	%		2.9	<0.5	2.2	<0.5	----
Total Organic Carbon	----	0.5	%		1.7	<0.5	1.3	<0.5	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	12	1B	3B	1D	----
				Client sampling date / time	23-Jul-2016 11:45	24-Jul-2016 08:43	24-Jul-2016 12:14	24-Jul-2016 08:00	----
Compound	CAS Number	LOR	Unit		EB1618953-006	EB1618953-007	EB1618953-008	EB1618953-009	--------
					Result	Result	Result	Result	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg		**110**	<100	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**110**	<50	<50	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**98.2**	**73.4**	**103**	**98.8**	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**88.9**	**66.8**	**97.7**	**90.8**	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**78.8**	**47.6**	**79.4**	**62.8**	----
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	12	1B	3B	1D	----
				Client sampling date / time	23-Jul-2016 11:45	24-Jul-2016 08:43	24-Jul-2016 12:14	24-Jul-2016 08:00	----
Compound	CAS Number	LOR	Unit		EB1618953-006	EB1618953-007	EB1618953-008	EB1618953-009	--------
					Result	Result	Result	Result	----
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		**103**	**82.9**	**112**	**107**	**----**
Anthracene-d10	1719-06-8	0.5	%		**98.9**	**76.5**	**102**	**95.4**	**----**
4-Terphenyl-d14	1718-51-0	0.5	%		**118**	**93.9**	**125**	**118**	**----**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**69.3**	**77.3**	**66.4**	**75.1**	**----**
Toluene-D8	2037-26-5	0.2	%		**76.2**	**79.2**	**75.8**	**82.7**	**----**
4-Bromofluorobenzene	460-00-4	0.2	%		**74.9**	**79.3**	**72.3**	**78.3**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	15	14	13	02	11
				Client sampling date / time	20-Jul-2016 10:30	21-Jul-2016 09:00	21-Jul-2016 12:15	22-Jul-2016 11:00	23-Jul-2016 09:22
Compound	CAS Number	LOR	Unit		EB1618953-010	EB1618953-011	EB1618953-012	EB1618953-013	EB1618953-014
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		34	158	394	25	177
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		83	78	72	91	78
Total Alkalinity as CaCO3	----	1	mg/L		83	78	72	91	78
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		4	18	4	100	5
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		<1	2	<1	2	<1
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		24	21	19	41	22
Magnesium	7439-95-4	1	mg/L		3	5	3	17	3
Sodium	7440-23-5	1	mg/L		3	8	3	6	3
Potassium	7440-09-7	1	mg/L		<1	1	<1	2	<1
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.01	0.02	0.02	<0.01	0.02
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		0.006	0.007	0.006	0.011	0.006
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Strontium	7440-24-6	0.001	mg/L		0.134	0.124	0.124	0.275	0.129
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.99	12.9	9.76	0.81	5.60
Arsenic	7440-38-2	0.001	mg/L		<0.001	0.004	0.003	<0.001	0.002
Barium	7440-39-3	0.001	mg/L		0.011	0.042	0.036	0.014	0.025

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	15	14	13	02	11
				Client sampling date / time	20-Jul-2016 10:30	21-Jul-2016 09:00	21-Jul-2016 12:15	22-Jul-2016 11:00	23-Jul-2016 09:22
Compound	CAS Number	LOR	Unit		EB1618953-010	EB1618953-011	EB1618953-012	EB1618953-013	EB1618953-014
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		**0.001**	**0.021**	**0.016**	**0.002**	**0.008**
Copper	7440-50-8	0.001	mg/L		**0.001**	**0.020**	**0.015**	**0.002**	**0.007**
Cobalt	7440-48-4	0.001	mg/L		<0.001	**0.009**	**0.007**	<0.001	**0.004**
Nickel	7440-02-0	0.001	mg/L		<0.001	**0.022**	**0.018**	**0.005**	**0.008**
Lead	7439-92-1	0.001	mg/L		<0.001	**0.005**	**0.004**	<0.001	**0.002**
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.040**	**0.030**	<0.005	**0.016**
Strontium	7440-24-6	0.001	mg/L		**0.148**	**0.164**	**0.161**	**0.293**	**0.157**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	**0.04**	**0.03**	<0.01	**0.02**
Iron	7439-89-6	0.05	mg/L		**1.36**	**21.4**	**16.2**	**1.62**	**8.76**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.04**	**0.04**	**0.02**	**0.05**	**0.01**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.02**	**0.02**	**0.02**	**0.02**	**0.02**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.02**	**0.02**	**0.02**	**0.02**	**0.02**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.2**	**0.6**	**0.5**	<0.1	**0.4**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.2**	**0.6**	**0.5**	<0.1	**0.4**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.04**	**0.30**	**0.26**	**0.04**	**0.21**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.02**	**0.02**	**0.02**	**0.02**	**0.02**
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**1.74**	**1.99**	**1.52**	**3.96**	**1.66**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	15	14	13	02	11
				Client sampling date / time	20-Jul-2016 10:30	21-Jul-2016 09:00	21-Jul-2016 12:15	22-Jul-2016 11:00	23-Jul-2016 09:22
Compound	CAS Number	LOR	Unit		EB1618953-010	EB1618953-011	EB1618953-012	EB1618953-013	EB1618953-014
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Total Cations	----	0.01	meq/L		1.58	1.83	1.32	3.76	1.48
Ionic Balance	----	0.01	%		----	----	----	2.57	----
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		2	3	2	4	2
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		2	2	2	2	1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	15	14	13	02	11
				Client sampling date / time	20-Jul-2016 10:30	21-Jul-2016 09:00	21-Jul-2016 12:15	22-Jul-2016 11:00	23-Jul-2016 09:22
Compound	CAS Number	LOR	Unit		EB1618953-010	EB1618953-011	EB1618953-012	EB1618953-013	EB1618953-014
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	<100	<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	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
Subcontracted Analysis									
Total Coliforms	----	1	CFU/100mL		**>80**	**>80**	**>80**	**>80**	**>80**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**34.6**	**31.4**	**34.7**	**35.7**	**37.2**
2-Chlorophenol-D4	93951-73-6	1	%		**76.1**	**72.7**	**77.6**	**80.3**	**75.6**
2.4.6-Tribromophenol	118-79-6	1	%		**90.3**	**86.5**	**96.5**	**84.6**	**89.3**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**79.9**	**78.4**	**86.7**	**83.4**	**78.0**
Anthracene-d10	1719-06-8	1	%		**75.4**	**73.8**	**75.5**	**75.2**	**71.5**
4-Terphenyl-d14	1718-51-0	1	%		**113**	**96.5**	**110**	**107**	**106**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**95.8**	**92.8**	**98.6**	**93.6**	**90.8**
Toluene-D8	2037-26-5	2	%		**91.5**	**91.1**	**93.0**	**90.5**	**91.0**
4-Bromofluorobenzene	460-00-4	2	%		**89.8**	**91.4**	**91.1**	**89.9**	**89.5**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	12	1B	3B	1D	----
				Client sampling date / time	23-Jul-2016 11:45	24-Jul-2016 08:43	24-Jul-2016 12:14	24-Jul-2016 08:00	----
Compound	CAS Number	LOR	Unit		EB1618953-015	EB1618953-016	EB1618953-017	EB1618953-018	--------
					Result	Result	Result	Result	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		175	43	27	71	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		63	58	134	59	----
Total Alkalinity as CaCO3	----	1	mg/L		63	58	134	59	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		4	24	42	24	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		<1	2	5	2	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		19	14	32	14	----
Magnesium	7439-95-4	1	mg/L		2	6	10	6	----
Sodium	7440-23-5	1	mg/L		2	8	20	8	----
Potassium	7440-09-7	1	mg/L		<1	1	2	1	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.04	<0.01	<0.01	<0.01	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Barium	7440-39-3	0.001	mg/L		0.004	0.004	0.004	0.004	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	----
Strontium	7440-24-6	0.001	mg/L		0.105	0.120	0.236	0.117	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
Iron	7439-89-6	0.05	mg/L		<0.05	0.08	<0.05	0.07	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		16.8	0.01	0.99	1.28	----
Arsenic	7440-38-2	0.001	mg/L		0.003	<0.001	<0.001	<0.001	----
Barium	7440-39-3	0.001	mg/L		0.074	0.004	0.006	0.007	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	12	1B	3B	1D	----
				Client sampling date / time	23-Jul-2016 11:45	24-Jul-2016 08:43	24-Jul-2016 12:14	24-Jul-2016 08:00	----
Compound	CAS Number	LOR	Unit		EB1618953-015	EB1618953-016	EB1618953-017	EB1618953-018	--------
					Result	Result	Result	Result	----
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		**0.021**	<0.001	**0.002**	**0.003**	----
Copper	7440-50-8	0.001	mg/L		**0.021**	<0.001	**0.002**	**0.003**	----
Cobalt	7440-48-4	0.001	mg/L		**0.009**	<0.001	<0.001	**0.001**	----
Nickel	7440-02-0	0.001	mg/L		**0.022**	<0.001	**0.002**	**0.003**	----
Lead	7439-92-1	0.001	mg/L		**0.005**	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L		**0.035**	<0.005	<0.005	<0.005	----
Strontium	7440-24-6	0.001	mg/L		**0.184**	**0.125**	**0.256**	**0.129**	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	----
Vanadium	7440-62-2	0.01	mg/L		**0.04**	<0.01	<0.01	<0.01	----
Iron	7439-89-6	0.05	mg/L		**19.6**	**0.09**	**1.58**	**2.65**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.06**	**0.06**	**0.06**	**0.05**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.01**	**0.02**	**0.02**	**0.02**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.01**	**0.02**	**0.02**	**0.02**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.6**	**0.2**	**0.1**	**0.2**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.6**	**0.2**	**0.1**	**0.2**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.33**	**0.07**	**0.04**	**0.06**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.02**	<0.01	**0.01**	<0.01	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**1.34**	**1.71**	**3.69**	**1.73**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	12	1B	3B	1D	----
				Client sampling date / time	23-Jul-2016 11:45	24-Jul-2016 08:43	24-Jul-2016 12:14	24-Jul-2016 08:00	----
Compound	CAS Number	LOR	Unit		EB1618953-015	EB1618953-016	EB1618953-017	EB1618953-018	--------
					Result	Result	Result	Result	----
EN055: Ionic Balance - Continued									
Total Cations	----	0.01	meq/L		1.20	1.56	3.34	1.56	----
Ionic Balance	----	0.01	%		----	----	5.00	----	----
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		3	3	3	3	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		2	2	3	2	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	<1.0	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	12	1B	3B	1D	----
				Client sampling date / time	23-Jul-2016 11:45	24-Jul-2016 08:43	24-Jul-2016 12:14	24-Jul-2016 08:00	----
Compound	CAS Number	LOR	Unit		EB1618953-015	EB1618953-016	EB1618953-017	EB1618953-018	--------
					Result	Result	Result	Result	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	<100	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	----
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
Subcontracted Analysis									
Total Coliforms	----	1	CFU/100mL		**>80**	**>80**	**>80**	**>80**	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**37.6**	**33.3**	**35.4**	**35.2**	----
2-Chlorophenol-D4	93951-73-6	1	%		**79.8**	**68.7**	**70.2**	**71.3**	----
2.4.6-Tribromophenol	118-79-6	1	%		**98.6**	**83.4**	**84.6**	**82.5**	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**90.4**	**75.3**	**84.6**	**80.2**	----
Anthracene-d10	1719-06-8	1	%		**84.3**	**67.6**	**71.9**	**69.6**	----
4-Terphenyl-d14	1718-51-0	1	%		**120**	**91.3**	**112**	**97.1**	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**96.7**	**93.9**	**98.2**	**99.7**	----
Toluene-D8	2037-26-5	2	%		**90.5**	**92.3**	**90.9**	**91.8**	----
4-Bromofluorobenzene	460-00-4	2	%		**91.1**	**90.3**	**89.1**	**91.7**	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	35	155
2-Chlorophenol-D4	93951-73-6	42	153
2.4.6-Tribromophenol	118-79-6	26	157
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	34	157
Anthracene-d10	1719-06-8	37	153
4-Terphenyl-d14	1718-51-0	42	172
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	53	134
Toluene-D8	2037-26-5	60	131
4-Bromofluorobenzene	460-00-4	59	127

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	72
2-Chlorophenol-D4	93951-73-6	27	130
2.4.6-Tribromophenol	118-79-6	19	181
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	14	146
Anthracene-d10	1719-06-8	35	137
4-Terphenyl-d14	1718-51-0	36	154
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB1618953**	Page	: 1 of 15
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: John Pickering
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61 7 3552 8634
Project	: B21414 Elk FW1	Date Samples Received	: 27-Jul-2016
Order number	: ----	Date Analysis Commenced	: 27-Jul-2016
C-O-C number	: ----	Issue Date	: 12-Aug-2016
Sampler	: BRAD HILES, DANIEL MORAN		
Site	: ----		
Quote number	: ----		
No. of samples received	: 18		
No. of samples analysed	: 18		

NATA Accredited Laboratory 825
Accredited for compliance with ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane External Subcontracting, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Peter Keyte	Newcastle Manager	Newcastle - Inorganics, Mayfield West, NSW

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

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: 532114)									
EB1618953-001	15	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	25.6	24.7	3.43	0% - 20%
EB1618981-013	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	10.7	11.5	7.48	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 535840)									
EB1619037-002	Anonymous	EG005T: Barium	7440-39-3	10	mg/kg	960	980	2.16	0% - 20%
		EG005T: Strontium	7440-24-6	2	mg/kg	88	90	1.53	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	12000	12200	1.55	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	11000	11000	0.847	0% - 20%
EB1618953-001	15	EG005T: Barium	7440-39-3	10	mg/kg	50	50	0.00	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	94	94	0.00	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	5	<5	0.00	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	14700	14600	0.406	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	32700	32600	0.402	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 535842)									
EB1618953-001	15	EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	14.7	14.9	1.33	0% - 20%
		EG020X-T: Chromium	7440-47-3	0.1	mg/kg	30.6	31.5	2.70	0% - 20%
		EG020X-T: Copper	7440-50-8	0.1	mg/kg	22.7	23.0	1.33	0% - 20%
		EG020X-T: Nickel	7440-02-0	0.1	mg/kg	31.0	31.6	2.01	0% - 20%
		EG020X-T: Lead	7439-92-1	0.1	mg/kg	6.1	6.0	0.00	0% - 20%
		EG020X-T: Zinc	7440-66-6	0.5	mg/kg	56.7	58.5	3.07	0% - 20%
		EG020X-T: Vanadium	7440-62-2	1	mg/kg	65	65	0.00	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 535843)									

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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 535843) - continued									
EB1618953-001	15	EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 535841)									
EB1619205-002	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EB1618953-001	15	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 531964)									
EB1618953-001	15	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.3	0.4	36.8	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 532129)									
EB1618953-001	15	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	230	230	0.00	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 532128)									
EB1618953-001	15	EK067G: Total Phosphorus as P	----	2	mg/kg	565	483	15.7	0% - 20%
EP004: Organic Matter (QC Lot: 531630)									
EB1618953-001	15	EP004: Organic Matter	----	0.5	%	<0.5	<0.5	0.00	No Limit
		EP004: Total Organic Carbon	----	0.5	%	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 532112)									
EB1618981-017	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EB1618953-001	15	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 532112) - continued									
EB1618953-001	15	EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 532111)									
EB1618953-001	15	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EB1618981-021	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 532113)									
EB1618981-050	Anonymous	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
EB1618953-001	15	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: 532111)									
EB1618953-001	15	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EB1618981-021	Anonymous	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: 532113)									
EB1618981-050	Anonymous	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	----	50	mg/kg	<50	<50	0.00	No Limit
EB1618953-001	15	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	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 532111)									
EB1618953-001	15	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 532111) - continued									
EB1618981-021	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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 sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 531509)									
EB1618929-001	Anonymous	EA025: Suspended Solids (SS)	----	1	mg/L	19	19	0.00	0% - 50%
EB1618953-017	3B	EA025: Suspended Solids (SS)	----	1	mg/L	27	27	0.00	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 531568)									
EB1618953-014	11	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	78	75	3.16	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	78	75	3.16	0% - 20%
EB1618952-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	434	436	0.388	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	434	436	0.388	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 531369)									
EB1618952-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	21	20	0.00	0% - 20%
EB1618953-014	11	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	5	4	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 531368)									
EB1618952-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	4	4	0.00	No Limit
EB1618953-014	11	ED045G: Chloride	16887-00-6	1	mg/L	<1	<1	0.00	No Limit
ED093F: Dissolved Major Cations (QC Lot: 534768)									
EB1618953-010	15	ED093F: Calcium	7440-70-2	1	mg/L	24	23	0.00	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	3	3	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	3	3	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 534766)									
EB1618953-010	15	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	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 (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 534766) - continued									
EB1618953-010	15	EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.01	0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 534767)									
EB1618953-010	15	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.134	0.134	0.00	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 534713)									
EB1618953-010	15	EG020B-T: Strontium	7440-24-6	0.001	mg/L	0.148	0.147	0.958	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 534714)									
EB1618953-010	15	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.011	0.010	0.00	0% - 50%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.99	0.88	11.4	0% - 20%
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	1.36	1.33	2.26	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 534769)									
EB1618953-010	15	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 534738)									
EB1618953-010	15	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 535245)									
EB1618952-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.09	1.05	3.30	0% - 20%
EB1618953-014	11	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 531370)									
EB1618952-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB1618953-014	11	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 535246)									
EB1618952-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB1618953-014	11	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.04	45.8	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 (%)*
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 531692)									
EB1618907-005	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.9	31.4	No Limit
EB1618953-015	12	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.6	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 531691)									
EB1618907-005	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.05	0.00	No Limit
EB1618953-015	12	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.33	0.33	0.00	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 531371)									
EB1618953-014	11	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.02	0.00	No Limit
EP002: Dissolved Organic Carbon (DOC) (QC Lot: 532269)									
EB1618953-010	15	EP002: Dissolved Organic Carbon	----	1	mg/L	2	4	42.1	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 532268)									
EB1618953-010	15	EP005: Total Organic Carbon	----	1	mg/L	2	<1	71.7	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 534112)									
EB1618953-010	15	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 534112)									
EB1618953-010	15	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 534112)									
EB1618953-010	15	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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 Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 535840)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	118.9 mg/kg	91.7	84	123
EG005T: Barium	7440-39-3	10	mg/kg	<10	105.1967 mg/kg	100	89	129
EG005T: Iron	7439-89-6	50	mg/kg	<50	34900 mg/kg	97.5	70	120
EG005T: Strontium	7440-24-6	2	mg/kg	<2	44.50816 mg/kg	114	83	117
EG005T: Tin	7440-31-5	5	mg/kg	<5	5.7 mg/kg	84.7	75	130
EG020T: Total Metals by ICP-MS (QCLot: 535842)								
EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	<0.1	11.6 mg/kg	109	88	129
EG020X-T: Chromium	7440-47-3	0.1	mg/kg	<0.1	22.9 mg/kg	106	75	130
EG020X-T: Copper	7440-50-8	0.1	mg/kg	<0.1	52.9 mg/kg	109	84	120
EG020X-T: Nickel	7440-02-0	0.1	mg/kg	<0.1	16.1 mg/kg	103	89	127
EG020X-T: Lead	7439-92-1	0.1	mg/kg	<0.1	66.3 mg/kg	115	85	117
EG020X-T: Zinc	7440-66-6	0.5	mg/kg	<0.5	187 mg/kg	111	71	130
EG020X-T: Vanadium	7440-62-2	1	mg/kg	<1	67.8 mg/kg	108	86	130
EG020T: Total Metals by ICP-MS (QCLot: 535843)								
EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	1.43 mg/kg	108	81	121
EG035T: Total Recoverable Mercury by FIMS (QCLot: 535841)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.09821 mg/kg	100	78	122
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 531964)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	96.3	86	115
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 532129)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	877 mg/kg	91.7	70	110
				<20	3644 mg/kg	83.7	70	110
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 532128)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	766 mg/kg	76.4	70	110
				<2	1200 mg/kg	93.0	70	110
EP004: Organic Matter (QCLot: 531630)								
EP004: Organic Matter	----	0.5	%	<0.5	2.3 %	88.2	83	115
EP004: Total Organic Carbon	----	0.5	%	<0.5	1.3 %	88.2	85	115
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 532112)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	104	74	119
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	104	74	118
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	103	83	121

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 532112) - continued								
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	108	81	116
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	103	72	117
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	98.0	72	115
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	109	70	116
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	111	70	134
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	111	64	120
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	110	66	119
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	1.5 mg/kg	107	59	129
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	1.5 mg/kg	97.4	70	129
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	101	76	121
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	104	53	135
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	106	45	134
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	105	64	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 532111)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	16 mg/kg	98.6	66	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 532113)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	318 mg/kg	116	79	123
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	531 mg/kg	109	77	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 532111)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	18.5 mg/kg	97.0	66	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 532113)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	428 mg/kg	117	81	122
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	395 mg/kg	104	74	122
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080: BTEXN (QCLot: 532111)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	92.3	73	105
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	83.5	73	105
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	88.1	67	104
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	86.6	66	106
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	90.1	68	105
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	85.6	72	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 531509)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 531509) - continued								
EA025: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	104	84	120
				<1	1000 mg/L	99.4	84	120
ED037P: Alkalinity by PC Titrator (QCLot: 531568)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	106	80	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 531369)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	107	85	118
				<1	100 mg/L	104	85	118
ED045G: Chloride by Discrete Analyser (QCLot: 531368)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	91.3	90	115
				<1	1000 mg/L	105	90	115
ED093F: Dissolved Major Cations (QCLot: 534768)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
ED093F: Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
ED093F: Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
ED093F: Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 534766)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	91.2	79	118
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.4	88	116
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.5 mg/L	95.6	70	130
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.7	88	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.3	87	113
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	97.0	86	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	94.6	88	114
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.4	89	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.1	89	113
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	98.9	86	112
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	102	88	114
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	95.1	87	113
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.6	82	114
EG020F: Dissolved Metals by ICP-MS (QCLot: 534767)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.5 mg/L	94.0	86	111
EG020T: Total Metals by ICP-MS (QCLot: 534713)								
EG020B-T: Strontium	7440-24-6	0.001	mg/L	<0.001	0.5 mg/L	103	86	112
EG020T: Total Metals by ICP-MS (QCLot: 534714)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	100.0	80	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	88	112
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.5 mg/L	96.7	70	130
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.2	88	111

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 534714) - continued								
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.1	89	115
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	100	89	115
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	101	88	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	89	112
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	100	88	116
EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	107	86	116
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	108	87	114
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	96.9	84	114
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	106	82	118
EG035F: Dissolved Mercury by FIMS (QCLot: 534769)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	96.0	84	118
EG035T: Total Recoverable Mercury by FIMS (QCLot: 534738)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	96.1	80	100
EK055G: Ammonia as N by Discrete Analyser (QCLot: 535245)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	100	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 531370)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	98.0	90	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 535246)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	92.2	89	115
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 531692)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	84.5	70	111
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 531691)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	100.0	77	109
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 531371)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	100	88	115
EP002: Dissolved Organic Carbon (DOC) (QCLot: 532269)								
EP002: Dissolved Organic Carbon	----	1	mg/L	<1	10 mg/L	91.5	80	112
				<1	100 mg/L	99.7	80	112
EP005: Total Organic Carbon (TOC) (QCLot: 532268)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	89.0	79	113
				<1	100 mg/L	101	79	113
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 531354)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	10 µg/L	74.7	47	101
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	10 µg/L	85.4	46	109
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	10 µg/L	72.4	50	104
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	10 µg/L	82.5	50	114
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	10 µg/L	73.7	49	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 531354) - continued								
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	10 µg/L	74.3	48	113
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	10 µg/L	73.6	48	120
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	10 µg/L	72.6	48	119
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	10 µg/L	80.8	48	125
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	10 µg/L	89.2	45	119
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	10 µg/L	82.7	43	130
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	10 µg/L	67.6	46	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	10 µg/L	74.7	49	125
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	10 µg/L	77.6	40	132
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	10 µg/L	80.6	42	140
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	10 µg/L	80.0	39	136
EP080/071: Total Petroleum Hydrocarbons (QCLot: 531355)								
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	94.4	50	132
EP071: C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 534112)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	160 µg/L	82.8	76	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 531355)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	1696 µg/L	90.1	43	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	1496 µg/L	99.0	49	134
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 534112)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	185 µg/L	80.1	75	123
EP080: C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080: BTEXN (QCLot: 534112)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	84.2	77	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	88.2	78	122
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	87.8	78	119
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	20 µg/L	91.4	77	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	91.6	76	121
EP080: Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----
EP080: Sum of BTEX	----	1	µg/L	<1	----	----	----	----
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	100	75	120

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 535840)							
EB1618953-002	14	EG005T: Arsenic	7440-38-2	50 mg/kg	97.2	70	130
		EG005T: Barium	7440-39-3	50 mg/kg	114	70	130
EG020T: Total Metals by ICP-MS (QCLot: 535842)							
EB1618953-002	14	EG020X-T: Cobalt	7440-48-4	50 mg/kg	105	70	130
		EG020X-T: Chromium	7440-47-3	50 mg/kg	102	70	130
		EG020X-T: Copper	7440-50-8	50 mg/kg	101	70	130
		EG020X-T: Nickel	7440-02-0	50 mg/kg	106	70	130
		EG020X-T: Lead	7439-92-1	50 mg/kg	99.4	70	130
		EG020X-T: Zinc	7440-66-6	50 mg/kg	107	70	130
		EG020X-T: Vanadium	7440-62-2	50 mg/kg	105	70	130
EG020T: Total Metals by ICP-MS (QCLot: 535843)							
EB1618953-002	14	EG020Y-T: Cadmium	7440-43-9	25 mg/kg	101	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 535841)							
EB1618953-002	14	EG035T: Mercury	7439-97-6	2.5 mg/kg	123	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 531964)							
EB1618953-002	14	EK059G: Nitrite + Nitrate as N (Sol.)	----	2 mg/kg	92.6	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 532129)							
EB1618953-002	14	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	87.4	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 532128)							
EB1618953-002	14	EK067G: Total Phosphorus as P	----	100 mg/kg	105	70	130
EP004: Organic Matter (QCLot: 531630)							
EB1618953-002	14	EP004: Organic Matter	----	1.84 %	73.9	70	130
		EP004: Total Organic Carbon	----	1.04 %	74.1	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 532112)							
EB1618953-002	14	EP075(SIM): Acenaphthene	83-32-9	1.5 mg/kg	101	70	130
		EP075(SIM): Pyrene	129-00-0	1.5 mg/kg	111	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 532111)							
EB1618953-002	14	EP080: C6 - C9 Fraction	----	8 mg/kg	# 65.3	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 532113)							
EB1618953-002	14	EP071: C10 - C14 Fraction	----	318 mg/kg	112	70	130
		EP071: C15 - C28 Fraction	----	531 mg/kg	111	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 532111)							

Sub-Matrix: **SOIL**

				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: 532111) - continued							
EB1618953-002	14	EP080: C6 - C10 Fraction	C6_C10	8 mg/kg	# 65.1	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 532113)							
EB1618953-002	14	EP071: >C10 - C16 Fraction	----	428 mg/kg	115	70	130
		EP071: >C16 - C34 Fraction	----	395 mg/kg	106	70	130
EP080: BTEXN (QCLot: 532111)							
EB1618953-002	14	EP080: Benzene	71-43-2	2 mg/kg	# 69.4	70	130
		EP080: Toluene	108-88-3	2 mg/kg	# 64.5	70	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
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 531369)							
EB1618952-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	89.3	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 531368)							
EB1618952-002	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	110	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 534766)							
EB1618953-011	14	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	98.2	70	130
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	95.8	70	130
		EG020A-F: Barium	7440-39-3	0.5 mg/L	99.7	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	95.7	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	90.6	70	130
		EG020A-F: Cobalt	7440-48-4	0.1 mg/L	91.2	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	91.7	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	99.9	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	89.4	70	130
		EG020A-F: Tin	7440-31-5	0.1 mg/L	78.5	70	130
		EG020A-F: Vanadium	7440-62-2	0.1 mg/L	92.0	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	92.6	70	130
EG020T: Total Metals by ICP-MS (QCLot: 534714)							
EB1618953-011	14	EG020A-T: Arsenic	7440-38-2	1 mg/L	101	70	130
		EG020A-T: Barium	7440-39-3	1 mg/L	100	70	130
		EG020A-T: Cadmium	7440-43-9	0.5 mg/L	101	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	101	70	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	104	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	105	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	105	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	104	70	130
		EG020A-T: Vanadium	7440-62-2	1 mg/L	101	70	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
EG020T: Total Metals by ICP-MS (QCLot: 534714) - continued							
EB1618953-011	14	EG020A-T: Zinc	7440-66-6	1 mg/L	98.9	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 534769)							
EB1618953-011	14	EG035F: Mercury	7439-97-6	0.01 mg/L	88.6	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 534738)							
EB1618953-011	14	EG035T: Mercury	7439-97-6	0.01 mg/L	82.4	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 535245)							
EB1618952-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	87.2	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 531370)							
EB1618952-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.4 mg/L	95.9	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 535246)							
EB1618952-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.4 mg/L	98.1	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 531692)							
EB1618907-006	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	92.6	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 531691)							
EB1618907-006	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	101	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 531371)							
EB1618953-011	14	EK071G: Reactive Phosphorus as P	14265-44-2	0.4 mg/L	103	70	130
EP002: Dissolved Organic Carbon (DOC) (QCLot: 532269)							
EB1618953-011	14	EP002: Dissolved Organic Carbon	----	100 mg/L	100	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 532268)							
EB1618953-011	14	EP005: Total Organic Carbon	----	100 mg/L	98.6	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 534112)							
EB1618953-011	14	EP080: C6 - C9 Fraction	----	40 µg/L	79.4	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 534112)							
EB1618953-011	14	EP080: C6 - C10 Fraction	C6_C10	40 µg/L	79.4	70	130
EP080: BTEXN (QCLot: 534112)							
EB1618953-011	14	EP080: Benzene	71-43-2	10 µg/L	80.6	70	130
		EP080: Toluene	108-88-3	10 µg/L	74.1	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB1618953**	Page	: 1 of 25
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Telephone	: +61 7 3552 8634
Project	: B21414 Elk FW1	Date Samples Received	: 27-Jul-2016
Site	: ----	Issue Date	: 12-Aug-2016
Sampler	: BRAD HILES, DANIEL MORAN	No. of samples received	: 18
Order number	: ----	No. of samples analysed	: 18

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: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP080/071: Total Petroleum Hydrocarbons	EB1618953--002	14	**C6 - C9 Fraction**	----	65.3 %	70-130%	**Recovery less than lower data quality objective**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	EB1618953--002	14	**C6 - C10 Fraction**	C6_C10	65.1 %	70-130%	**Recovery less than lower data quality objective**
EP080: BTEXN	EB1618953--002	14	**Benzene**	71-43-2	69.4 %	70-130%	**Recovery less than lower data quality objective**
EP080: BTEXN	EB1618953--002	14	**Toluene**	108-88-3	64.5 %	70-130%	**Recovery less than lower data quality objective**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA025: Total Suspended Solids dried at 104 ± 2°C						
Clear Plastic Bottle - Natural						
15	----	----	----	28-Jul-2016	27-Jul-2016	**1**
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural						
15	----	----	----	27-Jul-2016	22-Jul-2016	**5**
Clear Plastic Bottle - Natural						
14, 13	----	----	----	27-Jul-2016	23-Jul-2016	**4**
Clear Plastic Bottle - Natural						
02	----	----	----	27-Jul-2016	24-Jul-2016	**3**
Clear Plastic Bottle - Natural						
11, 12	----	----	----	27-Jul-2016	25-Jul-2016	**2**
Clear Plastic Bottle - Natural						
1B, 3B, 1D	----	----	----	27-Jul-2016	26-Jul-2016	**1**
EK071G: Reactive Phosphorus as P by discrete analyser						
Clear Plastic Bottle - Natural						
15	----	----	----	27-Jul-2016	22-Jul-2016	**5**
Clear Plastic Bottle - Natural						
14, 13	----	----	----	27-Jul-2016	23-Jul-2016	**4**
Clear Plastic Bottle - Natural						
02	----	----	----	27-Jul-2016	24-Jul-2016	**3**
Clear Plastic Bottle - Natural						
11, 12	----	----	----	27-Jul-2016	25-Jul-2016	**2**

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EK071G: Reactive Phosphorus as P by discrete analyser - Analysis Holding Time Compliance						
Clear Plastic Bottle - Natural						
1B, 3B, 1D	----	----	----	27-Jul-2016	26-Jul-2016	**1**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count: QC	Count: Regular	Rate (%): Actual	Rate (%): Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	9	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	9	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	9	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	9	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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 / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103) 15	**20-Jul-2016**	**----**	----	----	**28-Jul-2016**	03-Aug-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) 14, 13	**21-Jul-2016**	**----**	----	----	**28-Jul-2016**	04-Aug-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) 02	**22-Jul-2016**	**----**	----	----	**28-Jul-2016**	05-Aug-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) 11, 12	**23-Jul-2016**	**----**	----	----	**28-Jul-2016**	06-Aug-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**28-Jul-2016**	07-Aug-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA150: Particle Sizing							
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H) 15	**20-Jul-2016**	**----**	----	----	**11-Aug-2016**	16-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H) 14, 13	**21-Jul-2016**	**----**	----	----	**11-Aug-2016**	17-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H) 02	**22-Jul-2016**	**----**	----	----	**11-Aug-2016**	18-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H) 11, 12	**23-Jul-2016**	**----**	----	----	**11-Aug-2016**	19-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**11-Aug-2016**	20-Jan-2017	✓
EA150: Soil Classification based on Particle Size							
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H) 15	**20-Jul-2016**	**----**	----	----	**11-Aug-2016**	16-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H) 14, 13	**21-Jul-2016**	**----**	----	----	**11-Aug-2016**	17-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H) 02	**22-Jul-2016**	**----**	----	----	**11-Aug-2016**	18-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H) 11, 12	**23-Jul-2016**	**----**	----	----	**11-Aug-2016**	19-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**11-Aug-2016**	20-Jan-2017	✓
EA152: Soil Particle Density							
Snap Lock Bag - Friable Asbestos/PSD Bag (EA152) 15	**20-Jul-2016**	**----**	----	----	**11-Aug-2016**	16-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA152) 14, 13	**21-Jul-2016**	**----**	----	----	**11-Aug-2016**	17-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA152) 02	**22-Jul-2016**	**----**	----	----	**11-Aug-2016**	18-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA152) 11, 12	**23-Jul-2016**	**----**	----	----	**11-Aug-2016**	19-Jan-2017	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA152) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**11-Aug-2016**	20-Jan-2017	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) 15	**20-Jul-2016**	**02-Aug-2016**	16-Jan-2017	✓	**03-Aug-2016**	16-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG005T) 14, 13	**21-Jul-2016**	**02-Aug-2016**	17-Jan-2017	✓	**03-Aug-2016**	17-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG005T) 02	**22-Jul-2016**	**02-Aug-2016**	18-Jan-2017	✓	**03-Aug-2016**	18-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG005T) 11, 12	**23-Jul-2016**	**02-Aug-2016**	19-Jan-2017	✓	**03-Aug-2016**	19-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG005T) 1B, 3B, 1D	**24-Jul-2016**	**02-Aug-2016**	20-Jan-2017	✓	**03-Aug-2016**	20-Jan-2017	✓
EG020T: Total Metals by ICP-MS							
Soil Glass Jar - Unpreserved (EG020Y-T) 15	**20-Jul-2016**	**02-Aug-2016**	16-Jan-2017	✓	**03-Aug-2016**	16-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG020Y-T) 14, 13	**21-Jul-2016**	**02-Aug-2016**	17-Jan-2017	✓	**03-Aug-2016**	17-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG020Y-T) 02	**22-Jul-2016**	**02-Aug-2016**	18-Jan-2017	✓	**03-Aug-2016**	18-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG020Y-T) 11, 12	**23-Jul-2016**	**02-Aug-2016**	19-Jan-2017	✓	**03-Aug-2016**	19-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG020Y-T) 1B, 3B, 1D	**24-Jul-2016**	**02-Aug-2016**	20-Jan-2017	✓	**03-Aug-2016**	20-Jan-2017	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) 15	**20-Jul-2016**	**02-Aug-2016**	17-Aug-2016	✓	**03-Aug-2016**	17-Aug-2016	✓
Soil Glass Jar - Unpreserved (EG035T) 14, 13	**21-Jul-2016**	**02-Aug-2016**	18-Aug-2016	✓	**03-Aug-2016**	18-Aug-2016	✓
Soil Glass Jar - Unpreserved (EG035T) 02	**22-Jul-2016**	**02-Aug-2016**	19-Aug-2016	✓	**03-Aug-2016**	19-Aug-2016	✓
Soil Glass Jar - Unpreserved (EG035T) 11, 12	**23-Jul-2016**	**02-Aug-2016**	20-Aug-2016	✓	**03-Aug-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EG035T) 1B, 3B, 1D	**24-Jul-2016**	**02-Aug-2016**	21-Aug-2016	✓	**03-Aug-2016**	21-Aug-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK059G) 15	**20-Jul-2016**	**29-Jul-2016**	16-Jan-2017	✓	**01-Aug-2016**	16-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK059G) 14, 13	**21-Jul-2016**	**29-Jul-2016**	17-Jan-2017	✓	**01-Aug-2016**	17-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK059G) 02	**22-Jul-2016**	**29-Jul-2016**	18-Jan-2017	✓	**01-Aug-2016**	18-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK059G) 11, 12	**23-Jul-2016**	**29-Jul-2016**	19-Jan-2017	✓	**01-Aug-2016**	19-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK059G) 1B, 3B, 1D	**24-Jul-2016**	**29-Jul-2016**	20-Jan-2017	✓	**01-Aug-2016**	20-Jan-2017	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Soil Glass Jar - Unpreserved (EK061G) 15	**20-Jul-2016**	**29-Jul-2016**	16-Jan-2017	✓	**01-Aug-2016**	16-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK061G) 14, 13	**21-Jul-2016**	**29-Jul-2016**	17-Jan-2017	✓	**01-Aug-2016**	17-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK061G) 02	**22-Jul-2016**	**29-Jul-2016**	18-Jan-2017	✓	**01-Aug-2016**	18-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK061G) 11, 12	**23-Jul-2016**	**29-Jul-2016**	19-Jan-2017	✓	**01-Aug-2016**	19-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK061G) 1B, 3B, 1D	**24-Jul-2016**	**29-Jul-2016**	20-Jan-2017	✓	**01-Aug-2016**	20-Jan-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK067G) 15	**20-Jul-2016**	**29-Jul-2016**	16-Jan-2017	✓	**01-Aug-2016**	16-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK067G) 14, 13	**21-Jul-2016**	**29-Jul-2016**	17-Jan-2017	✓	**01-Aug-2016**	17-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK067G) 02	**22-Jul-2016**	**29-Jul-2016**	18-Jan-2017	✓	**01-Aug-2016**	18-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK067G) 11, 12	**23-Jul-2016**	**29-Jul-2016**	19-Jan-2017	✓	**01-Aug-2016**	19-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK067G) 1B, 3B, 1D	**24-Jul-2016**	**29-Jul-2016**	20-Jan-2017	✓	**01-Aug-2016**	20-Jan-2017	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP004: Organic Matter							
Soil Glass Jar - Unpreserved (EP004) 15	**20-Jul-2016**	**29-Jul-2016**	17-Aug-2016	✓	**02-Aug-2016**	17-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP004) 14, 13	**21-Jul-2016**	**29-Jul-2016**	18-Aug-2016	✓	**02-Aug-2016**	18-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP004) 02	**22-Jul-2016**	**29-Jul-2016**	19-Aug-2016	✓	**02-Aug-2016**	19-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP004) 11, 12	**23-Jul-2016**	**29-Jul-2016**	20-Aug-2016	✓	**02-Aug-2016**	20-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP004) 1B, 3B, 1D	**24-Jul-2016**	**29-Jul-2016**	21-Aug-2016	✓	**02-Aug-2016**	21-Aug-2016	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) 15	**20-Jul-2016**	**28-Jul-2016**	03-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) 14, 13	**21-Jul-2016**	**28-Jul-2016**	04-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) 02	**22-Jul-2016**	**28-Jul-2016**	05-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) 11, 12	**23-Jul-2016**	**28-Jul-2016**	06-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) 1B, 3B, 1D	**24-Jul-2016**	**28-Jul-2016**	07-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) 15	**20-Jul-2016**	**28-Jul-2016**	03-Aug-2016	✓	**01-Aug-2016**	03-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) 15	**20-Jul-2016**	**28-Jul-2016**	03-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 14, 13	**21-Jul-2016**	**28-Jul-2016**	04-Aug-2016	✓	**01-Aug-2016**	04-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) 14, 13	**21-Jul-2016**	**28-Jul-2016**	04-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 02	**22-Jul-2016**	**28-Jul-2016**	05-Aug-2016	✓	**01-Aug-2016**	05-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) 02	**22-Jul-2016**	**28-Jul-2016**	05-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 11, 12	**23-Jul-2016**	**28-Jul-2016**	06-Aug-2016	✓	**01-Aug-2016**	06-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) 11, 12	**23-Jul-2016**	**28-Jul-2016**	06-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 1B, 3B, 1D	**24-Jul-2016**	**28-Jul-2016**	07-Aug-2016	✓	**01-Aug-2016**	07-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) 1B, 3B, 1D	**24-Jul-2016**	**28-Jul-2016**	07-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) 15	**20-Jul-2016**	**28-Jul-2016**	03-Aug-2016	✓	**01-Aug-2016**	03-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) 15	**20-Jul-2016**	**28-Jul-2016**	03-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 14, 13	**21-Jul-2016**	**28-Jul-2016**	04-Aug-2016	✓	**01-Aug-2016**	04-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) 14, 13	**21-Jul-2016**	**28-Jul-2016**	04-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 02	**22-Jul-2016**	**28-Jul-2016**	05-Aug-2016	✓	**01-Aug-2016**	05-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) 02	**22-Jul-2016**	**28-Jul-2016**	05-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 11, 12	**23-Jul-2016**	**28-Jul-2016**	06-Aug-2016	✓	**01-Aug-2016**	06-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) 11, 12	**23-Jul-2016**	**28-Jul-2016**	06-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 1B, 3B, 1D	**24-Jul-2016**	**28-Jul-2016**	07-Aug-2016	✓	**01-Aug-2016**	07-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP071) 1B, 3B, 1D	**24-Jul-2016**	**28-Jul-2016**	07-Aug-2016	✓	**29-Jul-2016**	06-Sep-2016	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) 15	**20-Jul-2016**	**28-Jul-2016**	03-Aug-2016	✓	**01-Aug-2016**	03-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 14, 13	**21-Jul-2016**	**28-Jul-2016**	04-Aug-2016	✓	**01-Aug-2016**	04-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 02	**22-Jul-2016**	**28-Jul-2016**	05-Aug-2016	✓	**01-Aug-2016**	05-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 11, 12	**23-Jul-2016**	**28-Jul-2016**	06-Aug-2016	✓	**01-Aug-2016**	06-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 1B, 3B, 1D	**24-Jul-2016**	**28-Jul-2016**	07-Aug-2016	✓	**01-Aug-2016**	07-Aug-2016	✓

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

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
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025) 15	**20-Jul-2016**	**----**	----	----	**28-Jul-2016**	27-Jul-2016	×
Clear Plastic Bottle - Natural (EA025) 14, 13	**21-Jul-2016**	**----**	----	----	**28-Jul-2016**	28-Jul-2016	✓
Clear Plastic Bottle - Natural (EA025) 02	**22-Jul-2016**	**----**	----	----	**28-Jul-2016**	29-Jul-2016	✓
Clear Plastic Bottle - Natural (EA025) 11, 12	**23-Jul-2016**	**----**	----	----	**28-Jul-2016**	30-Jul-2016	✓
Clear Plastic Bottle - Natural (EA025) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**28-Jul-2016**	31-Jul-2016	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) 15	**20-Jul-2016**	**----**	----	----	**28-Jul-2016**	03-Aug-2016	✓
Clear Plastic Bottle - Natural (ED037-P) 14, 13	**21-Jul-2016**	**----**	----	----	**28-Jul-2016**	04-Aug-2016	✓
Clear Plastic Bottle - Natural (ED037-P) 02	**22-Jul-2016**	**----**	----	----	**28-Jul-2016**	05-Aug-2016	✓
Clear Plastic Bottle - Natural (ED037-P) 11, 12	**23-Jul-2016**	**----**	----	----	**28-Jul-2016**	06-Aug-2016	✓
Clear Plastic Bottle - Natural (ED037-P) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**28-Jul-2016**	07-Aug-2016	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) 15	**20-Jul-2016**	**----**	----	----	**27-Jul-2016**	17-Aug-2016	✓
Clear Plastic Bottle - Natural (ED041G) 14, 13	**21-Jul-2016**	**----**	----	----	**27-Jul-2016**	18-Aug-2016	✓
Clear Plastic Bottle - Natural (ED041G) 02	**22-Jul-2016**	**----**	----	----	**27-Jul-2016**	19-Aug-2016	✓
Clear Plastic Bottle - Natural (ED041G) 11, 12	**23-Jul-2016**	**----**	----	----	**27-Jul-2016**	20-Aug-2016	✓
Clear Plastic Bottle - Natural (ED041G) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**27-Jul-2016**	21-Aug-2016	✓

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
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) 15	**20-Jul-2016**	**----**	----	----	**27-Jul-2016**	17-Aug-2016	✓
Clear Plastic Bottle - Natural (ED045G) 14, 13	**21-Jul-2016**	**----**	----	----	**27-Jul-2016**	18-Aug-2016	✓
Clear Plastic Bottle - Natural (ED045G) 02	**22-Jul-2016**	**----**	----	----	**27-Jul-2016**	19-Aug-2016	✓
Clear Plastic Bottle - Natural (ED045G) 11, 12	**23-Jul-2016**	**----**	----	----	**27-Jul-2016**	20-Aug-2016	✓
Clear Plastic Bottle - Natural (ED045G) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**27-Jul-2016**	21-Aug-2016	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 15	**20-Jul-2016**	**----**	----	----	**02-Aug-2016**	17-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 14, 13	**21-Jul-2016**	**----**	----	----	**02-Aug-2016**	18-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 02	**22-Jul-2016**	**----**	----	----	**02-Aug-2016**	19-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 11, 12	**23-Jul-2016**	**----**	----	----	**02-Aug-2016**	20-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**02-Aug-2016**	21-Aug-2016	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 15	**20-Jul-2016**	**----**	----	----	**02-Aug-2016**	16-Jan-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 14, 13	**21-Jul-2016**	**----**	----	----	**02-Aug-2016**	17-Jan-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 02	**22-Jul-2016**	**----**	----	----	**02-Aug-2016**	18-Jan-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 11, 12	**23-Jul-2016**	**----**	----	----	**02-Aug-2016**	19-Jan-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**02-Aug-2016**	20-Jan-2017	✓

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
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 15	**20-Jul-2016**	**02-Aug-2016**	16-Jan-2017	✓	**02-Aug-2016**	16-Jan-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 14, 13	**21-Jul-2016**	**02-Aug-2016**	17-Jan-2017	✓	**02-Aug-2016**	17-Jan-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 02	**22-Jul-2016**	**02-Aug-2016**	18-Jan-2017	✓	**02-Aug-2016**	18-Jan-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 11, 12	**23-Jul-2016**	**02-Aug-2016**	19-Jan-2017	✓	**02-Aug-2016**	19-Jan-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 1B, 3B, 1D	**24-Jul-2016**	**02-Aug-2016**	20-Jan-2017	✓	**02-Aug-2016**	20-Jan-2017	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 15	**20-Jul-2016**	**----**	----	----	**02-Aug-2016**	17-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 14, 13	**21-Jul-2016**	**----**	----	----	**02-Aug-2016**	18-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 02	**22-Jul-2016**	**----**	----	----	**02-Aug-2016**	19-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 11, 12	**23-Jul-2016**	**----**	----	----	**02-Aug-2016**	20-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**02-Aug-2016**	21-Aug-2016	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 15	**20-Jul-2016**	**----**	----	----	**02-Aug-2016**	17-Aug-2016	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 14, 13	**21-Jul-2016**	**----**	----	----	**02-Aug-2016**	18-Aug-2016	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 02	**22-Jul-2016**	**----**	----	----	**02-Aug-2016**	19-Aug-2016	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 11, 12	**23-Jul-2016**	**----**	----	----	**02-Aug-2016**	20-Aug-2016	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**02-Aug-2016**	21-Aug-2016	✓

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
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) 15	**20-Jul-2016**	**----**	----	----	**01-Aug-2016**	17-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 14, 13	**21-Jul-2016**	**----**	----	----	**01-Aug-2016**	18-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 02	**22-Jul-2016**	**----**	----	----	**01-Aug-2016**	19-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 11, 12	**23-Jul-2016**	**----**	----	----	**01-Aug-2016**	20-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**01-Aug-2016**	21-Aug-2016	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) 15	**20-Jul-2016**	**----**	----	----	**27-Jul-2016**	22-Jul-2016	×
Clear Plastic Bottle - Natural (EK057G) 14, 13	**21-Jul-2016**	**----**	----	----	**27-Jul-2016**	23-Jul-2016	×
Clear Plastic Bottle - Natural (EK057G) 02	**22-Jul-2016**	**----**	----	----	**27-Jul-2016**	24-Jul-2016	×
Clear Plastic Bottle - Natural (EK057G) 11, 12	**23-Jul-2016**	**----**	----	----	**27-Jul-2016**	25-Jul-2016	×
Clear Plastic Bottle - Natural (EK057G) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**27-Jul-2016**	26-Jul-2016	×
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) 15	**20-Jul-2016**	**----**	----	----	**01-Aug-2016**	17-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 14, 13	**21-Jul-2016**	**----**	----	----	**01-Aug-2016**	18-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 02	**22-Jul-2016**	**----**	----	----	**01-Aug-2016**	19-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 11, 12	**23-Jul-2016**	**----**	----	----	**01-Aug-2016**	20-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**01-Aug-2016**	21-Aug-2016	✓

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
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) 15	**20-Jul-2016**	**28-Jul-2016**	17-Aug-2016	✓	**28-Jul-2016**	17-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 14, 13	**21-Jul-2016**	**28-Jul-2016**	18-Aug-2016	✓	**28-Jul-2016**	18-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 02	**22-Jul-2016**	**28-Jul-2016**	19-Aug-2016	✓	**28-Jul-2016**	19-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 11, 12	**23-Jul-2016**	**28-Jul-2016**	20-Aug-2016	✓	**28-Jul-2016**	20-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 1B, 3B, 1D	**24-Jul-2016**	**28-Jul-2016**	21-Aug-2016	✓	**28-Jul-2016**	21-Aug-2016	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) 15	**20-Jul-2016**	**28-Jul-2016**	17-Aug-2016	✓	**28-Jul-2016**	17-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 14, 13	**21-Jul-2016**	**28-Jul-2016**	18-Aug-2016	✓	**28-Jul-2016**	18-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 02	**22-Jul-2016**	**28-Jul-2016**	19-Aug-2016	✓	**28-Jul-2016**	19-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 11, 12	**23-Jul-2016**	**28-Jul-2016**	20-Aug-2016	✓	**28-Jul-2016**	20-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 1B, 3B, 1D	**24-Jul-2016**	**28-Jul-2016**	21-Aug-2016	✓	**28-Jul-2016**	21-Aug-2016	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) 15	**20-Jul-2016**	**----**	----	----	**27-Jul-2016**	22-Jul-2016	×
Clear Plastic Bottle - Natural (EK071G) 14, 13	**21-Jul-2016**	**----**	----	----	**27-Jul-2016**	23-Jul-2016	×
Clear Plastic Bottle - Natural (EK071G) 02	**22-Jul-2016**	**----**	----	----	**27-Jul-2016**	24-Jul-2016	×
Clear Plastic Bottle - Natural (EK071G) 11, 12	**23-Jul-2016**	**----**	----	----	**27-Jul-2016**	25-Jul-2016	×
Clear Plastic Bottle - Natural (EK071G) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**27-Jul-2016**	26-Jul-2016	×

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
EP002: Dissolved Organic Carbon (DOC)							
Amber DOC Filtered- Sulfuric Preserved (EP002) 15	**20-Jul-2016**	**----**	----	----	**28-Jul-2016**	17-Aug-2016	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 14, 13	**21-Jul-2016**	**----**	----	----	**28-Jul-2016**	18-Aug-2016	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 02	**22-Jul-2016**	**----**	----	----	**28-Jul-2016**	19-Aug-2016	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 11, 12	**23-Jul-2016**	**----**	----	----	**28-Jul-2016**	20-Aug-2016	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**28-Jul-2016**	21-Aug-2016	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005) 15	**20-Jul-2016**	**----**	----	----	**28-Jul-2016**	17-Aug-2016	✓
Amber TOC Vial - Sulfuric Acid (EP005) 14, 13	**21-Jul-2016**	**----**	----	----	**28-Jul-2016**	18-Aug-2016	✓
Amber TOC Vial - Sulfuric Acid (EP005) 02	**22-Jul-2016**	**----**	----	----	**28-Jul-2016**	19-Aug-2016	✓
Amber TOC Vial - Sulfuric Acid (EP005) 11, 12	**23-Jul-2016**	**----**	----	----	**28-Jul-2016**	20-Aug-2016	✓
Amber TOC Vial - Sulfuric Acid (EP005) 1B, 3B, 1D	**24-Jul-2016**	**----**	----	----	**28-Jul-2016**	21-Aug-2016	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) 15	**20-Jul-2016**	**27-Jul-2016**	27-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 14, 13	**21-Jul-2016**	**27-Jul-2016**	28-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 02	**22-Jul-2016**	**27-Jul-2016**	29-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 11, 12	**23-Jul-2016**	**27-Jul-2016**	30-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 1B, 3B, 1D	**24-Jul-2016**	**27-Jul-2016**	31-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓

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
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) 15	**20-Jul-2016**	**27-Jul-2016**	27-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071) 14, 13	**21-Jul-2016**	**27-Jul-2016**	28-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071) 02	**22-Jul-2016**	**27-Jul-2016**	29-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071) 11, 12	**23-Jul-2016**	**27-Jul-2016**	30-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071) 1B, 3B, 1D	**24-Jul-2016**	**27-Jul-2016**	31-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 15	**20-Jul-2016**	**01-Aug-2016**	03-Aug-2016	✓	**01-Aug-2016**	03-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 14, 13	**21-Jul-2016**	**01-Aug-2016**	04-Aug-2016	✓	**01-Aug-2016**	04-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 02	**22-Jul-2016**	**01-Aug-2016**	05-Aug-2016	✓	**01-Aug-2016**	05-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 11, 12	**23-Jul-2016**	**01-Aug-2016**	06-Aug-2016	✓	**01-Aug-2016**	06-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 1B, 3B, 1D	**24-Jul-2016**	**01-Aug-2016**	07-Aug-2016	✓	**01-Aug-2016**	07-Aug-2016	✓

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) 15	**20-Jul-2016**	**27-Jul-2016**	27-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071) 14, 13	**21-Jul-2016**	**27-Jul-2016**	28-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071) 02	**22-Jul-2016**	**27-Jul-2016**	29-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071) 11, 12	**23-Jul-2016**	**27-Jul-2016**	30-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071) 1B, 3B, 1D	**24-Jul-2016**	**27-Jul-2016**	31-Jul-2016	✓	**01-Aug-2016**	05-Sep-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 15	**20-Jul-2016**	**01-Aug-2016**	03-Aug-2016	✓	**01-Aug-2016**	03-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 14, 13	**21-Jul-2016**	**01-Aug-2016**	04-Aug-2016	✓	**01-Aug-2016**	04-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 02	**22-Jul-2016**	**01-Aug-2016**	05-Aug-2016	✓	**01-Aug-2016**	05-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 11, 12	**23-Jul-2016**	**01-Aug-2016**	06-Aug-2016	✓	**01-Aug-2016**	06-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 1B, 3B, 1D	**24-Jul-2016**	**01-Aug-2016**	07-Aug-2016	✓	**01-Aug-2016**	07-Aug-2016	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) 15	**20-Jul-2016**	**01-Aug-2016**	03-Aug-2016	✓	**01-Aug-2016**	03-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 14, 13	**21-Jul-2016**	**01-Aug-2016**	04-Aug-2016	✓	**01-Aug-2016**	04-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 02	**22-Jul-2016**	**01-Aug-2016**	05-Aug-2016	✓	**01-Aug-2016**	05-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 11, 12	**23-Jul-2016**	**01-Aug-2016**	06-Aug-2016	✓	**01-Aug-2016**	06-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 1B, 3B, 1D	**24-Jul-2016**	**01-Aug-2016**	07-Aug-2016	✓	**01-Aug-2016**	07-Aug-2016	✓

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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	2	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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	
Method Blanks (MB) - Continued							
Total Phosporus By Discrete Analyser	EK067G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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)							
Alkalinity by PC Titrator	ED037-P	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	9	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

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) - Continued							
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	9	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	2	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Method Blanks (MB) - Continued							
Total Mercury by FIMS	EG035T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	9	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	9	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Soil Particle Density	* EA152	SOIL	Soil Particle Density by AS 1289.3.5.1-2006 : Methods of testing soils for engineering purposes - Soil classification tests - Determination of the soil particle density of a soil - Standard method
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-MS - Suite X	EG020X-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite Y	EG020Y-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by Chemical Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	In house: Referenced to APHA 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Nitrogen as N (TKN + NOx) By Discrete Analyser	EK062G	SOIL	In house: Referenced to APHA 4500 Norg/NO3- Total Nitrogen is determined as the sum of TKN and Oxidised Nitrrogen, each determined seperately as N.
Total Phosporus By Discrete Analyser	EK067G	SOIL	In house: Referenced to APHA 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.
Organic Matter	EP004	SOIL	In house: Referenced to AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)

Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to 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.
Suspended Solids	EA025	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. 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 BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite B	EG020B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- 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)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Organic Carbon	EP002	WATER	In house: Referenced to APHA 5310 B. This method is compliant with NEPM (2013) Schedule B(3) . Samples are combusted at high termperature in the presence of an oxidative catalyst. The evolved carbon dioxide is quantified using an IR detector.

Analytical Methods	Method	Matrix	Method Descriptions
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to 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)
Total Coliforms (Water)	TCF-WAT	WATER	Total Coliforms analysis of water matrices conducted by Subcontracting Laboratory

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	In house: Referenced to APHA 4500 Norg- D; APHA 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Organic Matter	EP004-PR	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to 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.
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1619150**	Page	: 1 of 7
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: John Pickering
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61 7 3552 8634
Project	: B21414 Elk	Date Samples Received	: 28-Jul-2016 15:15
Order number	: ----	Date Analysis Commenced	: 29-Jul-2016
C-O-C number	: ----	Issue Date	: 09-Aug-2016 10:47
Sampler	: CONOR JONES, DANIEL MORAN		
Site	: ----		
Quote number	: ----		
No. of samples received	: 3		
No. of samples analysed	: 3		

NATA Accredited Laboratory 825
Accredited for compliance with ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

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
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Organics, Stafford, QLD

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.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.
~ = Indicates an estimated value.

- EA150H: Soil particle density results for sample #003 fell outside the scope of AS1289.3.6.3. Results should be scrutinised accordingly.
- **This work order has been created to rebatch samples from previous ALS workorder EB1617705.**
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	M25 EB1617705-024	16 EB1617705-028	17 EB1617705-029	----	----
			Client sampling date / time	04-Jul-2016 14:30	03-Jul-2016 10:00	03-Jul-2016 14:00	----	----
Compound	CAS Number	LOR	Unit	EB1619150-001	EB1619150-002	EB1619150-003	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	----	31.1	21.0	----	----
EA150: Particle Sizing								
+75µm	----	1	%	1	39	97	----	----
+150µm	----	1	%	<1	4	71	----	----
+300µm	----	1	%	<1	<1	28	----	----
+425µm	----	1	%	<1	<1	6	----	----
+600µm	----	1	%	<1	<1	<1	----	----
+1180µm	----	1	%	<1	<1	<1	----	----
+2.36mm	----	1	%	<1	<1	<1	----	----
+4.75mm	----	1	%	<1	<1	<1	----	----
+9.5mm	----	1	%	<1	<1	<1	----	----
+19.0mm	----	1	%	<1	<1	<1	----	----
+37.5mm	----	1	%	<1	<1	<1	----	----
+75.0mm	----	1	%	<1	<1	<1	----	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	40	10	<1	----	----
Silt (2-60 µm)	----	1	%	56	48	1	----	----
Sand (0.06-2.00 mm)	----	1	%	4	42	99	----	----
Gravel (>2mm)	----	1	%	<1	<1	<1	----	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	----	----
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.72	2.73	2.24	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	21400	15900	----	----
Arsenic	7440-38-2	5	mg/kg	----	<5	<5	----	----
Barium	7440-39-3	10	mg/kg	----	80	60	----	----
Iron	7439-89-6	50	mg/kg	----	40700	37400	----	----
Strontium	7440-24-6	2	mg/kg	----	99	71	----	----
Tin	7440-31-5	5	mg/kg	----	<5	<5	----	----
EG020T: Total Metals by ICP-MS								
Selenium	7782-49-2	1	mg/kg	----	<1	<1	----	----
Silver	7440-22-4	0.1	mg/kg	----	0.1	<0.1	----	----
Thallium	7440-28-0	0.1	mg/kg	----	<0.1	<0.1	----	----
Beryllium	7440-41-7	0.1	mg/kg	----	0.5	0.4	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M25 EB1617705-024	16 EB1617705-028	17 EB1617705-029	----	----
				Client sampling date / time	04-Jul-2016 14:30	03-Jul-2016 10:00	03-Jul-2016 14:00	----	----
Compound	CAS Number	LOR	Unit		EB1619150-001	EB1619150-002	EB1619150-003	--------	--------
					Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.1	mg/kg		----	<0.1	<0.1	----	----
Cobalt	7440-48-4	0.1	mg/kg		----	**20.7**	**20.6**	----	----
Chromium	7440-47-3	0.1	mg/kg		----	**47.1**	**45.8**	----	----
Copper	7440-50-8	0.1	mg/kg		----	**41.3**	**23.1**	----	----
Manganese	7439-96-5	0.1	mg/kg		----	**759**	**676**	----	----
Molybdenum	7439-98-7	0.1	mg/kg		----	**0.3**	**0.2**	----	----
Nickel	7440-02-0	0.1	mg/kg		----	**43.4**	**47.4**	----	----
Lead	7439-92-1	0.1	mg/kg		----	**10.1**	**6.1**	----	----
Antimony	7440-36-0	0.1	mg/kg		----	<0.1	<0.1	----	----
Zinc	7440-66-6	0.5	mg/kg		----	**93.5**	**78.3**	----	----
Vanadium	7440-62-2	1	mg/kg		----	**96**	**107**	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		----	<0.1	<0.1	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		----	<0.1	**0.1**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		----	**590**	**220**	----	----
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		----	**590**	**220**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		----	**534**	**771**	----	----
EP004: Organic Matter									
Organic Matter	----	0.5	%		----	**1.1**	<0.5	----	----
Total Organic Carbon	----	0.5	%		----	**0.6**	<0.5	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	<0.5	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		----	<0.5	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg		----	<0.5	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg		----	<0.5	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg		----	<0.5	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg		----	<0.5	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg		----	<0.5	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg		----	<0.5	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	<0.5	<0.5	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M25 EB1617705-024	16 EB1617705-028	17 EB1617705-029	----	----
				Client sampling date / time	04-Jul-2016 14:30	03-Jul-2016 10:00	03-Jul-2016 14:00	----	----
Compound	CAS Number	LOR	Unit		EB1619150-001	EB1619150-002	EB1619150-003	--------	--------
					Result	Result	Result	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		----	<0.5	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	<0.5	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	<0.5	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	<0.5	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	<0.5	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	<0.5	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	**0.6**	**0.6**	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	**1.2**	**1.2**	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		----	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		----	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		----	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		----	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		----	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		----	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	<50	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	<50	<50	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		----	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg		----	<0.2	<0.2	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	M25 EB1617705-024	16 EB1617705-028	17 EB1617705-029	----	----
				Client sampling date / time	04-Jul-2016 14:30	03-Jul-2016 10:00	03-Jul-2016 14:00	----	----
Compound	CAS Number	LOR	Unit		EB1619150-001	EB1619150-002	EB1619150-003	--------	--------
					Result	Result	Result	----	----
EP080: BTEXN - Continued									
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		----	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg		----	<1	<1	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	**105**	**104**	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	**97.7**	**98.8**	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		----	**66.7**	**61.6**	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	**95.9**	**99.9**	----	----
Anthracene-d10	1719-06-8	0.5	%		----	**77.6**	**76.9**	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	**85.4**	**86.6**	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	**78.7**	**75.9**	----	----
Toluene-D8	2037-26-5	0.2	%		----	**82.6**	**84.6**	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		----	**80.3**	**80.4**	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	35	155
2-Chlorophenol-D4	93951-73-6	42	153
2.4.6-Tribromophenol	118-79-6	26	157
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	34	157
Anthracene-d10	1719-06-8	37	153
4-Terphenyl-d14	1718-51-0	42	172
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	53	134
Toluene-D8	2037-26-5	60	131
4-Bromofluorobenzene	460-00-4	59	127

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB1619150**	Page	: 1 of 8
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: John Pickering
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61 7 3552 8634
Project	: B21414 Elk	Date Samples Received	: 28-Jul-2016
Order number	: ----	Date Analysis Commenced	: 29-Jul-2016
C-O-C number	: ----	Issue Date	: 09-Aug-2016
Sampler	: CONOR JONES, DANIEL MORAN		
Site	: ----		
Quote number	: ----		
No. of samples received	: 3		
No. of samples analysed	: 3		

NATA Accredited Laboratory 825
Accredited for compliance with ISO/IEC 17025.

NATA WORLD RECOGNISED ACCREDITATION

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Organics, Stafford, QLD

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

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: 534221)									
EB1619150-002	16 EB1617705-028	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	31.1	32.8	5.52	0% - 20%
EB1619170-010	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	12.8	14.8	14.4	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 539161)									
EB1619254-009	Anonymous	EG005T: Barium	7440-39-3	10	mg/kg	110	110	0.00	0% - 50%
		EG005T: Strontium	7440-24-6	2	mg/kg	6	5	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	37900	37800	0.214	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	104000	104000	0.626	0% - 20%
EB1619150-002	16 EB1617705-028	EG005T: Barium	7440-39-3	10	mg/kg	80	80	0.00	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	99	100	0.00	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	21400	21600	0.647	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	40700	40900	0.389	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 539158)									
EB1619150-002	16 EB1617705-028	EG020X-T: Lead	7439-92-1	0.1	mg/kg	10.1	9.5	5.85	0% - 20%
EB1619150-002	16 EB1617705-028	EG020X-T: Beryllium	7440-41-7	0.1	mg/kg	0.5	0.5	0.00	No Limit
		EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	20.7	21.7	4.78	0% - 20%
		EG020X-T: Chromium	7440-47-3	0.1	mg/kg	47.1	48.9	3.84	0% - 20%
		EG020X-T: Copper	7440-50-8	0.1	mg/kg	41.3	43.2	4.49	0% - 20%
		EG020X-T: Manganese	7439-96-5	0.1	mg/kg	759	790	3.99	0% - 20%
		EG020X-T: Molybdenum	7439-98-7	0.1	mg/kg	0.3	0.3	0.00	No Limit
		EG020X-T: Nickel	7440-02-0	0.1	mg/kg	43.4	45.8	5.57	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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 539158) - continued									
EB1619150-002	16 EB1617705-028	EG020X-T: Antimony	7440-36-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020X-T: Zinc	7440-66-6	0.5	mg/kg	93.5	97.2	3.94	0% - 20%
		EG020X-T: Vanadium	7440-62-2	1	mg/kg	96	99	2.88	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 539159)									
EB1619150-002	16 EB1617705-028	EG020Y-T: Thallium	7440-28-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
		EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	<1	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 539162)									
EB1619150-002	16 EB1617705-028	EG020Z-T: Silver	7440-22-4	0.1	mg/kg	0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 539160)									
EB1619254-009	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	0.1	0.00	No Limit
EB1619150-002	16 EB1617705-028	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 538774)									
EB1619151-030	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EB1619099-001	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 541157)									
EB1619150-002	16 EB1617705-028	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	590	580	0.00	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 541158)									
EB1619150-002	16 EB1617705-028	EK067G: Total Phosphorus as P	----	2	mg/kg	534	560	4.73	0% - 20%
EP004: Organic Matter (QC Lot: 533673)									
EB1619150-002	16 EB1617705-028	EP004: Organic Matter	----	0.5	%	1.1	1.1	0.00	No Limit
		EP004: Total Organic Carbon	----	0.5	%	0.6	0.6	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 534220)									
EB1619150-002	16 EB1617705-028	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 534220) - continued									
EB1619150-002	16 EB1617705-028	EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 534218)									
EB1619150-002	16 EB1617705-028	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EB1619170-010	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 534219)									
EB1619170-010	Anonymous	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
EB1619150-002	16 EB1617705-028	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: 534218)									
EB1619150-002	16 EB1617705-028	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EB1619170-010	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	13	<10	26.3	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 534219)									
EB1619170-010	Anonymous	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	----	50	mg/kg	<50	<50	0.00	No Limit
EB1619150-002	16 EB1617705-028	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	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 534218)									
EB1619150-002	16 EB1617705-028	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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
EB1619170-010	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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

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 Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 539161)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	118.9 mg/kg	96.7	84	123
EG005T: Barium	7440-39-3	10	mg/kg	<10	105.1967 mg/kg	94.8	89	129
EG005T: Iron	7439-89-6	50	mg/kg	<50	34900 mg/kg	93.9	70	120
EG005T: Strontium	7440-24-6	2	mg/kg	<2	44.50816 mg/kg	113	83	117
EG005T: Tin	7440-31-5	5	mg/kg	<5	5.7 mg/kg	91.6	75	130
EG020T: Total Metals by ICP-MS (QCLot: 539158)								
EG020X-T: Beryllium	7440-41-7	0.1	mg/kg	<0.1	0.64 mg/kg	98.4	79	130
EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	<0.1	11.6 mg/kg	113	88	129
EG020X-T: Chromium	7440-47-3	0.1	mg/kg	<0.1	22.9 mg/kg	107	75	130
EG020X-T: Copper	7440-50-8	0.1	mg/kg	<0.1	52.9 mg/kg	119	84	120
EG020X-T: Manganese	7439-96-5	0.1	mg/kg	<0.1	592 mg/kg	119	86	130
EG020X-T: Molybdenum	7439-98-7	0.1	mg/kg	<0.1	2 mg/kg	113	82	118
EG020X-T: Nickel	7440-02-0	0.1	mg/kg	<0.1	16.1 mg/kg	112	89	127
EG020X-T: Lead	7439-92-1	0.1	mg/kg	<0.1	66.3 mg/kg	114	85	117
EG020X-T: Antimony	7440-36-0	0.1	mg/kg	<0.1	----	----	----	----
EG020X-T: Zinc	7440-66-6	0.5	mg/kg	<0.5	187 mg/kg	118	71	130
EG020X-T: Vanadium	7440-62-2	1	mg/kg	<1	67.8 mg/kg	112	86	130
EG020T: Total Metals by ICP-MS (QCLot: 539159)								
EG020Y-T: Selenium	7782-49-2	1	mg/kg	<1	----	----	----	----
EG020Y-T: Thallium	7440-28-0	0.1	mg/kg	<0.1	----	----	----	----
EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	1.43 mg/kg	117	81	121
EG020T: Total Metals by ICP-MS (QCLot: 539162)								
EG020Z-T: Silver	7440-22-4	0.1	mg/kg	<0.1	3.16 mg/kg	72.5	72	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 539160)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.09821 mg/kg	116	78	122
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 538774)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	102	86	115
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 541157)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	877 mg/kg	93.6	70	110
				<20	3644 mg/kg	82.7	70	110
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 541158)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 541158) - continued								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	766 mg/kg	81.8	70	110
				<2	1200 mg/kg	97.0	70	110
EP004: Organic Matter (QCLot: 533673)								
EP004: Organic Matter	----	0.5	%	<0.5	2.3 %	88.2	83	115
EP004: Total Organic Carbon	----	0.5	%	<0.5	1.3 %	88.2	85	115
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 534220)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	98.6	74	119
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	90.7	74	118
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	98.2	83	121
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	94.9	81	116
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	104	72	117
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	99.4	72	115
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	101	70	116
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	102	70	134
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	87.5	64	120
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	114	66	119
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	1.5 mg/kg	82.8	59	129
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	1.5 mg/kg	96.6	70	129
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	84.9	76	121
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	91.7	53	135
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	93.3	45	134
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	105	64	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 534218)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	16 mg/kg	98.7	66	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 534219)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	318 mg/kg	89.7	79	123
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	531 mg/kg	89.5	77	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 534218)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	18.5 mg/kg	96.9	66	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 534219)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	428 mg/kg	90.0	81	122
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	395 mg/kg	88.3	74	122
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080: BTEXN (QCLot: 534218)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	101	73	105
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	92.2	73	105

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080: BTEXN (QCLot: 534218) - continued								
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	94.4	67	104
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	96.6	66	106
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	95.9	68	105
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	92.4	72	115

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	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 539161)							
EB1619150-003	17 EB1617705-029	EG005T: Arsenic	7440-38-2	50 mg/kg	92.4	70	130
		EG005T: Barium	7440-39-3	50 mg/kg	117	70	130
EG020T: Total Metals by ICP-MS (QCLot: 539158)							
EB1619150-003	17 EB1617705-029	EG020X-T: Lead	7439-92-1	50 mg/kg	105	70	130
EB1619150-003	17 EB1617705-029	EG020X-T: Beryllium	7440-41-7	5 mg/kg	90.8	70	130
		EG020X-T: Cobalt	7440-48-4	50 mg/kg	126	70	130
		EG020X-T: Chromium	7440-47-3	50 mg/kg	119	70	130
		EG020X-T: Copper	7440-50-8	50 mg/kg	125	70	130
		EG020X-T: Manganese	7439-96-5	50 mg/kg	# Not Determined	70	130
		EG020X-T: Nickel	7440-02-0	50 mg/kg	120	70	130
		EG020X-T: Zinc	7440-66-6	50 mg/kg	115	70	130
		EG020X-T: Vanadium	7440-62-2	50 mg/kg	109	70	130
EG020T: Total Metals by ICP-MS (QCLot: 539159)							
EB1619150-003	17 EB1617705-029	EG020Y-T: Cadmium	7440-43-9	25 mg/kg	119	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 539160)							
EB1619150-003	17 EB1617705-029	EG035T: Mercury	7439-97-6	2.5 mg/kg	122	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 538774)							
EB1619099-005	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	2 mg/kg	98.0	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 541157)							
EB1619150-003	17 EB1617705-029	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	99.2	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 541158)							
EB1619150-003	17 EB1617705-029						

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 541158) - continued							
EB1619150-003	17 EB1617705-029	EK067G: Total Phosphorus as P	----	100 mg/kg	# Not Determined	70	130
EP004: Organic Matter (QCLot: 533673)							
EB1619150-003	17 EB1617705-029	EP004: Organic Matter	----	1.84 %	81.9	70	130
		EP004: Total Organic Carbon	----	1.04 %	81.6	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 534220)							
EB1619150-003	17 EB1617705-029	EP075(SIM): Acenaphthene	83-32-9	1.5 mg/kg	92.4	70	130
		EP075(SIM): Pyrene	129-00-0	1.5 mg/kg	99.5	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 534218)							
EB1619150-003	17 EB1617705-029	EP080: C6 - C9 Fraction	----	8 mg/kg	72.3	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 534219)							
EB1619150-003	17 EB1617705-029	EP071: C10 - C14 Fraction	----	318 mg/kg	88.8	70	130
		EP071: C15 - C28 Fraction	----	531 mg/kg	89.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 534218)							
EB1619150-003	17 EB1617705-029	EP080: C6 - C10 Fraction	C6_C10	8 mg/kg	72.0	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 534219)							
EB1619150-003	17 EB1617705-029	EP071: >C10 - C16 Fraction	----	428 mg/kg	89.7	70	130
		EP071: >C16 - C34 Fraction	----	395 mg/kg	88.6	70	130
EP080: BTEXN (QCLot: 534218)							
EB1619150-003	17 EB1617705-029	EP080: Benzene	71-43-2	2 mg/kg	75.9	70	130
		EP080: Toluene	108-88-3	2 mg/kg	71.4	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB1619150**	Page	: 1 of 8
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Telephone	: +61 7 3552 8634
Project	: B21414 Elk	Date Samples Received	: 28-Jul-2016
Site	: ----	Issue Date	: 09-Aug-2016
Sampler	: CONOR JONES, DANIEL MORAN	No. of samples received	: 3
Order number	: ----	No. of samples analysed	: 3

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: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG020T: Total Metals by ICP-MS	EB1619150--003	17 EB1617705-029	**Manganese**	7439-96-5	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK067G: Total Phosphorus as P by Discrete Analyser	EB1619150--003	17 EB1617705-029	**Total Phosphorus as P**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content							
Soil Glass Jar - Unpreserved							
16 - EB1617705-028,	17 - EB1617705-029	----	----	----	29-Jul-2016	17-Jul-2016	**12**
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved							
16 - EB1617705-028,	17 - EB1617705-029	04-Aug-2016	31-Jul-2016	**4**	05-Aug-2016	31-Jul-2016	**5**
EP004: Organic Matter							
Soil Glass Jar - Unpreserved							
16 - EB1617705-028,	17 - EB1617705-029	----	----	----	02-Aug-2016	31-Jul-2016	**2**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved							
16 - EB1617705-028,	17 - EB1617705-029	29-Jul-2016	17-Jul-2016	**12**	----	----	----
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved							
16 - EB1617705-028,	17 - EB1617705-029	29-Jul-2016	17-Jul-2016	**12**	01-Aug-2016	17-Jul-2016	**15**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved							
16 - EB1617705-028,	17 - EB1617705-029	29-Jul-2016	17-Jul-2016	**12**	01-Aug-2016	17-Jul-2016	**15**
EP080: BTEXN							
Soil Glass Jar - Unpreserved							
16 - EB1617705-028,	17 - EB1617705-029	29-Jul-2016	17-Jul-2016	**12**	01-Aug-2016	17-Jul-2016	**15**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Matrix Spikes (MS)					
Total Metals by ICP-MS - Suite Z	0	2	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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 / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**----**	----	----	**29-Jul-2016**	17-Jul-2016	×
EA150: Particle Sizing							
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H)							
16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**----**	----	----	**03-Aug-2016**	30-Dec-2016	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H)							
M25 - EB1617705-024	**04-Jul-2016**	**----**	----	----	**03-Aug-2016**	31-Dec-2016	✓
EA150: Soil Classification based on Particle Size							
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H)							
16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**----**	----	----	**03-Aug-2016**	30-Dec-2016	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA150H)							
M25 - EB1617705-024	**04-Jul-2016**	**----**	----	----	**03-Aug-2016**	31-Dec-2016	✓
EA152: Soil Particle Density							
Snap Lock Bag - Friable Asbestos/PSD Bag (EA152)							
16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**----**	----	----	**03-Aug-2016**	30-Dec-2016	✓
Snap Lock Bag - Friable Asbestos/PSD Bag (EA152)							
M25 - EB1617705-024	**04-Jul-2016**	**----**	----	----	**03-Aug-2016**	31-Dec-2016	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**04-Aug-2016**	30-Dec-2016	✓	**05-Aug-2016**	30-Dec-2016	✓
EG020T: Total Metals by ICP-MS							
Soil Glass Jar - Unpreserved (EG020Z-T)							
16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**04-Aug-2016**	30-Dec-2016	✓	**05-Aug-2016**	30-Dec-2016	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**04-Aug-2016**	31-Jul-2016	×	**05-Aug-2016**	31-Jul-2016	×
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK059G)							
16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**05-Aug-2016**	30-Dec-2016	✓	**05-Aug-2016**	30-Dec-2016	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Soil Glass Jar - Unpreserved (EK061G)							
16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**05-Aug-2016**	30-Dec-2016	✓	**05-Aug-2016**	30-Dec-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067G: Total Phosphorus as P by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK067G) 16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**05-Aug-2016**	30-Dec-2016	✓	**05-Aug-2016**	30-Dec-2016	✓
EP004: Organic Matter							
Soil Glass Jar - Unpreserved (EP004) 16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**29-Jul-2016**	31-Jul-2016	✓	**02-Aug-2016**	31-Jul-2016	×
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) 16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**29-Jul-2016**	17-Jul-2016	×	**01-Aug-2016**	07-Sep-2016	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071) 16 - EB1617705-028	**03-Jul-2016**	**29-Jul-2016**	17-Jul-2016	×	**01-Aug-2016**	07-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 16 - EB1617705-028	**03-Jul-2016**	**29-Jul-2016**	17-Jul-2016	×	**01-Aug-2016**	17-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 17 - EB1617705-029	**03-Jul-2016**	**29-Jul-2016**	17-Jul-2016	×	**01-Aug-2016**	07-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 17 - EB1617705-029	**03-Jul-2016**	**29-Jul-2016**	17-Jul-2016	×	**01-Aug-2016**	17-Jul-2016	×
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071) 16 - EB1617705-028	**03-Jul-2016**	**29-Jul-2016**	17-Jul-2016	×	**01-Aug-2016**	07-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 16 - EB1617705-028	**03-Jul-2016**	**29-Jul-2016**	17-Jul-2016	×	**01-Aug-2016**	17-Jul-2016	×
Soil Glass Jar - Unpreserved (EP071) 17 - EB1617705-029	**03-Jul-2016**	**29-Jul-2016**	17-Jul-2016	×	**01-Aug-2016**	07-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP080) 17 - EB1617705-029	**03-Jul-2016**	**29-Jul-2016**	17-Jul-2016	×	**01-Aug-2016**	17-Jul-2016	×
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) 16 - EB1617705-028, 17 - EB1617705-029	**03-Jul-2016**	**29-Jul-2016**	17-Jul-2016	×	**01-Aug-2016**	17-Jul-2016	×

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	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	2	2	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Z	EG020Z-T	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	2	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	2	2	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Z	EG020Z-T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	2	2	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite X	EG020X-T	2	2	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Z	EG020Z-T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	2	2	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Z	EG020Z-T	0	2	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Soil Particle Density	* EA152	SOIL	Soil Particle Density by AS 1289.3.5.1-2006 : Methods of testing soils for engineering purposes - Soil classification tests - Determination of the soil particle density of a soil - Standard method
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-MS - Suite X	EG020X-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite Y	EG020Y-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite Z	EG020Z-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by Chemical Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	In house: Referenced to APHA 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Nitrogen as N (TKN + NOx) By Discrete Analyser	EK062G	SOIL	In house: Referenced to APHA 4500 Norg/NO3- Total Nitrogen is determined as the sum of TKN and Oxidised Nitrrogen, each determined seperately as N.
Total Phosporus By Discrete Analyser	EK067G	SOIL	In house: Referenced to APHA 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.
Organic Matter	EP004	SOIL	In house: Referenced to AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to 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.

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	In house: Referenced to APHA 4500 Norg- D; APHA 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Organic Matter	EP004-PR	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to 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.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1619349**	Page	: 1 of 19
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: John Pickering
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61 7 3552 8634
Project	: B21414 Elk FW1	Date Samples Received	: 01-Aug-2016 11:30
Order number	: ----	Date Analysis Commenced	: 02-Aug-2016
C-O-C number	: ----	Issue Date	: 12-Aug-2016 10:29
Sampler	: BRAD HILES, DANIEL MORAN		
Site	: ----		
Quote number	: ----		
No. of samples received	: 17		
No. of samples analysed	: 17		

NATA Accredited Laboratory 825
Accredited for compliance with ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

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
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Andrew Epps	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Greg Vogel	Laboratory Manager	Brisbane External Subcontracting, Stafford, QLD
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Acid Sulfate Soils Supervisor	Brisbane Acid Sulphate Soils, Stafford, QLD

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.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.
~ = Indicates an estimated value.

- It is recognised that EG020T (Total Metals) is less than EG020F (Dissolved Metals) for some samples. However, the difference is within experimental variation of the methods.
- EK067G (Total Phosphorus as P): Sample EB1619349-011 (6D) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EP080: High LCS recovery deemed acceptable as all associated analyte results are less than LOR.
- It is recognised that EP005 (Total Organic Carbon) is less than EP002 (Dissolved Organic Carbon) for some samples. However, the difference is within experimental variation of the methods.
- EP075(SIM): High LCS recovery deemed acceptable as all associated analyte results are less than LOR.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SITE 6	6D	5	4	4D
				Client sampling date / time	25-Jul-2016 09:04	25-Jul-2016 09:04	25-Jul-2016 10:30	25-Jul-2016 12:45	25-Jul-2016 12:45
Compound	CAS Number	LOR	Unit		EB1619349-010	EB1619349-011	EB1619349-012	EB1619349-013	EB1619349-014
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		29.1	27.7	27.2	25.4	23.3
EA150: Particle Sizing									
+75µm	----	1	%		28	----	17	40	----
+150µm	----	1	%		16	----	10	30	----
+300µm	----	1	%		9	----	8	13	----
+425µm	----	1	%		7	----	8	9	----
+600µm	----	1	%		6	----	7	7	----
+1180µm	----	1	%		5	----	5	6	----
+2.36mm	----	1	%		2	----	2	4	----
+4.75mm	----	1	%		<1	----	<1	1	----
+9.5mm	----	1	%		<1	----	<1	<1	----
+19.0mm	----	1	%		<1	----	<1	<1	----
+37.5mm	----	1	%		<1	----	<1	<1	----
+75.0mm	----	1	%		<1	----	<1	<1	----
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%		16	----	21	16	----
Silt (2-60 µm)	----	1	%		55	----	60	39	----
Sand (0.06-2.00 mm)	----	1	%		26	----	16	41	----
Gravel (>2mm)	----	1	%		3	----	3	4	----
Cobbles (>6cm)	----	1	%		<1	----	<1	<1	----
EA152: Soil Particle Density									
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3		2.65	----	2.61	2.67	----
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg		20200	21600	22500	20500	15500
Arsenic	7440-38-2	5	mg/kg		14	14	13	12	7
Barium	7440-39-3	10	mg/kg		80	70	30	40	30
Iron	7439-89-6	50	mg/kg		57400	51300	52000	43300	34000
Strontium	7440-24-6	2	mg/kg		36	38	40	28	30
Tin	7440-31-5	5	mg/kg		<5	<5	<5	<5	<5
EG020T: Total Metals by ICP-MS									
Cadmium	7440-43-9	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
Cobalt	7440-48-4	0.1	mg/kg		23.5	23.2	21.1	21.0	16.4
Chromium	7440-47-3	0.1	mg/kg		45.9	47.8	47.5	48.6	42.9
Copper	7440-50-8	0.1	mg/kg		24.5	28.3	33.4	21.7	19.0

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SITE 6	6D	5	4	4D
				Client sampling date / time	25-Jul-2016 09:04	25-Jul-2016 09:04	25-Jul-2016 10:30	25-Jul-2016 12:45	25-Jul-2016 12:45
Compound	CAS Number	LOR	Unit		EB1619349-010	EB1619349-011	EB1619349-012	EB1619349-013	EB1619349-014
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.1	mg/kg		48.7	51.8	50.4	45.3	37.8
Lead	7439-92-1	0.1	mg/kg		9.6	10.2	10.3	7.7	6.6
Zinc	7440-66-6	0.5	mg/kg		77.2	84.7	89.9	71.8	63.5
Vanadium	7440-62-2	1	mg/kg		63	66	65	68	59
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.3	<0.1	<0.1	<0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		670	540	510	410	350
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		670	540	510	410	350
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		472	492	885	508	465
EP004: Organic Matter									
Organic Matter	----	0.5	%		0.7	0.8	0.9	0.5	0.7
Total Organic Carbon	----	0.5	%		<0.5	<0.5	<0.5	<0.5	<0.5
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SITE 6	6D	5	4	4D
				Client sampling date / time	25-Jul-2016 09:04	25-Jul-2016 09:04	25-Jul-2016 10:30	25-Jul-2016 12:45	25-Jul-2016 12:45
Compound	CAS Number	LOR	Unit		EB1619349-010	EB1619349-011	EB1619349-012	EB1619349-013	EB1619349-014
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
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	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	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	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**101**	**93.9**	**89.0**	**89.6**	**87.6**
2-Chlorophenol-D4	93951-73-6	0.5	%		**104**	**97.4**	**93.7**	**94.9**	**80.6**
2.4.6-Tribromophenol	118-79-6	0.5	%		**74.7**	**64.9**	**63.2**	**70.6**	**55.2**
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SITE 6	6D	5	4	4D
				Client sampling date / time	25-Jul-2016 09:04	25-Jul-2016 09:04	25-Jul-2016 10:30	25-Jul-2016 12:45	25-Jul-2016 12:45
Compound	CAS Number	LOR	Unit		EB1619349-010	EB1619349-011	EB1619349-012	EB1619349-013	EB1619349-014
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		121	113	109	113	106
Anthracene-d10	1719-06-8	0.5	%		94.5	89.4	87.6	91.5	81.6
4-Terphenyl-d14	1718-51-0	0.5	%		120	111	111	120	112
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		110	104	105	100	91.8
Toluene-D8	2037-26-5	0.2	%		101	96.8	97.5	97.6	90.5
4-Bromofluorobenzene	460-00-4	0.2	%		111	107	105	103	97.8

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	10	9	TRIP BLANK	----	----
			Client sampling date / time	26-Jul-2016 13:30	27-Jul-2016 10:30	[23-Jul-2016]	----	----
Compound	CAS Number	LOR	Unit	EB1619349-015	EB1619349-016	EB1619349-017	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	32.2	27.2	<1.0	----	----
EA150: Particle Sizing								
+75µm	----	1	%	44	13	----	----	----
+150µm	----	1	%	40	9	----	----	----
+300µm	----	1	%	33	4	----	----	----
+425µm	----	1	%	28	3	----	----	----
+600µm	----	1	%	23	2	----	----	----
+1180µm	----	1	%	17	2	----	----	----
+2.36mm	----	1	%	11	<1	----	----	----
+4.75mm	----	1	%	3	<1	----	----	----
+9.5mm	----	1	%	<1	<1	----	----	----
+19.0mm	----	1	%	<1	<1	----	----	----
+37.5mm	----	1	%	<1	<1	----	----	----
+75.0mm	----	1	%	<1	<1	----	----	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	18	27	----	----	----
Silt (2-60 µm)	----	1	%	34	59	----	----	----
Sand (0.06-2.00 mm)	----	1	%	35	13	----	----	----
Gravel (>2mm)	----	1	%	13	1	----	----	----
Cobbles (>6cm)	----	1	%	<1	<1	----	----	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.70	2.72	----	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	20100	20700	----	----	----
Arsenic	7440-38-2	5	mg/kg	7	13	----	----	----
Barium	7440-39-3	10	mg/kg	30	40	----	----	----
Iron	7439-89-6	50	mg/kg	42700	55300	----	----	----
Strontium	7440-24-6	2	mg/kg	41	39	----	----	----
Tin	7440-31-5	5	mg/kg	<5	<5	----	----	----
EG020T: Total Metals by ICP-MS								
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	----	----	----
Cobalt	7440-48-4	0.1	mg/kg	20.0	21.2	----	----	----
Chromium	7440-47-3	0.1	mg/kg	48.5	43.1	----	----	----
Copper	7440-50-8	0.1	mg/kg	30.7	37.9	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	10	9	TRIP BLANK	----	----
				Client sampling date / time	26-Jul-2016 13:30	27-Jul-2016 10:30	[23-Jul-2016]	----	----
Compound	CAS Number	LOR	Unit		EB1619349-015	EB1619349-016	EB1619349-017	--------	--------
					Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS - Continued									
Nickel	7440-02-0	0.1	mg/kg		**44.8**	**53.3**	----	----	----
Lead	7439-92-1	0.1	mg/kg		**7.6**	**10.7**	----	----	----
Zinc	7440-66-6	0.5	mg/kg		**69.6**	**94.1**	----	----	----
Vanadium	7440-62-2	1	mg/kg		**70**	**58**	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		<0.1	<0.1	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		**710**	**720**	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		**710**	**720**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		**445**	**643**	----	----	----
EP004: Organic Matter									
Organic Matter	----	0.5	%		**1.5**	**0.9**	----	----	----
Total Organic Carbon	----	0.5	%		**0.9**	**0.5**	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	10	9	TRIP BLANK	----	----
				Client sampling date / time	26-Jul-2016 13:30	27-Jul-2016 10:30	[23-Jul-2016]	----	----
Compound	CAS Number	LOR	Unit		EB1619349-015	EB1619349-016	EB1619349-017	--------	--------
					Result	Result	Result	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**83.6**	**90.8**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**75.9**	**92.4**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**59.7**	**57.8**	----	----	----
EP075(SIM)T: PAH Surrogates									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	10	9	TRIP BLANK	----	----
				Client sampling date / time	26-Jul-2016 13:30	27-Jul-2016 10:30	[23-Jul-2016]	----	----
Compound	CAS Number	LOR	Unit		EB1619349-015	EB1619349-016	EB1619349-017	--------	--------
					Result	Result	Result	----	----
EP075(SIM)T: PAH Surrogates - Continued									
2-Fluorobiphenyl	321-60-8	0.5	%		**109**	**112**	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**85.7**	**83.6**	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**109**	**116**	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**103**	**101**	**110**	----	----
Toluene-D8	2037-26-5	0.2	%		**98.3**	**96.6**	**109**	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**102**	**104**	**112**	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	6	6D	5	4	4D
				Client sampling date / time	25-Jul-2016 09:04	25-Jul-2016 09:04	25-Jul-2016 10:30	25-Jul-2016 12:45	25-Jul-2016 12:45
					EB1619349-001	EB1619349-002	EB1619349-003	EB1619349-004	EB1619349-005
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		**130**	**140**	**6**	**7**	**8**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**66**	**65**	**83**	**38**	**38**
Total Alkalinity as CaCO3	----	1	mg/L		**66**	**65**	**83**	**38**	**38**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**15**	**15**	**31**	**12**	**13**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**2**	**1**	**1**	<1	<1
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**16**	**16**	**25**	**8**	**8**
Magnesium	7439-95-4	1	mg/L		**5**	**5**	**8**	**3**	**3**
Sodium	7440-23-5	1	mg/L		**8**	**8**	**8**	**4**	**4**
Potassium	7440-09-7	1	mg/L		**1**	<1	**1**	<1	<1
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.01**	**0.01**	<0.01	**0.01**	**0.01**
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		**0.005**	**0.005**	**0.003**	**0.006**	**0.006**
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	**0.009**	<0.005
Strontium	7440-24-6	0.001	mg/L		**0.111**	**0.110**	**0.156**	**0.058**	**0.059**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**4.88**	**4.88**	**0.25**	**0.37**	**0.38**
Arsenic	7440-38-2	0.001	mg/L		**0.002**	**0.002**	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		**0.025**	**0.026**	**0.004**	**0.023**	**0.022**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	6	6D	5	4	4D
				Client sampling date / time	25-Jul-2016 09:04	25-Jul-2016 09:04	25-Jul-2016 10:30	25-Jul-2016 12:45	25-Jul-2016 12:45
Compound	CAS Number	LOR	Unit		EB1619349-001	EB1619349-002	EB1619349-003	EB1619349-004	EB1619349-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		**0.008**	**0.008**	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.007**	**0.007**	<0.001	**0.001**	<0.001
Cobalt	7440-48-4	0.001	mg/L		**0.003**	**0.003**	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.008**	**0.008**	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		**0.002**	**0.002**	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		**0.016**	**0.015**	<0.005	<0.005	<0.005
Strontium	7440-24-6	0.001	mg/L		**0.133**	**0.132**	**0.177**	**0.068**	**0.067**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		**0.01**	**0.01**	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L		**8.17**	**8.19**	**0.37**	**0.52**	**0.53**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.08**	**0.03**	**0.06**	**0.05**	**0.07**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.02**	**0.02**	**0.03**	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.02**	**0.02**	**0.03**	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.4**	**0.4**	**0.1**	**0.1**	**0.1**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.4**	**0.4**	**0.1**	**0.1**	**0.1**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.15**	**0.16**	**0.02**	**0.03**	**0.02**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	**0.01**	<0.01	<0.01
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**1.69**	**1.64**	**2.33**	**1.01**	**1.03**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	6	6D	5	4	4D
				Client sampling date / time	25-Jul-2016 09:04	25-Jul-2016 09:04	25-Jul-2016 10:30	25-Jul-2016 12:45	25-Jul-2016 12:45
Compound	CAS Number	LOR	Unit		EB1619349-001	EB1619349-002	EB1619349-003	EB1619349-004	EB1619349-005
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Total Cations	----	0.01	meq/L		1.58	1.56	2.28	0.82	0.82
Ionic Balance	----	0.01	%		----	----	----	----	----
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		3	3	2	2	2
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		3	3	2	1	2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	6	6D	5	4	4D
				Client sampling date / time	25-Jul-2016 09:04	25-Jul-2016 09:04	25-Jul-2016 10:30	25-Jul-2016 12:45	25-Jul-2016 12:45
Compound	CAS Number	LOR	Unit		EB1619349-001	EB1619349-002	EB1619349-003	EB1619349-004	EB1619349-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	<100	<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	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
Subcontracted Analysis									
Total Coliforms	----	1	CFU/100mL		**>80**	**>80**	**>80**	**>80**	**>80**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**35.8**	**44.2**	**31.4**	**38.3**	**32.5**
2-Chlorophenol-D4	93951-73-6	1	%		**71.8**	**83.8**	**69.1**	**80.1**	**73.5**
2.4.6-Tribromophenol	118-79-6	1	%		**86.3**	**99.1**	**79.3**	**94.1**	**87.1**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**79.4**	**88.9**	**74.3**	**86.3**	**79.8**
Anthracene-d10	1719-06-8	1	%		**95.5**	**109**	**89.5**	**102**	**97.4**
4-Terphenyl-d14	1718-51-0	1	%		**106**	**121**	**104**	**116**	**110**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**95.7**	**91.4**	**94.3**	**87.0**	**90.8**
Toluene-D8	2037-26-5	2	%		**97.1**	**99.8**	**97.2**	**97.2**	**94.9**
4-Bromofluorobenzene	460-00-4	2	%		**96.9**	**107**	**99.3**	**108**	**97.1**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	10	9	TB150498 BMTWBM	RINSATE	----
				Client sampling date / time	26-Jul-2016 13:30	27-Jul-2016 10:30	[23-Jul-2016]	[27-Jul-2016]	----
Compound	CAS Number	LOR	Unit		EB1619349-006	EB1619349-007	EB1619349-008	EB1619349-009	--------
					Result	Result	Result	Result	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		3	2	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		104	84	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		104	84	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		74	11	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		5	1	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		31	21	----	----	----
Magnesium	7439-95-4	1	mg/L		16	5	----	----	----
Sodium	7440-23-5	1	mg/L		19	8	----	----	----
Potassium	7440-09-7	1	mg/L		2	<1	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	<0.01	----	<0.01	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Barium	7440-39-3	0.001	mg/L		0.005	0.005	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L		0.008	<0.005	----	<0.005	----
Strontium	7440-24-6	0.001	mg/L		0.225	0.153	----	<0.001	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	----	<0.01	----
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	----	<0.05	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.10	0.09	----	<0.01	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Barium	7440-39-3	0.001	mg/L		0.005	0.006	----	<0.001	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	10	9	TB150498 BMTWBM	RINSATE	----
				Client sampling date / time	26-Jul-2016 13:30	27-Jul-2016 10:30	[23-Jul-2016]	[27-Jul-2016]	----
Compound	CAS Number	LOR	Unit		EB1619349-006	EB1619349-007	EB1619349-008	EB1619349-009	--------
					Result	Result	Result	Result	----
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Copper	7440-50-8	0.001	mg/L		**0.007**	<0.001	----	**0.002**	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	----	<0.005	----
Strontium	7440-24-6	0.001	mg/L		**0.250**	**0.171**	----	<0.001	----
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	----	<0.001	----
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	----	<0.01	----
Iron	7439-89-6	0.05	mg/L		**0.15**	**0.12**	----	<0.05	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	<0.0001	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.08**	**0.02**	----	**0.05**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	----	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.06**	**0.03**	----	**0.01**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.06**	**0.03**	----	**0.01**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		<0.1	<0.1	----	<0.1	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		<0.1	<0.1	----	<0.1	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.05**	**0.02**	----	<0.01	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.03**	<0.01	----	<0.01	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**3.76**	**1.94**	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	10	9	TB150498 BMTWBM	RINSATE	----
				Client sampling date / time	26-Jul-2016 13:30	27-Jul-2016 10:30	[23-Jul-2016]	[27-Jul-2016]	----
Compound	CAS Number	LOR	Unit		EB1619349-006	EB1619349-007	EB1619349-008	EB1619349-009	--------
					Result	Result	Result	Result	----
EN055: Ionic Balance - Continued									
Total Cations	----	0.01	meq/L		3.74	1.81	----	----	----
Ionic Balance	----	0.01	%		0.25	----	----	----	----
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		3	2	----	<1	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		2	2	----	<1	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	----	<1.0	----
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	----	<1.0	----
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	----	<1.0	----
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	----	<1.0	----
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	----	<1.0	----
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	----	<1.0	----
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	----	<1.0	----
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	----	<1.0	----
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	----	<1.0	----
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	----	<1.0	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	----	<1.0	----
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	----	<1.0	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	----	<1.0	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	----	<1.0	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	----	<1.0	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	----	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	----	<0.5	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	----	<100	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	----	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	10	9	TB150498 BMTWBM	RINSATE	----
				Client sampling date / time	26-Jul-2016 13:30	27-Jul-2016 10:30	[23-Jul-2016]	[27-Jul-2016]	----
Compound	CAS Number	LOR	Unit		EB1619349-006	EB1619349-007	EB1619349-008	EB1619349-009	--------
					Result	Result	Result	Result	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	----	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	----	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	<100	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	----	<100	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	<100	----	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	----
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
Subcontracted Analysis									
Total Coliforms	----	1	CFU/100mL		**>80**	**>80**	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**38.2**	**38.8**	----	**37.6**	----
2-Chlorophenol-D4	93951-73-6	1	%		**87.0**	**79.5**	----	**73.7**	----
2.4.6-Tribromophenol	118-79-6	1	%		**77.8**	**74.0**	----	**69.8**	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**95.0**	**84.3**	----	**76.7**	----
Anthracene-d10	1719-06-8	1	%		**98.5**	**84.2**	----	**78.5**	----
4-Terphenyl-d14	1718-51-0	1	%		**109**	**93.5**	----	**87.1**	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**96.2**	**89.2**	**90.2**	**89.5**	----
Toluene-D8	2037-26-5	2	%		**94.1**	**95.5**	**90.1**	**93.3**	----
4-Bromofluorobenzene	460-00-4	2	%		**96.0**	**98.4**	**103**	**100**	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	35	155
2-Chlorophenol-D4	93951-73-6	42	153
2.4.6-Tribromophenol	118-79-6	26	157
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	34	157
Anthracene-d10	1719-06-8	37	153
4-Terphenyl-d14	1718-51-0	42	172
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	53	134
Toluene-D8	2037-26-5	60	131
4-Bromofluorobenzene	460-00-4	59	127

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	72
2-Chlorophenol-D4	93951-73-6	27	130
2.4.6-Tribromophenol	118-79-6	19	181
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	14	146
Anthracene-d10	1719-06-8	35	137
4-Terphenyl-d14	1718-51-0	36	154
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB1619349**	Page	: 1 of 15
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: John Pickering
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61 7 3552 8634
Project	: B21414 Elk FW1	Date Samples Received	: 01-Aug-2016
Order number	: ----	Date Analysis Commenced	: 02-Aug-2016
C-O-C number	: ----	Issue Date	: 12-Aug-2016
Sampler	: BRAD HILES, DANIEL MORAN		
Site	: ----		
Quote number	: ----		
No. of samples received	: 17		
No. of samples analysed	: 17		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Andrew Epps	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Greg Vogel	Laboratory Manager	Brisbane External Subcontracting, Stafford, QLD
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Satishkumar Trivedi	Acid Sulfate Soils Supervisor	Brisbane Acid Sulphate Soils, Stafford, QLD

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

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: 538162)									
EB1619349-010	SITE 6	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	29.1	27.9	4.20	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 540069)									
EB1619188-007	Anonymous	EG005T: Barium	7440-39-3	10	mg/kg	10	10	0.00	No Limit
		EG005T: Strontium	7440-24-6	2	mg/kg	5	5	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	15300	15200	0.809	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	21000	21100	0.558	0% - 20%
EB1619305-009	Anonymous	EG005T: Barium	7440-39-3	10	mg/kg	210	200	0.00	0% - 20%
		EG005T: Strontium	7440-24-6	2	mg/kg	111	109	1.70	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	1430	1380	3.63	0% - 20%
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	22900	22600	1.28	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	36000	35100	2.58	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 540071)									
EB1619349-010	SITE 6	EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	23.5	23.8	1.36	0% - 20%
		EG020X-T: Chromium	7440-47-3	0.1	mg/kg	45.9	46.2	0.680	0% - 20%
		EG020X-T: Copper	7440-50-8	0.1	mg/kg	24.5	24.9	1.66	0% - 20%
		EG020X-T: Nickel	7440-02-0	0.1	mg/kg	48.7	49.4	1.56	0% - 20%
		EG020X-T: Lead	7439-92-1	0.1	mg/kg	9.6	9.8	1.86	0% - 20%
		EG020X-T: Zinc	7440-66-6	0.5	mg/kg	77.2	78.6	1.80	0% - 20%
		EG020X-T: Vanadium	7440-62-2	1	mg/kg	63	64	1.68	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 540072)									
EB1619349-010	SITE 6	EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 540070)									
EB1619496-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.1	0.00	No Limit
EB1619349-010	SITE 6	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 538774)									
EB1619151-030	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EB1619099-001	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 540031)									
EB1619349-010	SITE 6	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	670	620	7.79	0% - 20%
ME1601048-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	430	420	0.00	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 540030)									
EB1619349-010	SITE 6	EK067G: Total Phosphorus as P	----	2	mg/kg	472	417	12.4	0% - 20%
ME1601048-004	Anonymous	EK067G: Total Phosphorus as P	----	2	mg/kg	141	139	1.49	0% - 20%
EP004: Organic Matter (QC Lot: 536905)									
EB1619349-010	SITE 6	EP004: Organic Matter	----	0.5	%	0.7	0.7	0.00	No Limit
		EP004: Total Organic Carbon	----	0.5	%	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 538160)									
EB1619349-010	SITE 6	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 538159)									
EB1619349-010	SITE 6	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 538161)									
EB1619349-010	SITE 6	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

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 538159)									
EB1619349-010	SITE 6	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: 538161)									
EB1619349-010	SITE 6	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	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 538159)									
EB1619349-010	SITE 6	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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 sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 537582)									
EB1619349-001	6	EA025: Suspended Solids (SS)	----	1	mg/L	130	143	9.66	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 539309)									
EB1619349-002	6D	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	65	65	0.00	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	65	65	0.00	0% - 20%
EB1619355-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	226	225	0.00	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	226	225	0.00	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 536929)									
EB1619360-009	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2620	2620	0.00	0% - 20%
EB1619349-001	6	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	15	14	0.00	0% - 50%
ED045G: Chloride by Discrete Analyser (QC Lot: 536930)									
EB1619349-001	6	ED045G: Chloride	16887-00-6	1	mg/L	2	1	0.00	No Limit
ED093F: Dissolved Major Cations (QC Lot: 538900)									
EB1619349-007	9	ED093F: Calcium	7440-70-2	1	mg/L	21	21	0.00	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	5	6	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	8	8	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
EB1619316-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	65	65	0.00	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	98	96	2.42	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	835	822	1.55	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 (%)*
ED093F: Dissolved Major Cations (QC Lot: 538900) - continued									
EB1619316-001	Anonymous	ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 538898)									
EB1619349-007	9	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EB1619316-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.108	0.106	1.55	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.047	0.046	0.00	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.052	0.051	2.64	0% - 50%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 538899)									
EB1619349-007	9	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.153	0.152	0.00	0% - 20%
EB1619316-001	Anonymous	EG020B-F: Strontium	7440-24-6	0.001	mg/L	2.88	2.82	2.16	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 538819)									
EB1618725-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.079	0.078	1.53	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 538819) - continued									
EB1618725-002	Anonymous	EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EB1619342-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.252	0.256	1.78	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.111	0.113	1.57	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.016	0.016	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 538820)									
EB1618725-002	Anonymous	EG020B-T: Strontium	7440-24-6	0.001	mg/L	0.822	0.830	1.05	0% - 20%
EB1619342-001	Anonymous	EG020B-T: Strontium	7440-24-6	0.001	mg/L	2.05	1.99	3.07	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 538901)									
EB1619349-009	RINSATE	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EB1619316-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 538949)									
EB1618725-002	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EB1619349-003	5	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 538300)									
EB1619349-001	6	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.04	72.6	No Limit
EB1619363-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.01	59.2	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 536927)									
EB1619360-009	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB1619349-001	6	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 538301)									
EB1619349-001	6	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.00	No Limit
EB1619363-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 537197)									
EB1618725-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.2	40.5	No Limit
EB1619349-003	5	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	<0.1	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 (%)*
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 537198)									
EB1618725-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.01	0.00	No Limit
EB1619349-003	5	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 536928)									
EB1619360-009	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB1619349-001	6	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP002: Dissolved Organic Carbon (DOC) (QC Lot: 540250)									
EB1619349-001	6	EP002: Dissolved Organic Carbon	----	1	mg/L	3	3	0.00	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 540255)									
EB1619349-001	6	EP005: Total Organic Carbon	----	1	mg/L	3	3	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 540847)									
EB1619349-001	6	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 540847)									
EB1619349-001	6	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 540847)									
EB1619349-001	6	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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 Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 540069)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	118.9 mg/kg	90.5	84	123
EG005T: Barium	7440-39-3	10	mg/kg	<10	105.1967 mg/kg	92.9	89	129
EG005T: Iron	7439-89-6	50	mg/kg	<50	34900 mg/kg	92.0	70	120
EG005T: Strontium	7440-24-6	2	mg/kg	<2	44.50816 mg/kg	116	83	117
EG005T: Tin	7440-31-5	5	mg/kg	<5	5.7 mg/kg	92.2	75	130
EG020T: Total Metals by ICP-MS (QCLot: 540071)								
EG020X-T: Cobalt	7440-48-4	0.1	mg/kg	<0.1	11.6 mg/kg	101	88	129
EG020X-T: Chromium	7440-47-3	0.1	mg/kg	<0.1	22.9 mg/kg	94.1	75	130
EG020X-T: Copper	7440-50-8	0.1	mg/kg	<0.1	52.9 mg/kg	99.2	84	120
EG020X-T: Nickel	7440-02-0	0.1	mg/kg	<0.1	16.1 mg/kg	97.2	89	127
EG020X-T: Lead	7439-92-1	0.1	mg/kg	<0.1	66.3 mg/kg	96.8	85	117
EG020X-T: Zinc	7440-66-6	0.5	mg/kg	<0.5	187 mg/kg	103	71	130
EG020X-T: Vanadium	7440-62-2	1	mg/kg	<1	67.8 mg/kg	97.1	86	130
EG020T: Total Metals by ICP-MS (QCLot: 540072)								
EG020Y-T: Cadmium	7440-43-9	0.1	mg/kg	<0.1	1.43 mg/kg	103	81	121
EG035T: Total Recoverable Mercury by FIMS (QCLot: 540070)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.09821 mg/kg	107	78	122
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 538774)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	102	86	115
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 540031)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	877 mg/kg	78.7	70	110
				<20	3644 mg/kg	70.4	70	110
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 540030)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	766 mg/kg	78.8	70	110
				<2	1200 mg/kg	83.5	70	110
EP004: Organic Matter (QCLot: 536905)								
EP004: Organic Matter	----	0.5	%	<0.5	2.3 %	92.2	83	115
EP004: Total Organic Carbon	----	0.5	%	<0.5	1.3 %	92.2	85	115
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 538160)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.5 mg/kg	100.0	74	119
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.5 mg/kg	93.7	74	118
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.5 mg/kg	99.0	83	121

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 538160) - continued								
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	1.5 mg/kg	105	81	116
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.5 mg/kg	102	72	117
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	1.5 mg/kg	94.7	72	115
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.5 mg/kg	99.3	70	116
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	1.5 mg/kg	98.1	70	134
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.5 mg/kg	82.4	64	120
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	1.5 mg/kg	108	66	119
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	1.5 mg/kg	108	59	129
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	1.5 mg/kg	94.8	70	129
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.5 mg/kg	82.7	76	121
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.5 mg/kg	109	53	135
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.5 mg/kg	118	45	134
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	1.5 mg/kg	119	64	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 538159)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	16 mg/kg	105	66	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 538161)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	318 mg/kg	81.7	79	123
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	531 mg/kg	78.2	77	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 538159)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	18.5 mg/kg	106	66	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 538161)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	428 mg/kg	84.2	81	122
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	395 mg/kg	76.4	74	122
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080: BTEXN (QCLot: 538159)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	103	73	105
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	89.4	73	105
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	# 105	67	104
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	106	66	106
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	105	68	105
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	103	72	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 537582)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 537582) - continued								
EA025: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	98.7	84	120
				<1	1000 mg/L	92.9	84	120
ED037P: Alkalinity by PC Titrator (QCLot: 539309)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	100	80	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 536929)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	104	85	118
				<1	100 mg/L	96.5	85	118
ED045G: Chloride by Discrete Analyser (QCLot: 536930)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	94.7	90	115
				<1	1000 mg/L	102	90	115
ED093F: Dissolved Major Cations (QCLot: 538900)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
ED093F: Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
ED093F: Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
ED093F: Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 538898)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	106	79	118
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	108	88	116
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.5 mg/L	107	70	130
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	105	88	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	104	87	113
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	105	86	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	108	88	114
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	108	89	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	106	89	113
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	108	86	112
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	112	88	114
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	101	87	113
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	82	114
EG020F: Dissolved Metals by ICP-MS (QCLot: 538899)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.5 mg/L	99.9	86	111
EG020T: Total Metals by ICP-MS (QCLot: 538819)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	109	80	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	109	88	112
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.5 mg/L	108	70	130
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.3	88	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	110	89	115
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	106	89	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 538819) - continued								
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	106	88	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	104	89	112
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	111	88	116
EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	99.4	86	116
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	107	87	114
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	104	84	114
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	108	82	118
EG020T: Total Metals by ICP-MS (QCLot: 538820)								
EG020B-T: Strontium	7440-24-6	0.001	mg/L	<0.001	0.5 mg/L	111	86	112
EG035F: Dissolved Mercury by FIMS (QCLot: 538901)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	93.8	84	118
EG035T: Total Recoverable Mercury by FIMS (QCLot: 538949)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	94.6	80	100
EK055G: Ammonia as N by Discrete Analyser (QCLot: 538300)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	93.4	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 536927)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	95.9	90	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 538301)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.7	89	115
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 537197)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	90.2	70	111
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 537198)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	106	77	109
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 536928)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	98.3	88	115
EP002: Dissolved Organic Carbon (DOC) (QCLot: 540250)								
EP002: Dissolved Organic Carbon	----	1	mg/L	<1	10 mg/L	107	80	112
				<1	100 mg/L	112	80	112
EP005: Total Organic Carbon (TOC) (QCLot: 540255)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	110	79	113
				<1	100 mg/L	112	79	113
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 536932)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	10 µg/L	# 102	47	101
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	10 µg/L	90.5	46	109
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	10 µg/L	88.0	50	104
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	10 µg/L	92.3	50	114
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	10 µg/L	87.1	49	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 536932) - continued								
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	10 µg/L	90.5	48	113
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	10 µg/L	87.8	48	120
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	10 µg/L	88.9	48	119
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	10 µg/L	94.2	48	125
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	10 µg/L	83.2	45	119
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	10 µg/L	84.7	43	130
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	10 µg/L	89.6	46	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	10 µg/L	91.8	49	125
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	10 µg/L	96.8	40	132
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	10 µg/L	102	42	140
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	10 µg/L	96.5	39	136
EP080/071: Total Petroleum Hydrocarbons (QCLot: 536933)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	1211 µg/L	84.0	38	114
EP071: C15 - C28 Fraction	----	100	µg/L	<100	2103 µg/L	89.6	50	132
EP071: C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 540847)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	160 µg/L	101	76	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 536933)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	1696 µg/L	86.5	43	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	1496 µg/L	91.2	49	134
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 540847)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	185 µg/L	102	75	123
EP080: C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080: BTEXN (QCLot: 540847)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	92.9	77	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	90.3	78	122
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	92.6	78	119
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	20 µg/L	89.8	77	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	95.4	76	121
EP080: Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----
EP080: Sum of BTEX	----	1	µg/L	<1	----	----	----	----
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	87.7	75	120

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 540069)							
EB1619188-008	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	99.8	70	130
		EG005T: Barium	7440-39-3	50 mg/kg	112	70	130
EG020T: Total Metals by ICP-MS (QCLot: 540071)							
EB1619349-011	6D	EG020X-T: Cobalt	7440-48-4	50 mg/kg	101	70	130
		EG020X-T: Chromium	7440-47-3	50 mg/kg	95.4	70	130
		EG020X-T: Copper	7440-50-8	50 mg/kg	93.3	70	130
		EG020X-T: Nickel	7440-02-0	50 mg/kg	96.2	70	130
		EG020X-T: Lead	7439-92-1	50 mg/kg	90.8	70	130
		EG020X-T: Zinc	7440-66-6	50 mg/kg	93.6	70	130
		EG020X-T: Vanadium	7440-62-2	50 mg/kg	97.6	70	130
EG020T: Total Metals by ICP-MS (QCLot: 540072)							
EB1619349-011	6D	EG020Y-T: Cadmium	7440-43-9	25 mg/kg	101	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 540070)							
EB1619349-011	6D	EG035T: Mercury	7439-97-6	2.5 mg/kg	120	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 538774)							
EB1619099-005	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	2 mg/kg	98.0	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 540031)							
EB1619349-011	6D	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	95.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 540030)							
EB1619349-011	6D	EK067G: Total Phosphorus as P	----	100 mg/kg	# 132	70	130
EP004: Organic Matter (QCLot: 536905)							
EB1619349-011	6D	EP004: Organic Matter	----	1.84 %	80.3	70	130
		EP004: Total Organic Carbon	----	1.04 %	80.4	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 538160)							
EB1619349-011	6D	EP075(SIM): Acenaphthene	83-32-9	1.5 mg/kg	91.4	70	130
		EP075(SIM): Pyrene	129-00-0	1.5 mg/kg	106	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 538159)							
EB1619349-011	6D	EP080: C6 - C9 Fraction	----	8 mg/kg	94.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 538161)							
EB1619349-011	6D	EP071: C10 - C14 Fraction	----	318 mg/kg	83.7	70	130
		EP071: C15 - C28 Fraction	----	531 mg/kg	80.9	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 538159)							

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 538159) - continued							
EB1619349-011	6D	EP080: C6 - C10 Fraction	C6_C10	8 mg/kg	96.4	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 538161)							
EB1619349-011	6D	EP071: >C10 - C16 Fraction	----	428 mg/kg	83.4	70	130
		EP071: >C16 - C34 Fraction	----	395 mg/kg	80.2	70	130
EP080: BTEXN (QCLot: 538159)							
EB1619349-011	6D	EP080: Benzene	71-43-2	2 mg/kg	89.3	70	130
		EP080: Toluene	108-88-3	2 mg/kg	79.6	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 536929)							
EB1619349-002	6D	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	95.3	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 536930)							
EB1619349-002	6D	ED045G: Chloride	16887-00-6	400 mg/L	111	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 538898)							
EB1619342-001	Anonymous	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	103	70	130
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	103	70	130
		EG020A-F: Barium	7440-39-3	0.5 mg/L	109	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	104	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	99.2	70	130
		EG020A-F: Cobalt	7440-48-4	0.1 mg/L	97.8	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	101	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	99.2	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	99.2	70	130
		EG020A-F: Tin	7440-31-5	0.1 mg/L	82.5	70	130
		EG020A-F: Vanadium	7440-62-2	0.1 mg/L	92.6	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	101	70	130
EG020T: Total Metals by ICP-MS (QCLot: 538819)							
EB1618986-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	114	70	130
		EG020A-T: Barium	7440-39-3	1 mg/L	130	70	130
		EG020A-T: Cadmium	7440-43-9	0.5 mg/L	114	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	100	70	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	100	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	96.1	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	101	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	97.4	70	130
		EG020A-T: Vanadium	7440-62-2	1 mg/L	105	70	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*
EG020T: Total Metals by ICP-MS (QCLot: 538819) - continued							
EB1618986-001	Anonymous	EG020A-T: Zinc	7440-66-6	1 mg/L	98.0	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 538901)							
EB1619342-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	89.1	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 538949)							
EB1618986-001	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	71.9	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 538300)							
EB1619349-002	6D	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	83.1	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 536927)							
EB1619349-002	6D	EK057G: Nitrite as N	14797-65-0	0.4 mg/L	95.9	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 538301)							
EB1619349-002	6D	EK059G: Nitrite + Nitrate as N	----	0.4 mg/L	98.2	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 537197)							
EB1619132-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	# Not Determined	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 537198)							
EB1619132-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	# Not Determined	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 536928)							
EB1619349-002	6D	EK071G: Reactive Phosphorus as P	14265-44-2	0.4 mg/L	107	70	130
EP002: Dissolved Organic Carbon (DOC) (QCLot: 540250)							
EB1619349-002	6D	EP002: Dissolved Organic Carbon	----	100 mg/L	111	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 540255)							
EB1619349-002	6D	EP005: Total Organic Carbon	----	100 mg/L	113	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 540847)							
EB1619349-002	6D	EP080: C6 - C9 Fraction	----	40 µg/L	102	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 540847)							
EB1619349-002	6D	EP080: C6 - C10 Fraction	C6_C10	40 µg/L	106	70	130
EP080: BTEXN (QCLot: 540847)							
EB1619349-002	6D	EP080: Benzene	71-43-2	10 µg/L	91.8	70	130
		EP080: Toluene	108-88-3	10 µg/L	82.2	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB1619349**	Page	: 1 of 21
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Telephone	: +61 7 3552 8634
Project	: B21414 Elk FW1	Date Samples Received	: 01-Aug-2016
Site	: ----	Issue Date	: 12-Aug-2016
Sampler	: BRAD HILES, DANIEL MORAN	No. of samples received	: 17
Order number	: ----	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.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **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: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP080: BTEXN	QC-538159-002	----	**Ethylbenzene**	100-41-4	105 %	67-104%	**Recovery greater than upper control limit**
Matrix Spike (MS) Recoveries							
EK067G: Total Phosphorus as P by Discrete Analyser	EB1619349--011	6D	**Total Phosphorus as P**	----	132 %	70-130%	**Recovery greater than upper data quality objective**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	QC-536932-002	----	**Naphthalene**	91-20-3	102 %	47-101%	**Recovery greater than upper control limit**
Matrix Spike (MS) Recoveries							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser	EB1619132--001	Anonymous	**Total Kjeldahl Nitrogen as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK067G: Total Phosphorus as P by Discrete Analyser	EB1619132--001	Anonymous	**Total Phosphorus as P**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / **Container** / Client Sample ID(s)	*Extraction / Preparation*			*Analysis*		
	Date extracted	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA025: Total Suspended Solids dried at 104 ± 2°C						
Clear Plastic Bottle - Natural						
6, 6D, 5, 4, 4D	----	----	----	03-Aug-2016	01-Aug-2016	**2**
Clear Plastic Bottle - Natural						
10	----	----	----	03-Aug-2016	02-Aug-2016	**1**
EK057G: Nitrite as N by Discrete Analyser						
Amber Glass Bottle - Unpreserved						
RINSATE	----	----	----	02-Aug-2016	29-Jul-2016	**4**
Clear Plastic Bottle - Natural						
6, 6D, 5, 4, 4D	----	----	----	02-Aug-2016	27-Jul-2016	**6**
Clear Plastic Bottle - Natural						
10	----	----	----	02-Aug-2016	28-Jul-2016	**5**

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK057G: Nitrite as N by Discrete Analyser - Analysis Holding Time Compliance						
Clear Plastic Bottle - Natural						
9	----	----	----	02-Aug-2016	29-Jul-2016	**4**
EK071G: Reactive Phosphorus as P by discrete analyser						
Amber Glass Bottle - Unpreserved						
RINSATE	----	----	----	02-Aug-2016	29-Jul-2016	**4**
Clear Plastic Bottle - Natural						
6, 6D, 5, 4, 4D	----	----	----	02-Aug-2016	27-Jul-2016	**6**
Clear Plastic Bottle - Natural						
10	----	----	----	02-Aug-2016	28-Jul-2016	**5**
Clear Plastic Bottle - Natural						
9	----	----	----	02-Aug-2016	29-Jul-2016	**4**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
Amber Glass Bottle - Unpreserved						
6, 6D, 5, 4, 4D	02-Aug-2016	01-Aug-2016	**1**	----	----	----
EP080/071: Total Petroleum Hydrocarbons						
Amber Glass Bottle - Unpreserved						
6, 6D, 5, 4, 4D	02-Aug-2016	01-Aug-2016	**1**	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions						
Amber Glass Bottle - Unpreserved						
6, 6D, 5, 4, 4D	02-Aug-2016	01-Aug-2016	**1**	----	----	----

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	8	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	8	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	8	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	8	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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 / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103) TRIP BLANK	**23-Jul-2016**	**----**	----	----	**03-Aug-2016**	06-Aug-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) SITE 6, 6D, 5, 4, 4D	**25-Jul-2016**	**----**	----	----	**03-Aug-2016**	08-Aug-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) 10	**26-Jul-2016**	**----**	----	----	**03-Aug-2016**	09-Aug-2016	✓
Soil Glass Jar - Unpreserved (EA055-103) 9	**27-Jul-2016**	**----**	----	----	**03-Aug-2016**	10-Aug-2016	✓
EA150: Particle Sizing							
Snap Lock Bag - ACM/Asbestos Grab Bag (EA150H) SITE 6, 5, 4	**25-Jul-2016**	**----**	----	----	**12-Aug-2016**	21-Jan-2017	✓
Snap Lock Bag - ACM/Asbestos Grab Bag (EA150H) 10	**26-Jul-2016**	**----**	----	----	**12-Aug-2016**	22-Jan-2017	✓
Snap Lock Bag - ACM/Asbestos Grab Bag (EA150H) 9	**27-Jul-2016**	**----**	----	----	**12-Aug-2016**	23-Jan-2017	✓
EA150: Soil Classification based on Particle Size							
Snap Lock Bag - ACM/Asbestos Grab Bag (EA150H) SITE 6, 5, 4	**25-Jul-2016**	**----**	----	----	**12-Aug-2016**	21-Jan-2017	✓
Snap Lock Bag - ACM/Asbestos Grab Bag (EA150H) 10	**26-Jul-2016**	**----**	----	----	**12-Aug-2016**	22-Jan-2017	✓
Snap Lock Bag - ACM/Asbestos Grab Bag (EA150H) 9	**27-Jul-2016**	**----**	----	----	**12-Aug-2016**	23-Jan-2017	✓
EA152: Soil Particle Density							
Snap Lock Bag - ACM/Asbestos Grab Bag (EA152) SITE 6, 5, 4	**25-Jul-2016**	**----**	----	----	**12-Aug-2016**	21-Jan-2017	✓
Snap Lock Bag - ACM/Asbestos Grab Bag (EA152) 10	**26-Jul-2016**	**----**	----	----	**12-Aug-2016**	22-Jan-2017	✓
Snap Lock Bag - ACM/Asbestos Grab Bag (EA152) 9	**27-Jul-2016**	**----**	----	----	**12-Aug-2016**	23-Jan-2017	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) SITE 6, 5, 4D, 6D, 4,	**25-Jul-2016**	**05-Aug-2016**	21-Jan-2017	✓	**08-Aug-2016**	21-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG005T) 10	**26-Jul-2016**	**05-Aug-2016**	22-Jan-2017	✓	**08-Aug-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG005T) 9	**27-Jul-2016**	**05-Aug-2016**	23-Jan-2017	✓	**08-Aug-2016**	23-Jan-2017	✓
EG020T: Total Metals by ICP-MS							
Soil Glass Jar - Unpreserved (EG020Y-T) SITE 6, 5, 4D, 6D, 4,	**25-Jul-2016**	**05-Aug-2016**	21-Jan-2017	✓	**08-Aug-2016**	21-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG020Y-T) 10	**26-Jul-2016**	**05-Aug-2016**	22-Jan-2017	✓	**08-Aug-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EG020Y-T) 9	**27-Jul-2016**	**05-Aug-2016**	23-Jan-2017	✓	**08-Aug-2016**	23-Jan-2017	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) SITE 6, 5, 4D, 6D, 4,	**25-Jul-2016**	**05-Aug-2016**	22-Aug-2016	✓	**08-Aug-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EG035T) 10	**26-Jul-2016**	**05-Aug-2016**	23-Aug-2016	✓	**08-Aug-2016**	23-Aug-2016	✓
Soil Glass Jar - Unpreserved (EG035T) 9	**27-Jul-2016**	**05-Aug-2016**	24-Aug-2016	✓	**08-Aug-2016**	24-Aug-2016	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK059G) SITE 6, 5, 4D, 6D, 4,	**25-Jul-2016**	**05-Aug-2016**	21-Jan-2017	✓	**05-Aug-2016**	21-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK059G) 10	**26-Jul-2016**	**05-Aug-2016**	22-Jan-2017	✓	**05-Aug-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK059G) 9	**27-Jul-2016**	**05-Aug-2016**	23-Jan-2017	✓	**05-Aug-2016**	23-Jan-2017	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Soil Glass Jar - Unpreserved (EK061G) SITE 6, 6D, 5, 4, 4D	**25-Jul-2016**	**05-Aug-2016**	21-Jan-2017	✓	**08-Aug-2016**	21-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK061G) 10	**26-Jul-2016**	**05-Aug-2016**	22-Jan-2017	✓	**08-Aug-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK061G) 9	**27-Jul-2016**	**05-Aug-2016**	23-Jan-2017	✓	**08-Aug-2016**	23-Jan-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK067G) SITE 6, 6D, 5, 4, 4D	**25-Jul-2016**	**05-Aug-2016**	21-Jan-2017	✓	**08-Aug-2016**	21-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK067G) 10	**26-Jul-2016**	**05-Aug-2016**	22-Jan-2017	✓	**08-Aug-2016**	22-Jan-2017	✓
Soil Glass Jar - Unpreserved (EK067G) 9	**27-Jul-2016**	**05-Aug-2016**	23-Jan-2017	✓	**08-Aug-2016**	23-Jan-2017	✓
EP004: Organic Matter							
Soil Glass Jar - Unpreserved (EP004) SITE 6, 6D, 5, 4, 4D	**25-Jul-2016**	**05-Aug-2016**	22-Aug-2016	✓	**08-Aug-2016**	22-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP004) 10	**26-Jul-2016**	**05-Aug-2016**	23-Aug-2016	✓	**08-Aug-2016**	23-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP004) 9	**27-Jul-2016**	**05-Aug-2016**	24-Aug-2016	✓	**08-Aug-2016**	24-Aug-2016	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) SITE 6, 6D, 5, 4, 4D	**25-Jul-2016**	**04-Aug-2016**	08-Aug-2016	✓	**05-Aug-2016**	13-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) 10	**26-Jul-2016**	**04-Aug-2016**	09-Aug-2016	✓	**05-Aug-2016**	13-Sep-2016	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) 9	**27-Jul-2016**	**04-Aug-2016**	10-Aug-2016	✓	**05-Aug-2016**	13-Sep-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) TRIP BLANK	**23-Jul-2016**	**04-Aug-2016**	06-Aug-2016	✓	**05-Aug-2016**	06-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) SITE 6, 6D, 5, 4, 4D	**25-Jul-2016**	**04-Aug-2016**	08-Aug-2016	✓	**05-Aug-2016**	08-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 10	**26-Jul-2016**	**04-Aug-2016**	09-Aug-2016	✓	**05-Aug-2016**	09-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 9	**27-Jul-2016**	**04-Aug-2016**	10-Aug-2016	✓	**05-Aug-2016**	10-Aug-2016	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) TRIP BLANK	**23-Jul-2016**	**04-Aug-2016**	06-Aug-2016	✓	**05-Aug-2016**	06-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) SITE 6, 6D, 5, 4, 4D	**25-Jul-2016**	**04-Aug-2016**	08-Aug-2016	✓	**05-Aug-2016**	08-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 10	**26-Jul-2016**	**04-Aug-2016**	09-Aug-2016	✓	**05-Aug-2016**	09-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 9	**27-Jul-2016**	**04-Aug-2016**	10-Aug-2016	✓	**05-Aug-2016**	10-Aug-2016	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) TRIP BLANK	**23-Jul-2016**	**04-Aug-2016**	06-Aug-2016	✓	**05-Aug-2016**	06-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) SITE 6, 6D, 5, 4, 4D	**25-Jul-2016**	**04-Aug-2016**	08-Aug-2016	✓	**05-Aug-2016**	08-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 10	**26-Jul-2016**	**04-Aug-2016**	09-Aug-2016	✓	**05-Aug-2016**	09-Aug-2016	✓
Soil Glass Jar - Unpreserved (EP080) 9	**27-Jul-2016**	**04-Aug-2016**	10-Aug-2016	✓	**05-Aug-2016**	10-Aug-2016	✓

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

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
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025) 6, 6D, 5, 4, 4D	**25-Jul-2016**	**----**	----	----	**03-Aug-2016**	01-Aug-2016	×
Clear Plastic Bottle - Natural (EA025) 10	**26-Jul-2016**	**----**	----	----	**03-Aug-2016**	02-Aug-2016	×
Clear Plastic Bottle - Natural (EA025) 9	**27-Jul-2016**	**----**	----	----	**03-Aug-2016**	03-Aug-2016	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) 6, 6D, 5, 4, 4D	**25-Jul-2016**	**----**	----	----	**04-Aug-2016**	08-Aug-2016	✓
Clear Plastic Bottle - Natural (ED037-P) 10	**26-Jul-2016**	**----**	----	----	**04-Aug-2016**	09-Aug-2016	✓
Clear Plastic Bottle - Natural (ED037-P) 9	**27-Jul-2016**	**----**	----	----	**04-Aug-2016**	10-Aug-2016	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) 6, 6D, 5, 4, 4D	**25-Jul-2016**	**----**	----	----	**02-Aug-2016**	22-Aug-2016	✓
Clear Plastic Bottle - Natural (ED041G) 10	**26-Jul-2016**	**----**	----	----	**02-Aug-2016**	23-Aug-2016	✓
Clear Plastic Bottle - Natural (ED041G) 9	**27-Jul-2016**	**----**	----	----	**02-Aug-2016**	24-Aug-2016	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) 6, 6D, 5, 4, 4D	**25-Jul-2016**	**----**	----	----	**02-Aug-2016**	22-Aug-2016	✓
Clear Plastic Bottle - Natural (ED045G) 10	**26-Jul-2016**	**----**	----	----	**02-Aug-2016**	23-Aug-2016	✓
Clear Plastic Bottle - Natural (ED045G) 9	**27-Jul-2016**	**----**	----	----	**02-Aug-2016**	24-Aug-2016	✓

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
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 6, 6D, 5, 4, 4D	**25-Jul-2016**	**----**	----	----	**05-Aug-2016**	22-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 10	**26-Jul-2016**	**----**	----	----	**05-Aug-2016**	23-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 9	**27-Jul-2016**	**----**	----	----	**05-Aug-2016**	24-Aug-2016	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 6, 6D, 5, 4, 4D	**25-Jul-2016**	**----**	----	----	**05-Aug-2016**	21-Jan-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 10	**26-Jul-2016**	**----**	----	----	**05-Aug-2016**	22-Jan-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 9, RINSATE	**27-Jul-2016**	**----**	----	----	**05-Aug-2016**	23-Jan-2017	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 6, 6D, 5, 4, 4D	**25-Jul-2016**	**05-Aug-2016**	21-Jan-2017	✓	**05-Aug-2016**	21-Jan-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 10	**26-Jul-2016**	**05-Aug-2016**	22-Jan-2017	✓	**05-Aug-2016**	22-Jan-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 9, RINSATE	**27-Jul-2016**	**05-Aug-2016**	23-Jan-2017	✓	**05-Aug-2016**	23-Jan-2017	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 6, 6D, 5, 4, 4D	**25-Jul-2016**	**----**	----	----	**05-Aug-2016**	22-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 10	**26-Jul-2016**	**----**	----	----	**05-Aug-2016**	23-Aug-2016	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 9, RINSATE	**27-Jul-2016**	**----**	----	----	**05-Aug-2016**	24-Aug-2016	✓

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
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T)							
6, 5, 4D	**25-Jul-2016**	**----**	----	----	**05-Aug-2016**	22-Aug-2016	✓
6D, 4,							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T)							
10	**26-Jul-2016**	**----**	----	----	**05-Aug-2016**	23-Aug-2016	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T)							
9, RINSATE	**27-Jul-2016**	**----**	----	----	**05-Aug-2016**	24-Aug-2016	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
6, 5, 4D	**25-Jul-2016**	**----**	----	----	**05-Aug-2016**	22-Aug-2016	✓
6D, 4,							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
10	**26-Jul-2016**	**----**	----	----	**05-Aug-2016**	23-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
9, RINSATE	**27-Jul-2016**	**----**	----	----	**05-Aug-2016**	24-Aug-2016	✓
EK057G: Nitrite as N by Discrete Analyser							
Amber Glass Bottle - Unpreserved (EK057G)							
RINSATE	**27-Jul-2016**	**----**	----	----	**02-Aug-2016**	29-Jul-2016	×
Clear Plastic Bottle - Natural (EK057G)							
6, 5, 4D	**25-Jul-2016**	**----**	----	----	**02-Aug-2016**	27-Jul-2016	×
6D, 4,							
Clear Plastic Bottle - Natural (EK057G)							
10	**26-Jul-2016**	**----**	----	----	**02-Aug-2016**	28-Jul-2016	×
Clear Plastic Bottle - Natural (EK057G)							
9	**27-Jul-2016**	**----**	----	----	**02-Aug-2016**	29-Jul-2016	×
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
6, 5, 4D	**25-Jul-2016**	**----**	----	----	**05-Aug-2016**	22-Aug-2016	✓
6D, 4,							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
10	**26-Jul-2016**	**----**	----	----	**05-Aug-2016**	23-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
9, RINSATE	**27-Jul-2016**	**----**	----	----	**05-Aug-2016**	24-Aug-2016	✓

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
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) 6, 5, 4D / 6D, 4,	**25-Jul-2016**	**03-Aug-2016**	22-Aug-2016	✓	**03-Aug-2016**	22-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 10	**26-Jul-2016**	**03-Aug-2016**	23-Aug-2016	✓	**03-Aug-2016**	23-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 9, / RINSATE	**27-Jul-2016**	**03-Aug-2016**	24-Aug-2016	✓	**03-Aug-2016**	24-Aug-2016	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) 6, 5, 4D / 6D, 4,	**25-Jul-2016**	**03-Aug-2016**	22-Aug-2016	✓	**03-Aug-2016**	22-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 10	**26-Jul-2016**	**03-Aug-2016**	23-Aug-2016	✓	**03-Aug-2016**	23-Aug-2016	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 9, / RINSATE	**27-Jul-2016**	**03-Aug-2016**	24-Aug-2016	✓	**03-Aug-2016**	24-Aug-2016	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Amber Glass Bottle - Unpreserved (EK071G) RINSATE	**27-Jul-2016**	**----**	----	----	**02-Aug-2016**	29-Jul-2016	×
Clear Plastic Bottle - Natural (EK071G) 6, 5, 4D / 6D, 4,	**25-Jul-2016**	**----**	----	----	**02-Aug-2016**	27-Jul-2016	×
Clear Plastic Bottle - Natural (EK071G) 10	**26-Jul-2016**	**----**	----	----	**02-Aug-2016**	28-Jul-2016	×
Clear Plastic Bottle - Natural (EK071G) 9	**27-Jul-2016**	**----**	----	----	**02-Aug-2016**	29-Jul-2016	×
EP002: Dissolved Organic Carbon (DOC)							
Amber DOC Filtered- Sulfuric Preserved (EP002) 6, 5, 4D / 6D, 4,	**25-Jul-2016**	**----**	----	----	**04-Aug-2016**	22-Aug-2016	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 10	**26-Jul-2016**	**----**	----	----	**04-Aug-2016**	23-Aug-2016	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 9, / RINSATE	**27-Jul-2016**	**----**	----	----	**04-Aug-2016**	24-Aug-2016	✓

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
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005) 6, 5, 4D / 6D, 4,	**25-Jul-2016**	**----**	----	----	**04-Aug-2016**	22-Aug-2016	✓
Amber TOC Vial - Sulfuric Acid (EP005) 10	**26-Jul-2016**	**----**	----	----	**04-Aug-2016**	23-Aug-2016	✓
Amber TOC Vial - Sulfuric Acid (EP005) 9, / RINSATE	**27-Jul-2016**	**----**	----	----	**04-Aug-2016**	24-Aug-2016	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) 6, 5, 4D / 6D, 4,	**25-Jul-2016**	**02-Aug-2016**	01-Aug-2016	×	**03-Aug-2016**	11-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 10	**26-Jul-2016**	**02-Aug-2016**	02-Aug-2016	✓	**03-Aug-2016**	11-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 9, / RINSATE	**27-Jul-2016**	**02-Aug-2016**	03-Aug-2016	✓	**03-Aug-2016**	11-Sep-2016	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) 6, 5, 4D / 6D, 4,	**25-Jul-2016**	**02-Aug-2016**	01-Aug-2016	×	**03-Aug-2016**	11-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071) 10	**26-Jul-2016**	**02-Aug-2016**	02-Aug-2016	✓	**03-Aug-2016**	11-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071) 9, / RINSATE	**27-Jul-2016**	**02-Aug-2016**	03-Aug-2016	✓	**03-Aug-2016**	11-Sep-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) TB150498 BMTWBM	**23-Jul-2016**	**05-Aug-2016**	06-Aug-2016	✓	**05-Aug-2016**	06-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 6, 5, 4D / 6D, 4,	**25-Jul-2016**	**05-Aug-2016**	08-Aug-2016	✓	**05-Aug-2016**	08-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 10	**26-Jul-2016**	**05-Aug-2016**	09-Aug-2016	✓	**05-Aug-2016**	09-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080) 9, / RINSATE	**27-Jul-2016**	**05-Aug-2016**	10-Aug-2016	✓	**05-Aug-2016**	10-Aug-2016	✓

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
6, 5, 4D / 6D, 4,	**25-Jul-2016**	**02-Aug-2016**	01-Aug-2016	×	**03-Aug-2016**	11-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071)							
10	**26-Jul-2016**	**02-Aug-2016**	02-Aug-2016	✓	**03-Aug-2016**	11-Sep-2016	✓
Amber Glass Bottle - Unpreserved (EP071)							
9, RINSATE	**27-Jul-2016**	**02-Aug-2016**	03-Aug-2016	✓	**03-Aug-2016**	11-Sep-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
TB150498 BMTWBM	**23-Jul-2016**	**05-Aug-2016**	06-Aug-2016	✓	**05-Aug-2016**	06-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
6, 5, 4D / 6D, 4,	**25-Jul-2016**	**05-Aug-2016**	08-Aug-2016	✓	**05-Aug-2016**	08-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
10	**26-Jul-2016**	**05-Aug-2016**	09-Aug-2016	✓	**05-Aug-2016**	09-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
9, RINSATE	**27-Jul-2016**	**05-Aug-2016**	10-Aug-2016	✓	**05-Aug-2016**	10-Aug-2016	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
TB150498 BMTWBM	**23-Jul-2016**	**05-Aug-2016**	06-Aug-2016	✓	**05-Aug-2016**	06-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
6, 5, 4D / 6D, 4,	**25-Jul-2016**	**05-Aug-2016**	08-Aug-2016	✓	**05-Aug-2016**	08-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
10	**26-Jul-2016**	**05-Aug-2016**	09-Aug-2016	✓	**05-Aug-2016**	09-Aug-2016	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
9, RINSATE	**27-Jul-2016**	**05-Aug-2016**	10-Aug-2016	✓	**05-Aug-2016**	10-Aug-2016	✓

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	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	7	**28.57**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	7	**28.57**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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	
Method Blanks (MB) - Continued							
Total Phosporus By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite X	EG020X-T	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite Y	EG020Y-T	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosporus By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard

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)							
Alkalinity by PC Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	8	0.00	10.00	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	10	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	1	7	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard

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) - Continued							
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	8	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	2	8	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	2	7	**28.57**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	8	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Method Blanks (MB) - Continued							
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	8	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	8	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Soil Particle Density	EA152	SOIL	Soil Particle Density by AS 1289.3.5.1-2006 : Methods of testing soils for engineering purposes - Soil classification tests - Determination of the soil particle density of a soil - Standard method
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-MS - Suite X	EG020X-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite Y	EG020Y-T	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by Chemical Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	In house: Referenced to APHA 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Nitrogen as N (TKN + NOx) By Discrete Analyser	EK062G	SOIL	In house: Referenced to APHA 4500 Norg/NO3- Total Nitrogen is determined as the sum of TKN and Oxidised Nitrrogen, each determined seperately as N.
Total Phosporus By Discrete Analyser	EK067G	SOIL	In house: Referenced to APHA 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.
Organic Matter	EP004	SOIL	In house: Referenced to AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)

Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to 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.
Suspended Solids	EA025	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. 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 BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite B	EG020B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- 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)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Organic Carbon	EP002	WATER	In house: Referenced to APHA 5310 B. This method is compliant with NEPM (2013) Schedule B(3) . Samples are combusted at high termperature in the presence of an oxidative catalyst. The evolved carbon dioxide is quantified using an IR detector.

Analytical Methods	Method	Matrix	Method Descriptions
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to 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)
Total Coliforms in Water (MF)	TCMF-WAT	WATER	Total Coliforms analysis of water matrices conducted by Subcontracting Laboratory.

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	In house: Referenced to APHA 4500 Norg- D; APHA 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Organic Matter	EP004-PR	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to 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.
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1701993**	Page	: 1 of 15
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: Customer Services EB
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61-7-3243 7222
Project	: B21414 Elk FW1	Date Samples Received	: 02-Feb-2017 11:30
Order number	: ----	Date Analysis Commenced	: 02-Feb-2017
C-O-C number	: ----	Issue Date	: 13-Feb-2017 13:53
Sampler	: BRAD HILES, DANIEL MORAN		
Site	: ----		
Quote number	: BN/250/15 V5		
No. of samples received	: 14		
No. of samples analysed	: 14		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Andrew Epps	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Martina Louw	Inorganic Chemist	Brisbane External Subcontracting, Stafford, QLD

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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.
~ = Indicates an estimated value.

- EK061G (Total Kjeldahl Nitrogen as N)/ EK067G (Total Phosphorous as P): Some samples were diluted due to matrix interference. LOR adjusted accordingly.
- EG035T (Total Mercury): Positive results for Mercury have been confirmed by re-extraction and re-analysis.
- EG020-F (Dissolved Metals by ICP-MS): Limit of reporting raised due to matrix interference.
- EG020-T (Total Metals by ICP-MS): Limit of reporting raised due to matrix interference.
- It is recognised that EP005 (Total Organic Carbon) is less than EP002 (Dissolved Organic Carbon) for some samples. However, the difference is within experimental variation of the methods.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	20	21	22b	19	18
				Client sampling date / time	[17-Jan-2017]	[18-Jan-2017]	[18-Jan-2017]	[19-Jan-2017]	[19-Jan-2017]
Compound	CAS Number	LOR	Unit		EB1701993-001	EB1701993-002	EB1701993-003	EB1701993-004	EB1701993-005
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		10	8	117	222	35
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		119	132	76	74	133
Total Alkalinity as CaCO3	----	1	mg/L		119	132	76	74	133
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		365	257	4	3	24
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		3080	2640	4	<1	9
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		77	70	22	21	28
Magnesium	7439-95-4	1	mg/L		201	168	3	3	13
Sodium	7440-23-5	1	mg/L		1680	1410	5	3	24
Potassium	7440-09-7	1	mg/L		63	54	<1	<1	2
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	<0.01	0.02	0.02	<0.01
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		0.012	0.017	0.006	0.006	0.007
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	0.001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Strontium	7440-24-6	0.001	mg/L		1.17	0.969	0.131	0.129	0.224
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	0.10
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.20	0.42	4.74	9.00	1.21
Arsenic	7440-38-2	0.001	mg/L		0.001	0.001	0.001	0.002	0.002
Barium	7440-39-3	0.001	mg/L		0.013	0.018	0.025	0.041	0.010

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	20	21	22b	19	18
				Client sampling date / time	[17-Jan-2017]	[18-Jan-2017]	[18-Jan-2017]	[19-Jan-2017]	[19-Jan-2017]
Compound	CAS Number	LOR	Unit		EB1701993-001	EB1701993-002	EB1701993-003	EB1701993-004	EB1701993-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	**0.007**	**0.013**	**0.002**
Copper	7440-50-8	0.001	mg/L		<0.001	**0.002**	**0.007**	**0.013**	**0.003**
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	**0.002**	**0.005**	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	**0.006**	**0.011**	**0.002**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	**0.002**	**0.003**	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	**0.010**	**0.023**	<0.005
Strontium	7440-24-6	0.001	mg/L		**1.17**	**0.999**	**0.146**	**0.162**	**0.227**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	**0.02**	**0.03**	<0.01
Iron	7439-89-6	0.05	mg/L		**1.00**	**0.71**	**6.37**	**12.7**	**2.59**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.10**	**0.05**	**0.04**	**0.02**	**0.05**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.03**	**0.03**	**0.05**	**0.04**	**0.01**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.03**	**0.03**	**0.05**	**0.04**	**0.01**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.2**	**0.2**	**0.2**	**0.4**	**0.3**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.2**	**0.2**	**0.2**	**0.4**	**0.3**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.07**	**0.08**	**0.10**	**0.24**	**0.08**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.04**	**0.06**	**0.02**	**0.02**	**0.02**
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**96.8**	**82.4**	**1.71**	**1.54**	**3.41**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	20	21	22b	19	18
				Client sampling date / time	[17-Jan-2017]	[18-Jan-2017]	[18-Jan-2017]	[19-Jan-2017]	[19-Jan-2017]
Compound	CAS Number	LOR	Unit		EB1701993-001	EB1701993-002	EB1701993-003	EB1701993-004	EB1701993-005
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Total Cations	----	0.01	meq/L		95.1	80.0	1.56	1.42	3.56
Ionic Balance	----	0.01	%		0.93	1.49	----	----	2.17
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		6	6	2	2	8
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		6	5	2	2	7
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		----	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		----	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		----	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		----	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		----	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		----	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		----	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		----	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	20	21	22b	19	18
				Client sampling date / time	[17-Jan-2017]	[18-Jan-2017]	[18-Jan-2017]	[19-Jan-2017]	[19-Jan-2017]
Compound	CAS Number	LOR	Unit		EB1701993-001	EB1701993-002	EB1701993-003	EB1701993-004	EB1701993-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		----	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		----	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		----	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		----	<100	<100	<100	<100
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		----	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
Subcontracted Analysis									
Total Coliforms	----	1	MPN/100mL		**350**	**17**	**3500**	**1600**	**920**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		----	**34.3**	**35.0**	**34.4**	**32.3**
2-Chlorophenol-D4	93951-73-6	1	%		----	**85.4**	**75.6**	**82.6**	**82.7**
2.4.6-Tribromophenol	118-79-6	1	%		----	**97.0**	**77.6**	**94.7**	**96.5**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		----	**87.8**	**71.6**	**85.5**	**83.2**
Anthracene-d10	1719-06-8	1	%		----	**86.7**	**73.8**	**80.9**	**81.6**
4-Terphenyl-d14	1718-51-0	1	%		----	**90.9**	**74.8**	**85.4**	**87.8**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**97.8**	**96.6**	**120**	**102**	**98.3**
Toluene-D8	2037-26-5	2	%		**96.0**	**101**	**104**	**96.7**	**95.2**
4-Bromofluorobenzene	460-00-4	2	%		**110**	**105**	**99.6**	**108**	**109**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	17	16	24	23	23-D
				Client sampling date / time	[20-Jan-2017]	[20-Jan-2017]	[22-Jan-2017]	[22-Jan-2017]	[22-Jan-2017]
Compound	CAS Number	LOR	Unit		EB1701993-006	EB1701993-007	EB1701993-008	EB1701993-009	EB1701993-010
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		324	333	228	113	112
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		69	74	66	77	77
Total Alkalinity as CaCO3	----	1	mg/L		69	74	66	77	77
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		3	4	3	4	3
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		<1	<1	<1	23	23
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		19	20	20	20	20
Magnesium	7439-95-4	1	mg/L		3	3	2	5	5
Sodium	7440-23-5	1	mg/L		3	3	3	20	20
Potassium	7440-09-7	1	mg/L		<1	<1	<1	2	2
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.02	0.02	0.02	<0.01	0.01
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		0.005	0.005	0.005	0.008	0.008
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Strontium	7440-24-6	0.001	mg/L		0.123	0.126	0.117	0.137	0.136
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		9.68	9.52	8.69	5.46	5.13
Arsenic	7440-38-2	0.001	mg/L		0.002	0.002	0.002	0.001	0.001
Barium	7440-39-3	0.001	mg/L		0.043	0.037	0.035	0.026	0.026

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	17	16	24	23	23-D
				Client sampling date / time	[20-Jan-2017]	[20-Jan-2017]	[22-Jan-2017]	[22-Jan-2017]	[22-Jan-2017]
Compound	CAS Number	LOR	Unit		EB1701993-006	EB1701993-007	EB1701993-008	EB1701993-009	EB1701993-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		**0.015**	**0.014**	**0.011**	**0.008**	**0.007**
Copper	7440-50-8	0.001	mg/L		**0.014**	**0.014**	**0.010**	**0.008**	**0.007**
Cobalt	7440-48-4	0.001	mg/L		**0.006**	**0.006**	**0.004**	**0.002**	**0.002**
Nickel	7440-02-0	0.001	mg/L		**0.014**	**0.013**	**0.009**	**0.007**	**0.006**
Lead	7439-92-1	0.001	mg/L		**0.003**	**0.003**	**0.002**	**0.002**	**0.001**
Zinc	7440-66-6	0.005	mg/L		**0.024**	**0.025**	**0.020**	**0.013**	**0.011**
Strontium	7440-24-6	0.001	mg/L		**0.157**	**0.151**	**0.136**	**0.143**	**0.142**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		**0.03**	**0.03**	**0.02**	**0.02**	**0.02**
Iron	7439-89-6	0.05	mg/L		**14.0**	**14.2**	**11.4**	**7.07**	**6.60**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	**0.0002**	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.02**	**0.03**	**0.02**	**0.04**	**0.04**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.04**	**0.04**	**0.04**	**0.05**	**0.05**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.04**	**0.04**	**0.04**	**0.05**	**0.05**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.4**	**0.3**	**0.3**	**0.2**	**0.2**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.4**	**0.3**	**0.3**	**0.2**	**0.2**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.20**	**0.17**	**0.18**	**0.13**	**0.13**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.02**	**0.02**	**0.02**	**0.03**	**0.03**
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**1.44**	**1.56**	**1.38**	**2.27**	**2.25**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	17	16	24	23	23-D
				Client sampling date / time	[20-Jan-2017]	[20-Jan-2017]	[22-Jan-2017]	[22-Jan-2017]	[22-Jan-2017]
Compound	CAS Number	LOR	Unit		EB1701993-006	EB1701993-007	EB1701993-008	EB1701993-009	EB1701993-010
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Total Cations	----	0.01	meq/L		**1.32**	**1.38**	**1.29**	**2.33**	**2.33**
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		**2**	**2**	**3**	**3**	**3**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**2**	**2**	**2**	**2**	**2**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	17	16	24	23	23-D
				Client sampling date / time	[20-Jan-2017]	[20-Jan-2017]	[22-Jan-2017]	[22-Jan-2017]	[22-Jan-2017]
Compound	CAS Number	LOR	Unit		EB1701993-006	EB1701993-007	EB1701993-008	EB1701993-009	EB1701993-010
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	<100	<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	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
Subcontracted Analysis									
Total Coliforms	----	1	MPN/100mL		**1600**	**9200**	**16000**	**5400**	**5400**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**35.0**	**30.5**	**31.7**	**32.2**	**37.4**
2-Chlorophenol-D4	93951-73-6	1	%		**85.1**	**77.0**	**83.1**	**84.2**	**82.5**
2.4.6-Tribromophenol	118-79-6	1	%		**99.5**	**90.9**	**92.5**	**96.1**	**97.4**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**86.2**	**79.6**	**83.1**	**83.5**	**80.2**
Anthracene-d10	1719-06-8	1	%		**82.7**	**77.0**	**81.1**	**83.3**	**82.3**
4-Terphenyl-d14	1718-51-0	1	%		**87.3**	**81.1**	**83.6**	**92.3**	**87.4**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**102**	**123**	**96.9**	**99.4**	**97.9**
Toluene-D8	2037-26-5	2	%		**101**	**106**	**100**	**102**	**98.6**
4-Bromofluorobenzene	460-00-4	2	%		**109**	**97.5**	**108**	**108**	**106**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	28	28-D	29	RINSATE	----
				Client sampling date / time	[29-Jan-2017]	[29-Jan-2017]	[30-Jan-2017]	[30-Jan-2017]	----
Compound	CAS Number	LOR	Unit		EB1701993-011	EB1701993-012	EB1701993-013	EB1701993-014	--------
					Result	Result	Result	Result	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		14	15	6	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		119	122	119	----	----
Total Alkalinity as CaCO3	----	1	mg/L		119	122	119	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		2310	2280	2000	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		16000	16200	14100	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		396	389	346	----	----
Magnesium	7439-95-4	1	mg/L		1170	1150	1020	----	----
Sodium	7440-23-5	1	mg/L		9940	9780	8840	----	----
Potassium	7440-09-7	1	mg/L		362	366	326	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.05	<0.05	<0.05	<0.01	----
Arsenic	7440-38-2	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Barium	7440-39-3	0.001	mg/L		0.010	0.010	0.014	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0005	<0.0005	<0.0005	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Copper	7440-50-8	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Cobalt	7440-48-4	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Nickel	7440-02-0	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Lead	7439-92-1	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Zinc	7440-66-6	0.005	mg/L		<0.025	<0.025	<0.025	<0.005	----
Strontium	7440-24-6	0.001	mg/L		6.72	6.77	6.10	<0.001	----
Tin	7440-31-5	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Vanadium	7440-62-2	0.01	mg/L		<0.05	<0.05	<0.05	<0.01	----
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.12	0.10	0.29	<0.01	----
Arsenic	7440-38-2	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Barium	7440-39-3	0.001	mg/L		0.011	0.010	0.014	<0.001	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	28	28-D	29	RINSATE	----
				Client sampling date / time	[29-Jan-2017]	[29-Jan-2017]	[30-Jan-2017]	[30-Jan-2017]	----
Compound	CAS Number	LOR	Unit		EB1701993-011	EB1701993-012	EB1701993-013	EB1701993-014	--------
					Result	Result	Result	Result	----
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0005	<0.0005	<0.0005	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Copper	7440-50-8	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Cobalt	7440-48-4	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Nickel	7440-02-0	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Lead	7439-92-1	0.001	mg/L		<0.005	<0.005	<0.005	<0.001	----
Zinc	7440-66-6	0.005	mg/L		<0.026	<0.026	<0.026	<0.005	----
Strontium	7440-24-6	0.001	mg/L		**7.27**	**7.09**	**6.31**	<0.001	----
Tin	7440-31-5	0.001	mg/L		**0.013**	**0.010**	**0.007**	<0.001	----
Vanadium	7440-62-2	0.01	mg/L		<0.05	<0.05	<0.05	<0.01	----
Iron	7439-89-6	0.05	mg/L		**0.16**	**0.15**	**0.28**	<0.05	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.11**	**0.11**	**0.08**	<0.01	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		<0.5	<0.5	<0.5	<0.1	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		<0.5	<0.5	<0.5	<0.1	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.08**	<0.05	**0.06**	<0.01	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**502**	**507**	**442**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	28	28-D	29	RINSATE	----
			Client sampling date / time	[29-Jan-2017]	[29-Jan-2017]	[30-Jan-2017]	[30-Jan-2017]	----
Compound	CAS Number	LOR	Unit	EB1701993-011	EB1701993-012	EB1701993-013	EB1701993-014	--------
				Result	Result	Result	Result	----
EN055: Ionic Balance - Continued								
Total Cations	----	0.01	meq/L	558	549	494	----	----
Ionic Balance	----	0.01	%	5.27	3.97	5.59	----	----
EP002: Dissolved Organic Carbon (DOC)								
Dissolved Organic Carbon	----	1	mg/L	4	3	4	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	3	3	6	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	28	28-D	29	RINSATE	----
			Client sampling date / time	[29-Jan-2017]	[29-Jan-2017]	[30-Jan-2017]	[30-Jan-2017]	----
Compound	CAS Number	LOR	Unit	EB1701993-011	EB1701993-012	EB1701993-013	EB1701993-014	--------
				Result	Result	Result	Result	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----
Subcontracted Analysis								
Total Coliforms	----	1	MPN/100mL	7	5	920	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	37.1	36.0	39.8	34.4	----
2-Chlorophenol-D4	93951-73-6	1	%	82.0	76.7	89.3	80.8	----
2.4.6-Tribromophenol	118-79-6	1	%	95.3	94.4	103	90.8	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	79.5	79.1	87.1	79.6	----
Anthracene-d10	1719-06-8	1	%	79.8	79.0	87.7	77.3	----
4-Terphenyl-d14	1718-51-0	1	%	86.0	84.5	93.3	81.8	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	103	103	105	98.1	----
Toluene-D8	2037-26-5	2	%	100.0	98.0	101	99.6	----
4-Bromofluorobenzene	460-00-4	2	%	112	104	110	108	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	72
2-Chlorophenol-D4	93951-73-6	27	130
2.4.6-Tribromophenol	118-79-6	19	181
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	14	146
Anthracene-d10	1719-06-8	35	137
4-Terphenyl-d14	1718-51-0	36	154
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB1701993**	Page	: 1 of 11
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: Customer Services EB
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61-7-3243 7222
Project	: B21414 Elk FW1	Date Samples Received	: 02-Feb-2017
Order number	: ----	Date Analysis Commenced	: 02-Feb-2017
C-O-C number	: ----	Issue Date	: 13-Feb-2017
Sampler	: BRAD HILES, DANIEL MORAN		
Site	: ----		
Quote number	: BN/250/15 V5		
No. of samples received	: 14		
No. of samples analysed	: 14		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Andrew Epps	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Martina Louw	Inorganic Chemist	Brisbane External Subcontracting, Stafford, QLD

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

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 (%)*
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 741468)									
EB1701993-001	20	EA025: Suspended Solids (SS)	----	1	mg/L	10	12	11.2	0% - 50%
EB1701993-011	28	EA025: Suspended Solids (SS)	----	1	mg/L	14	13	0.00	0% - 50%
ED037P: Alkalinity by PC Titrator (QC Lot: 741374)									
EB1701993-001	20	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	119	118	1.47	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	119	118	1.47	0% - 20%
ET1700054-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	104	105	0.00	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	104	105	0.00	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 742391)									
EB1701885-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	79	70	12.7	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	79	70	12.7	0% - 20%
EB1701903-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4	<1	116	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	4	<1	116	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 742392)									
EB1701993-009	23	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	77	77	0.00	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 (%)*
ED037P: Alkalinity by PC Titrator (QC Lot: 742392) - continued									
EB1701993-009	23	ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	77	77	0.00	0% - 20%
EB1701999-006	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.00	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 741356)									
EB1701993-001	20	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	365	373	2.07	0% - 20%
EB1701993-011	28	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2310	2290	0.546	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 741357)									
EB1701993-001	20	ED045G: Chloride	16887-00-6	1	mg/L	3080	3100	0.554	0% - 20%
EB1701993-011	28	ED045G: Chloride	16887-00-6	1	mg/L	16000	16000	0.336	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 743829)									
EB1701993-010	23-D	ED093F: Calcium	7440-70-2	1	mg/L	20	19	0.00	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	5	5	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	20	20	0.00	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.00	No Limit
EB1701993-001	20	ED093F: Calcium	7440-70-2	1	mg/L	77	76	0.00	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	201	203	1.13	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1680	1690	0.608	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	63	63	0.00	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 743827)									
EB1701993-010	23-D	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.008	0.008	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.01	0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EB1701993-001	20	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.012	0.012	0.00	0% - 50%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	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 (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 743827) - continued									
EB1701993-001	20	EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 743828)									
EB1701993-010	23-D	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.136	0.138	1.40	0% - 20%
EB1701993-001	20	EG020B-F: Strontium	7440-24-6	0.001	mg/L	1.17	1.16	0.453	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 743658)									
EB1701993-001	20	EG020B-T: Strontium	7440-24-6	0.001	mg/L	1.17	1.19	1.25	0% - 20%
EB1701993-010	23-D	EG020B-T: Strontium	7440-24-6	0.001	mg/L	0.142	0.142	0.00	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 743659)									
EB1701993-001	20	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.013	0.013	0.00	0% - 50%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.20	0.21	5.69	0% - 20%
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	1.00	1.02	2.26	0% - 20%
EB1701993-010	23-D	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.026	0.025	0.00	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.007	0.007	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.007	0.007	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.011	0.011	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	5.13	5.14	0.265	0% - 20%
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	0.02	0.02	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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 743659) - continued									
EB1701993-010	23-D	EG020A-T: Iron	7439-89-6	0.05	mg/L	6.60	6.58	0.310	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 743830)									
EB1701993-011	28	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EB1701993-001	20	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 743663)									
EB1701993-001	20	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EB1701993-011	28	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 741366)									
EB1701993-001	20	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.07	34.6	No Limit
EB1701993-011	28	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.11	0.07	36.8	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 741354)									
EB1701993-001	20	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB1701993-011	28	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 741367)									
EB1701993-001	20	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.03	0.00	No Limit
EB1701993-011	28	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 744657)									
EB1701993-001	20	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EB1701993-011	28	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.5	<0.5	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 744656)									
EB1701993-001	20	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	0.08	0.00	No Limit
EB1701993-011	28	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.07	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 741355)									
EB1701993-001	20	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.04	0.03	0.00	No Limit
EB1701993-011	28	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP002: Dissolved Organic Carbon (DOC) (QC Lot: 742102)									
EB1701993-001	20	EP002: Dissolved Organic Carbon	----	1	mg/L	6	6	0.00	No Limit
EB1701993-010	23-D	EP002: Dissolved Organic Carbon	----	1	mg/L	3	3	0.00	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 742106)									
EB1701993-001	20	EP005: Total Organic Carbon	----	1	mg/L	6	5	0.00	No Limit
EB1701993-010	23-D	EP005: Total Organic Carbon	----	1	mg/L	2	2	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 741835)									
EB1701993-001	20	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EB1701993-011	28	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 741835)									
EB1701993-001	20	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EB1701993-011	28	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 741835)									

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: BTEXN (QC Lot: 741835) - continued									
EB1701993-001	20	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EB1701993-011	28	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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 Spike (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			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 741468)								
EA025: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	104	84	120
				<1	1000 mg/L	93.9	84	120
ED037P: Alkalinity by PC Titrator (QCLot: 741374)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	117	80	120
ED037P: Alkalinity by PC Titrator (QCLot: 742391)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	101	80	120
ED037P: Alkalinity by PC Titrator (QCLot: 742392)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	98.0	80	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 741356)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	105	85	118
				<1	100 mg/L	101	85	118
ED045G: Chloride by Discrete Analyser (QCLot: 741357)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	100	90	115
				<1	1000 mg/L	102	90	115
ED093F: Dissolved Major Cations (QCLot: 743829)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
ED093F: Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
ED093F: Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
ED093F: Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 743827)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	101	79	118
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.0	88	116
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.5 mg/L	98.7	70	130
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.4	88	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.8	87	113
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	95.6	86	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	102	88	114
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	89	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	97.9	89	113
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	102	86	112
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	97.6	88	114
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	95.9	87	113
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	82	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 743828)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.5 mg/L	104	86	111
EG020T: Total Metals by ICP-MS (QCLot: 743658)								
EG020B-T: Strontium	7440-24-6	0.001	mg/L	<0.001	0.5 mg/L	102	86	112
EG020T: Total Metals by ICP-MS (QCLot: 743659)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	96.3	80	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	100.0	88	112
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.5 mg/L	97.4	70	130
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.4	88	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.5	89	115
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	97.7	89	115
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	98.6	88	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	100	89	112
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.0	88	116
EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	98.3	86	116
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	99.8	87	114
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	95.3	84	114
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	105	82	118
EG035F: Dissolved Mercury by FIMS (QCLot: 743830)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	85.6	84	118
EG035T: Total Recoverable Mercury by FIMS (QCLot: 743663)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	94.1	80	100
EK055G: Ammonia as N by Discrete Analyser (QCLot: 741366)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	107	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 741354)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	90	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 741367)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.6	89	115
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 744657)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	81.9	70	111
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 744656)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	82.8	77	109
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 741355)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	101	88	115
EP002: Dissolved Organic Carbon (DOC) (QCLot: 742102)								
EP002: Dissolved Organic Carbon	----	1	mg/L	<1	10 mg/L	99.0	80	112
				<1	100 mg/L	102	80	112
EP005: Total Organic Carbon (TOC) (QCLot: 742106)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP005: Total Organic Carbon (TOC) (QCLot: 742106) - continued								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	88.8	79	113
				<1	100 mg/L	95.4	79	113
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 741589)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	10 µg/L	79.9	47	101
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	10 µg/L	84.8	46	109
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	10 µg/L	87.6	50	104
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	10 µg/L	86.9	50	114
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	10 µg/L	82.9	49	114
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	10 µg/L	81.0	48	113
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	10 µg/L	82.3	48	120
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	10 µg/L	82.1	48	119
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	10 µg/L	84.3	48	125
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	10 µg/L	80.8	45	119
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	10 µg/L	87.6	43	130
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	10 µg/L	86.8	46	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	10 µg/L	91.1	49	125
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	10 µg/L	90.2	40	132
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	10 µg/L	93.9	42	140
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	10 µg/L	89.8	39	136
EP080/071: Total Petroleum Hydrocarbons (QCLot: 741588)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	1211 µg/L	77.9	38	114
EP071: C15 - C28 Fraction	----	100	µg/L	<100	2103 µg/L	98.1	50	132
EP071: C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 741835)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	160 µg/L	98.3	76	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 741588)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	1696 µg/L	81.6	43	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	1496 µg/L	98.8	49	134
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 741835)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	185 µg/L	99.4	75	123
EP080: C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080: BTEXN (QCLot: 741835)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	91.4	77	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	92.7	78	122
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	90.1	78	119

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080: BTEXN (QCLot: 741835) - continued								
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	20 µg/L	93.0	77	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	89.0	76	121
EP080: Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----
EP080: Sum of BTEX	----	1	µg/L	<1	----	----	----	----
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	97.5	75	120

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**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 741356)							
EB1701993-002	21	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	# Not Determined	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 741357)							
EB1701993-002	21	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 743827)							
EB1701993-002	21	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	92.2	70	130
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	99.0	70	130
		EG020A-F: Barium	7440-39-3	0.5 mg/L	104	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	100	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	86.6	70	130
		EG020A-F: Cobalt	7440-48-4	0.1 mg/L	84.6	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	87.9	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	92.7	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	85.8	70	130
		EG020A-F: Tin	7440-31-5	0.1 mg/L	84.3	70	130
		EG020A-F: Vanadium	7440-62-2	0.1 mg/L	92.9	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	86.0	70	130
EG020T: Total Metals by ICP-MS (QCLot: 743659)							
EB1701993-002	21	EG020A-T: Arsenic	7440-38-2	1 mg/L	101	70	130
		EG020A-T: Barium	7440-39-3	1 mg/L	104	70	130
		EG020A-T: Cadmium	7440-43-9	0.5 mg/L	96.8	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	98.3	70	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
EG020T: Total Metals by ICP-MS (QCLot: 743659) - continued							
EB1701993-002	21	EG020A-T: Cobalt	7440-48-4	1 mg/L	99.9	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	91.2	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	96.5	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	92.6	70	130
		EG020A-T: Vanadium	7440-62-2	1 mg/L	103	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	90.0	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 743830)							
EB1701993-002	21	EG035F: Mercury	7439-97-6	0.01 mg/L	75.2	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 743663)							
EB1701993-002	21	EG035T: Mercury	7439-97-6	0.01 mg/L	78.3	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 741366)							
EB1701993-002	21	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	106	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 741354)							
EB1701993-002	21	EK057G: Nitrite as N	14797-65-0	0.4 mg/L	105	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 741367)							
EB1701993-002	21	EK059G: Nitrite + Nitrate as N	----	0.4 mg/L	95.1	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 744657)							
EB1701993-002	21	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	82.9	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 744656)							
EB1701993-002	21	EK067G: Total Phosphorus as P	----	1 mg/L	91.4	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 741355)							
EB1701993-002	21	EK071G: Reactive Phosphorus as P	14265-44-2	0.4 mg/L	106	70	130
EP002: Dissolved Organic Carbon (DOC) (QCLot: 742102)							
EB1701993-002	21	EP002: Dissolved Organic Carbon	----	100 mg/L	100	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 742106)							
EB1701993-002	21	EP005: Total Organic Carbon	----	100 mg/L	96.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 741835)							
EB1701993-002	21	EP080: C6 - C9 Fraction	----	40 µg/L	114	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 741835)							
EB1701993-002	21	EP080: C6 - C10 Fraction	C6_C10	40 µg/L	107	70	130
EP080: BTEXN (QCLot: 741835)							
EB1701993-002	21	EP080: Benzene	71-43-2	10 µg/L	94.1	70	130
		EP080: Toluene	108-88-3	10 µg/L	87.5	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB1701993**	Page	: 1 of 21
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Telephone	: +61-7-3243 7222
Project	: B21414 Elk FW1	Date Samples Received	: 02-Feb-2017
Site	: ----	Issue Date	: 13-Feb-2017
Sampler	: BRAD HILES, DANIEL MORAN	No. of samples received	: 14
Order number	: ----	No. of samples analysed	: 14

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 SO4 2- by DA	EB1701993--002	21	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	EB1701993--002	21	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA025: Total Suspended Solids dried at 104 ± 2°C						
Clear Plastic Bottle - Natural 20	----	----	----	02-Feb-2017	24-Jan-2017	**9**
Clear Plastic Bottle - Natural 21, 22b	----	----	----	02-Feb-2017	25-Jan-2017	**8**
Clear Plastic Bottle - Natural 19, 18	----	----	----	02-Feb-2017	26-Jan-2017	**7**
Clear Plastic Bottle - Natural 17, 16	----	----	----	02-Feb-2017	27-Jan-2017	**6**
Clear Plastic Bottle - Natural 24, 23, 23-D	----	----	----	02-Feb-2017	29-Jan-2017	**4**
ED037P: Alkalinity by PC Titrator						
Clear Plastic Bottle - Natural 20	----	----	----	03-Feb-2017	31-Jan-2017	**3**
Clear Plastic Bottle - Natural 21, 22b	----	----	----	03-Feb-2017	01-Feb-2017	**2**
Clear Plastic Bottle - Natural 19, 18	----	----	----	03-Feb-2017	02-Feb-2017	**1**
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural 20	----	----	----	02-Feb-2017	19-Jan-2017	**14**
Clear Plastic Bottle - Natural 21, 22b	----	----	----	02-Feb-2017	20-Jan-2017	**13**
Clear Plastic Bottle - Natural 19, 18	----	----	----	02-Feb-2017	21-Jan-2017	**12**
Clear Plastic Bottle - Natural 17, 16	----	----	----	02-Feb-2017	22-Jan-2017	**11**

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EK057G: Nitrite as N by Discrete Analyser - Analysis Holding Time Compliance						
Clear Plastic Bottle - Natural						
24, 23-D	----	----	----	02-Feb-2017	24-Jan-2017	**9**
Clear Plastic Bottle - Natural						
28, 28-D	----	----	----	02-Feb-2017	31-Jan-2017	**2**
Clear Plastic Bottle - Natural						
29	----	----	----	02-Feb-2017	01-Feb-2017	**1**
EK071G: Reactive Phosphorus as P by discrete analyser						
Clear Plastic Bottle - Natural						
20	----	----	----	02-Feb-2017	19-Jan-2017	**14**
Clear Plastic Bottle - Natural						
21, 22b	----	----	----	02-Feb-2017	20-Jan-2017	**13**
Clear Plastic Bottle - Natural						
19, 18	----	----	----	02-Feb-2017	21-Jan-2017	**12**
Clear Plastic Bottle - Natural						
17, 16	----	----	----	02-Feb-2017	22-Jan-2017	**11**
Clear Plastic Bottle - Natural						
24, 23-D	----	----	----	02-Feb-2017	24-Jan-2017	**9**
Clear Plastic Bottle - Natural						
28, 28-D	----	----	----	02-Feb-2017	31-Jan-2017	**2**
Clear Plastic Bottle - Natural						
29	----	----	----	02-Feb-2017	01-Feb-2017	**1**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
Amber Glass Bottle - Unpreserved						
21, 22b	02-Feb-2017	25-Jan-2017	**8**	----	----	----
Amber Glass Bottle - Unpreserved						
19, 18	02-Feb-2017	26-Jan-2017	**7**	----	----	----
Amber Glass Bottle - Unpreserved						
17, 16	02-Feb-2017	27-Jan-2017	**6**	----	----	----
Amber Glass Bottle - Unpreserved						
24, 23-D	02-Feb-2017	29-Jan-2017	**4**	----	----	----
EP080/071: Total Petroleum Hydrocarbons						
Amber Glass Bottle - Unpreserved						
21, 22b	02-Feb-2017	25-Jan-2017	**8**	----	----	----
Amber Glass Bottle - Unpreserved						
19, 18	02-Feb-2017	26-Jan-2017	**7**	----	----	----
Amber Glass Bottle - Unpreserved						
17, 16	02-Feb-2017	27-Jan-2017	**6**	----	----	----

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EP080/071: Total Petroleum Hydrocarbons - Analysis Holding Time Compliance						
Amber Glass Bottle - Unpreserved 24, 23, 23-D	02-Feb-2017	29-Jan-2017	**4**	----	----	----
Amber VOC Vial - Sulfuric Acid 20	03-Feb-2017	31-Jan-2017	**3**	03-Feb-2017	31-Jan-2017	**3**
Amber VOC Vial - Sulfuric Acid 21, 22b	03-Feb-2017	01-Feb-2017	**2**	03-Feb-2017	01-Feb-2017	**2**
Amber VOC Vial - Sulfuric Acid 19, 18	03-Feb-2017	02-Feb-2017	**1**	03-Feb-2017	02-Feb-2017	**1**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions						
Amber Glass Bottle - Unpreserved 21, 22b	02-Feb-2017	25-Jan-2017	**8**	----	----	----
Amber Glass Bottle - Unpreserved 19, 18	02-Feb-2017	26-Jan-2017	**7**	----	----	----
Amber Glass Bottle - Unpreserved 17, 16	02-Feb-2017	27-Jan-2017	**6**	----	----	----
Amber Glass Bottle - Unpreserved 24, 23, 23-D	02-Feb-2017	29-Jan-2017	**4**	----	----	----
Amber VOC Vial - Sulfuric Acid 20	03-Feb-2017	31-Jan-2017	**3**	03-Feb-2017	31-Jan-2017	**3**
Amber VOC Vial - Sulfuric Acid 21, 22b	03-Feb-2017	01-Feb-2017	**2**	03-Feb-2017	01-Feb-2017	**2**
Amber VOC Vial - Sulfuric Acid 19, 18	03-Feb-2017	02-Feb-2017	**1**	03-Feb-2017	02-Feb-2017	**1**
EP080: BTEXN						
Amber VOC Vial - Sulfuric Acid 20	03-Feb-2017	31-Jan-2017	**3**	03-Feb-2017	31-Jan-2017	**3**
Amber VOC Vial - Sulfuric Acid 21, 22b	03-Feb-2017	01-Feb-2017	**2**	03-Feb-2017	01-Feb-2017	**2**
Amber VOC Vial - Sulfuric Acid 19, 18	03-Feb-2017	02-Feb-2017	**1**	03-Feb-2017	02-Feb-2017	**1**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count: QC	Count: Regular	Rate (%): Actual	Rate (%): Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS) - Continued					
PAH/Phenols (GC/MS - SIM)	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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*
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025) 20	**17-Jan-2017**	**----**	----	----	**02-Feb-2017**	24-Jan-2017	×
Clear Plastic Bottle - Natural (EA025) 21, 22b	**18-Jan-2017**	**----**	----	----	**02-Feb-2017**	25-Jan-2017	×
Clear Plastic Bottle - Natural (EA025) 19, 18	**19-Jan-2017**	**----**	----	----	**02-Feb-2017**	26-Jan-2017	×
Clear Plastic Bottle - Natural (EA025) 17, 16	**20-Jan-2017**	**----**	----	----	**02-Feb-2017**	27-Jan-2017	×
Clear Plastic Bottle - Natural (EA025) 24, 23, 23-D	**22-Jan-2017**	**----**	----	----	**02-Feb-2017**	29-Jan-2017	×
Clear Plastic Bottle - Natural (EA025) 28, 28-D	**29-Jan-2017**	**----**	----	----	**02-Feb-2017**	05-Feb-2017	✓
Clear Plastic Bottle - Natural (EA025) 29	**30-Jan-2017**	**----**	----	----	**02-Feb-2017**	06-Feb-2017	✓

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
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) 20	**17-Jan-2017**	**----**	----	----	**03-Feb-2017**	31-Jan-2017	×
Clear Plastic Bottle - Natural (ED037-P) 21, 22b	**18-Jan-2017**	**----**	----	----	**03-Feb-2017**	01-Feb-2017	×
Clear Plastic Bottle - Natural (ED037-P) 19, 18	**19-Jan-2017**	**----**	----	----	**03-Feb-2017**	02-Feb-2017	×
Clear Plastic Bottle - Natural (ED037-P) 17, 16	**20-Jan-2017**	**----**	----	----	**03-Feb-2017**	03-Feb-2017	✓
Clear Plastic Bottle - Natural (ED037-P) 24, 23, 23-D	**22-Jan-2017**	**----**	----	----	**04-Feb-2017**	05-Feb-2017	✓
Clear Plastic Bottle - Natural (ED037-P) 28, 28-D	**29-Jan-2017**	**----**	----	----	**04-Feb-2017**	12-Feb-2017	✓
Clear Plastic Bottle - Natural (ED037-P) 29	**30-Jan-2017**	**----**	----	----	**04-Feb-2017**	13-Feb-2017	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) 20	**17-Jan-2017**	**----**	----	----	**02-Feb-2017**	14-Feb-2017	✓
Clear Plastic Bottle - Natural (ED041G) 21, 22b	**18-Jan-2017**	**----**	----	----	**02-Feb-2017**	15-Feb-2017	✓
Clear Plastic Bottle - Natural (ED041G) 19, 18	**19-Jan-2017**	**----**	----	----	**02-Feb-2017**	16-Feb-2017	✓
Clear Plastic Bottle - Natural (ED041G) 17, 16	**20-Jan-2017**	**----**	----	----	**02-Feb-2017**	17-Feb-2017	✓
Clear Plastic Bottle - Natural (ED041G) 24, 23, 23-D	**22-Jan-2017**	**----**	----	----	**02-Feb-2017**	19-Feb-2017	✓
Clear Plastic Bottle - Natural (ED041G) 28, 28-D	**29-Jan-2017**	**----**	----	----	**02-Feb-2017**	26-Feb-2017	✓
Clear Plastic Bottle - Natural (ED041G) 29	**30-Jan-2017**	**----**	----	----	**02-Feb-2017**	27-Feb-2017	✓

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
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) 20	**17-Jan-2017**	**----**	----	----	**02-Feb-2017**	14-Feb-2017	✓
Clear Plastic Bottle - Natural (ED045G) 21, 22b	**18-Jan-2017**	**----**	----	----	**02-Feb-2017**	15-Feb-2017	✓
Clear Plastic Bottle - Natural (ED045G) 19, 18	**19-Jan-2017**	**----**	----	----	**02-Feb-2017**	16-Feb-2017	✓
Clear Plastic Bottle - Natural (ED045G) 17, 16	**20-Jan-2017**	**----**	----	----	**02-Feb-2017**	17-Feb-2017	✓
Clear Plastic Bottle - Natural (ED045G) 24, 23, 23-D	**22-Jan-2017**	**----**	----	----	**02-Feb-2017**	19-Feb-2017	✓
Clear Plastic Bottle - Natural (ED045G) 28, 28-D	**29-Jan-2017**	**----**	----	----	**02-Feb-2017**	26-Feb-2017	✓
Clear Plastic Bottle - Natural (ED045G) 29	**30-Jan-2017**	**----**	----	----	**02-Feb-2017**	27-Feb-2017	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 20	**17-Jan-2017**	**----**	----	----	**07-Feb-2017**	14-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 21, 22b	**18-Jan-2017**	**----**	----	----	**07-Feb-2017**	15-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 19, 18	**19-Jan-2017**	**----**	----	----	**07-Feb-2017**	16-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 17, 16	**20-Jan-2017**	**----**	----	----	**07-Feb-2017**	17-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 24, 23, 23-D	**22-Jan-2017**	**----**	----	----	**07-Feb-2017**	19-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 28, 28-D	**29-Jan-2017**	**----**	----	----	**07-Feb-2017**	26-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) 29	**30-Jan-2017**	**----**	----	----	**07-Feb-2017**	27-Feb-2017	✓

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
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 20		**17-Jan-2017**	**----**	----	----	**07-Feb-2017**	16-Jul-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 21,	22b	**18-Jan-2017**	**----**	----	----	**07-Feb-2017**	17-Jul-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 19,	18	**19-Jan-2017**	**----**	----	----	**07-Feb-2017**	18-Jul-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 17,	16	**20-Jan-2017**	**----**	----	----	**07-Feb-2017**	19-Jul-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 24, 23-D	23,	**22-Jan-2017**	**----**	----	----	**07-Feb-2017**	21-Jul-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 28,	28-D	**29-Jan-2017**	**----**	----	----	**07-Feb-2017**	28-Jul-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) 29,	RINSATE	**30-Jan-2017**	**----**	----	----	**07-Feb-2017**	29-Jul-2017	✓
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 20		**17-Jan-2017**	**07-Feb-2017**	16-Jul-2017	✓	**07-Feb-2017**	16-Jul-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 21,	22b	**18-Jan-2017**	**07-Feb-2017**	17-Jul-2017	✓	**07-Feb-2017**	17-Jul-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 19,	18	**19-Jan-2017**	**07-Feb-2017**	18-Jul-2017	✓	**07-Feb-2017**	18-Jul-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 17,	16	**20-Jan-2017**	**07-Feb-2017**	19-Jul-2017	✓	**07-Feb-2017**	19-Jul-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 24, 23-D	23,	**22-Jan-2017**	**07-Feb-2017**	21-Jul-2017	✓	**07-Feb-2017**	21-Jul-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 28,	28-D	**29-Jan-2017**	**07-Feb-2017**	28-Jul-2017	✓	**07-Feb-2017**	28-Jul-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) 29,	RINSATE	**30-Jan-2017**	**07-Feb-2017**	29-Jul-2017	✓	**07-Feb-2017**	29-Jul-2017	✓

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
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 20		**17-Jan-2017**	**----**	----	----	**07-Feb-2017**	14-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 21,	22b	**18-Jan-2017**	**----**	----	----	**07-Feb-2017**	15-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 19,	18	**19-Jan-2017**	**----**	----	----	**07-Feb-2017**	16-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 17,	16	**20-Jan-2017**	**----**	----	----	**07-Feb-2017**	17-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 24, 23-D	23,	**22-Jan-2017**	**----**	----	----	**07-Feb-2017**	19-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 28,	28-D	**29-Jan-2017**	**----**	----	----	**07-Feb-2017**	26-Feb-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) 29,	RINSATE	**30-Jan-2017**	**----**	----	----	**07-Feb-2017**	27-Feb-2017	✓
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 20		**17-Jan-2017**	**----**	----	----	**07-Feb-2017**	14-Feb-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 21,	22b	**18-Jan-2017**	**----**	----	----	**07-Feb-2017**	15-Feb-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 19,	18	**19-Jan-2017**	**----**	----	----	**07-Feb-2017**	16-Feb-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 17,	16	**20-Jan-2017**	**----**	----	----	**07-Feb-2017**	17-Feb-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 24, 23-D	23,	**22-Jan-2017**	**----**	----	----	**07-Feb-2017**	19-Feb-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 28,	28-D	**29-Jan-2017**	**----**	----	----	**07-Feb-2017**	26-Feb-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) 29,	RINSATE	**30-Jan-2017**	**----**	----	----	**07-Feb-2017**	27-Feb-2017	✓

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
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G) 20		**17-Jan-2017**	**----**	----	----	**02-Feb-2017**	14-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 21,	22b	**18-Jan-2017**	**----**	----	----	**02-Feb-2017**	15-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 19,	18	**19-Jan-2017**	**----**	----	----	**02-Feb-2017**	16-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 17,	16	**20-Jan-2017**	**----**	----	----	**02-Feb-2017**	17-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 24, 23-D	23,	**22-Jan-2017**	**----**	----	----	**02-Feb-2017**	19-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 28,	28-D	**29-Jan-2017**	**----**	----	----	**02-Feb-2017**	26-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 29,	RINSATE	**30-Jan-2017**	**----**	----	----	**02-Feb-2017**	27-Feb-2017	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) 20		**17-Jan-2017**	**----**	----	----	**02-Feb-2017**	19-Jan-2017	×
Clear Plastic Bottle - Natural (EK057G) 21,	22b	**18-Jan-2017**	**----**	----	----	**02-Feb-2017**	20-Jan-2017	×
Clear Plastic Bottle - Natural (EK057G) 19,	18	**19-Jan-2017**	**----**	----	----	**02-Feb-2017**	21-Jan-2017	×
Clear Plastic Bottle - Natural (EK057G) 17,	16	**20-Jan-2017**	**----**	----	----	**02-Feb-2017**	22-Jan-2017	×
Clear Plastic Bottle - Natural (EK057G) 24, 23-D	23,	**22-Jan-2017**	**----**	----	----	**02-Feb-2017**	24-Jan-2017	×
Clear Plastic Bottle - Natural (EK057G) 28,	28-D	**29-Jan-2017**	**----**	----	----	**02-Feb-2017**	31-Jan-2017	×
Clear Plastic Bottle - Natural (EK057G) 29		**30-Jan-2017**	**----**	----	----	**02-Feb-2017**	01-Feb-2017	×

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
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) 20		**17-Jan-2017**	**----**	----	----	**02-Feb-2017**	14-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 21,	22b	**18-Jan-2017**	**----**	----	----	**02-Feb-2017**	15-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 19,	18	**19-Jan-2017**	**----**	----	----	**02-Feb-2017**	16-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 17,	16	**20-Jan-2017**	**----**	----	----	**02-Feb-2017**	17-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 24, 23-D	23,	**22-Jan-2017**	**----**	----	----	**02-Feb-2017**	19-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 28,	28-D	**29-Jan-2017**	**----**	----	----	**02-Feb-2017**	26-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 29,	RINSATE	**30-Jan-2017**	**----**	----	----	**02-Feb-2017**	27-Feb-2017	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) 20		**17-Jan-2017**	**08-Feb-2017**	14-Feb-2017	✓	**08-Feb-2017**	14-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 21,	22b	**18-Jan-2017**	**08-Feb-2017**	15-Feb-2017	✓	**08-Feb-2017**	15-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 19,	18	**19-Jan-2017**	**08-Feb-2017**	16-Feb-2017	✓	**08-Feb-2017**	16-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 17,	16	**20-Jan-2017**	**08-Feb-2017**	17-Feb-2017	✓	**08-Feb-2017**	17-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 24, 23-D	23,	**22-Jan-2017**	**08-Feb-2017**	19-Feb-2017	✓	**08-Feb-2017**	19-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 28,	28-D	**29-Jan-2017**	**08-Feb-2017**	26-Feb-2017	✓	**08-Feb-2017**	26-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) 29,	RINSATE	**30-Jan-2017**	**08-Feb-2017**	27-Feb-2017	✓	**08-Feb-2017**	27-Feb-2017	✓

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
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) 20		**17-Jan-2017**	**08-Feb-2017**	14-Feb-2017	✓	**08-Feb-2017**	14-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 21,	22b	**18-Jan-2017**	**08-Feb-2017**	15-Feb-2017	✓	**08-Feb-2017**	15-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 19,	18	**19-Jan-2017**	**08-Feb-2017**	16-Feb-2017	✓	**08-Feb-2017**	16-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 17,	16	**20-Jan-2017**	**08-Feb-2017**	17-Feb-2017	✓	**08-Feb-2017**	17-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 24, 23-D	23,	**22-Jan-2017**	**08-Feb-2017**	19-Feb-2017	✓	**08-Feb-2017**	19-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 28,	28-D	**29-Jan-2017**	**08-Feb-2017**	26-Feb-2017	✓	**08-Feb-2017**	26-Feb-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) 29,	RINSATE	**30-Jan-2017**	**08-Feb-2017**	27-Feb-2017	✓	**08-Feb-2017**	27-Feb-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) 20		**17-Jan-2017**	**----**	----	----	**02-Feb-2017**	19-Jan-2017	×
Clear Plastic Bottle - Natural (EK071G) 21,	22b	**18-Jan-2017**	**----**	----	----	**02-Feb-2017**	20-Jan-2017	×
Clear Plastic Bottle - Natural (EK071G) 19,	18	**19-Jan-2017**	**----**	----	----	**02-Feb-2017**	21-Jan-2017	×
Clear Plastic Bottle - Natural (EK071G) 17,	16	**20-Jan-2017**	**----**	----	----	**02-Feb-2017**	22-Jan-2017	×
Clear Plastic Bottle - Natural (EK071G) 24, 23-D	23,	**22-Jan-2017**	**----**	----	----	**02-Feb-2017**	24-Jan-2017	×
Clear Plastic Bottle - Natural (EK071G) 28,	28-D	**29-Jan-2017**	**----**	----	----	**02-Feb-2017**	31-Jan-2017	×
Clear Plastic Bottle - Natural (EK071G) 29		**30-Jan-2017**	**----**	----	----	**02-Feb-2017**	01-Feb-2017	×

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
EP002: Dissolved Organic Carbon (DOC)							
Amber DOC Filtered- Sulfuric Preserved (EP002) 20	**17-Jan-2017**	**----**	----	----	**03-Feb-2017**	14-Feb-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 21, 22b	**18-Jan-2017**	**----**	----	----	**03-Feb-2017**	15-Feb-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 19, 18	**19-Jan-2017**	**----**	----	----	**03-Feb-2017**	16-Feb-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 17, 16	**20-Jan-2017**	**----**	----	----	**03-Feb-2017**	17-Feb-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 24, 23, 23-D	**22-Jan-2017**	**----**	----	----	**03-Feb-2017**	19-Feb-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 28, 28-D	**29-Jan-2017**	**----**	----	----	**03-Feb-2017**	26-Feb-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 29	**30-Jan-2017**	**----**	----	----	**03-Feb-2017**	27-Feb-2017	✓
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005) 20	**17-Jan-2017**	**----**	----	----	**03-Feb-2017**	14-Feb-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) 21, 22b	**18-Jan-2017**	**----**	----	----	**03-Feb-2017**	15-Feb-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) 19, 18	**19-Jan-2017**	**----**	----	----	**03-Feb-2017**	16-Feb-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) 17, 16	**20-Jan-2017**	**----**	----	----	**03-Feb-2017**	17-Feb-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) 24, 23, 23-D	**22-Jan-2017**	**----**	----	----	**03-Feb-2017**	19-Feb-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) 28, 28-D	**29-Jan-2017**	**----**	----	----	**03-Feb-2017**	26-Feb-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) 29	**30-Jan-2017**	**----**	----	----	**03-Feb-2017**	27-Feb-2017	✓

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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM)) 21,	22b	**18-Jan-2017**	**02-Feb-2017**	25-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 19,	18	**19-Jan-2017**	**02-Feb-2017**	26-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 17,	16	**20-Jan-2017**	**02-Feb-2017**	27-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 24, 23-D	23,	**22-Jan-2017**	**02-Feb-2017**	29-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 28,	28-D	**29-Jan-2017**	**02-Feb-2017**	05-Feb-2017	✓	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) 29,	RINSATE	**30-Jan-2017**	**02-Feb-2017**	06-Feb-2017	✓	**08-Feb-2017**	14-Mar-2017	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) 21,	22b	**18-Jan-2017**	**02-Feb-2017**	25-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP071) 19,	18	**19-Jan-2017**	**02-Feb-2017**	26-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP071) 17,	16	**20-Jan-2017**	**02-Feb-2017**	27-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP071) 24, 23-D	23,	**22-Jan-2017**	**02-Feb-2017**	29-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP071) 28,	28-D	**29-Jan-2017**	**02-Feb-2017**	05-Feb-2017	✓	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP071) 29,	RINSATE	**30-Jan-2017**	**02-Feb-2017**	06-Feb-2017	✓	**08-Feb-2017**	14-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 20		**17-Jan-2017**	**03-Feb-2017**	31-Jan-2017	×	**03-Feb-2017**	31-Jan-2017	×
Amber VOC Vial - Sulfuric Acid (EP080) 21,	22b	**18-Jan-2017**	**03-Feb-2017**	01-Feb-2017	×	**03-Feb-2017**	01-Feb-2017	×
Amber VOC Vial - Sulfuric Acid (EP080) 19,	18	**19-Jan-2017**	**03-Feb-2017**	02-Feb-2017	×	**03-Feb-2017**	02-Feb-2017	×
Amber VOC Vial - Sulfuric Acid (EP080) 17,	16	**20-Jan-2017**	**03-Feb-2017**	03-Feb-2017	✓	**03-Feb-2017**	03-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 24, 23-D	23,	**22-Jan-2017**	**03-Feb-2017**	05-Feb-2017	✓	**03-Feb-2017**	05-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 28,	28-D	**29-Jan-2017**	**03-Feb-2017**	12-Feb-2017	✓	**03-Feb-2017**	12-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 29,	RINSATE	**30-Jan-2017**	**03-Feb-2017**	13-Feb-2017	✓	**03-Feb-2017**	13-Feb-2017	✓

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) 21,	22b	**18-Jan-2017**	**02-Feb-2017**	25-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP071) 19,	18	**19-Jan-2017**	**02-Feb-2017**	26-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP071) 17,	16	**20-Jan-2017**	**02-Feb-2017**	27-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP071) 24, 23-D	23,	**22-Jan-2017**	**02-Feb-2017**	29-Jan-2017	×	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP071) 28,	28-D	**29-Jan-2017**	**02-Feb-2017**	05-Feb-2017	✓	**08-Feb-2017**	14-Mar-2017	✓
Amber Glass Bottle - Unpreserved (EP071) 29,	RINSATE	**30-Jan-2017**	**02-Feb-2017**	06-Feb-2017	✓	**08-Feb-2017**	14-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 20		**17-Jan-2017**	**03-Feb-2017**	31-Jan-2017	×	**03-Feb-2017**	31-Jan-2017	×
Amber VOC Vial - Sulfuric Acid (EP080) 21,	22b	**18-Jan-2017**	**03-Feb-2017**	01-Feb-2017	×	**03-Feb-2017**	01-Feb-2017	×
Amber VOC Vial - Sulfuric Acid (EP080) 19,	18	**19-Jan-2017**	**03-Feb-2017**	02-Feb-2017	×	**03-Feb-2017**	02-Feb-2017	×
Amber VOC Vial - Sulfuric Acid (EP080) 17,	16	**20-Jan-2017**	**03-Feb-2017**	03-Feb-2017	✓	**03-Feb-2017**	03-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 24, 23-D	23,	**22-Jan-2017**	**03-Feb-2017**	05-Feb-2017	✓	**03-Feb-2017**	05-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 28,	28-D	**29-Jan-2017**	**03-Feb-2017**	12-Feb-2017	✓	**03-Feb-2017**	12-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 29,	RINSATE	**30-Jan-2017**	**03-Feb-2017**	13-Feb-2017	✓	**03-Feb-2017**	13-Feb-2017	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) 20		**17-Jan-2017**	**03-Feb-2017**	31-Jan-2017	×	**03-Feb-2017**	31-Jan-2017	×
Amber VOC Vial - Sulfuric Acid (EP080) 21,	22b	**18-Jan-2017**	**03-Feb-2017**	01-Feb-2017	×	**03-Feb-2017**	01-Feb-2017	×
Amber VOC Vial - Sulfuric Acid (EP080) 19,	18	**19-Jan-2017**	**03-Feb-2017**	02-Feb-2017	×	**03-Feb-2017**	02-Feb-2017	×
Amber VOC Vial - Sulfuric Acid (EP080) 17,	16	**20-Jan-2017**	**03-Feb-2017**	03-Feb-2017	✓	**03-Feb-2017**	03-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 24, 23-D	23,	**22-Jan-2017**	**03-Feb-2017**	05-Feb-2017	✓	**03-Feb-2017**	05-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 28,	28-D	**29-Jan-2017**	**03-Feb-2017**	12-Feb-2017	✓	**03-Feb-2017**	12-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) 29,	RINSATE	**30-Jan-2017**	**03-Feb-2017**	13-Feb-2017	✓	**03-Feb-2017**	13-Feb-2017	✓

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)							
Alkalinity by PC Titrator	ED037-P	6	52	**11.54**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	13	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	13	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	3	52	**5.77**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

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 Control Samples (LCS) - Continued							
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	13	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Matrix Spikes (MS) - Continued							
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	13	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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
Suspended Solids	EA025	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. 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 BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Total Metals by ICP-MS - Suite B	EG020B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- 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)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Organic Carbon	EP002	WATER	In house: Referenced to APHA 5310 B. This method is compliant with NEPM (2013) Schedule B(3) . Samples are combusted at high termperature in the presence of an oxidative catalyst. The evolved carbon dioxide is quantified using an IR detector.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to 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)
Total Coliforms in Water (MF)	TCMF-WAT	WATER	Total Coliforms analysis of water matrices conducted by Subcontracting Laboratory.

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1703554**	Page	: 1 of 15
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: Customer Services EB
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61-7-3243 7222
Project	: B21414 Elk FW1	Date Samples Received	: 23-Feb-2017 11:40
Order number	: ----	Date Analysis Commenced	: 24-Feb-2017
C-O-C number	: ----	Issue Date	: 02-Mar-2017 14:02
Sampler	: BRAD HILES, DANIEL MORAN		
Site	: ----		
Quote number	: BN/250/15 V5		
No. of samples received	: 15		
No. of samples analysed	: 15		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Amanda Conkie	Organic Chemist	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.
~ = Indicates an estimated value.

- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for some samples. However, the difference is within experimental variation of the methods.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Site 14	Site 9	Site 3b	3b-D	Site 6
				Client sampling date / time	14-Feb-2017 14:00	15-Feb-2017 08:45	15-Feb-2017 12:00	15-Feb-2017 12:00	16-Feb-2017 09:00
Compound	CAS Number	LOR	Unit		EB1703554-001	EB1703554-002	EB1703554-003	EB1703554-004	EB1703554-005
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		21	2	3	2	31
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		85	84	168	169	68
Total Alkalinity as CaCO3	----	1	mg/L		85	84	168	169	68
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		25	10	35	35	13
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		2	1	9	9	2
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		18	21	41	42	18
Magnesium	7439-95-4	1	mg/L		9	5	12	12	5
Sodium	7440-23-5	1	mg/L		10	8	29	26	6
Potassium	7440-09-7	1	mg/L		1	1	2	2	<1
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	0.01
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		0.005	0.005	0.006	0.006	0.007
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Strontium	7440-24-6	0.001	mg/L		0.128	0.151	0.282	0.302	0.114
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L		0.13	<0.05	<0.05	<0.05	<0.05
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.91	0.06	0.07	0.06	1.02
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		0.009	0.005	0.006	0.006	0.015

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Site 14	Site 9	Site 3b	3b-D	Site 6
				Client sampling date / time	14-Feb-2017 14:00	15-Feb-2017 08:45	15-Feb-2017 12:00	15-Feb-2017 12:00	16-Feb-2017 09:00
Compound	CAS Number	LOR	Unit		EB1703554-001	EB1703554-002	EB1703554-003	EB1703554-004	EB1703554-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		**0.002**	<0.001	<0.001	<0.001	**0.002**
Copper	7440-50-8	0.001	mg/L		**0.005**	<0.001	**0.001**	<0.001	**0.002**
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.002**	<0.001	<0.001	<0.001	**0.002**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		**0.024**	<0.005	<0.005	<0.005	<0.005
Strontium	7440-24-6	0.001	mg/L		**0.147**	**0.161**	**0.298**	**0.296**	**0.129**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L		**1.29**	**0.09**	**0.15**	**0.13**	**1.78**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.06**	**0.03**	**0.03**	**0.50**	**0.02**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	**0.02**	**0.02**	**0.03**	**0.02**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	**0.02**	**0.02**	**0.03**	**0.02**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.2**	<0.1	**0.1**	**0.6**	**0.2**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.2**	<0.1	**0.1**	**0.6**	**0.2**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.05**	**0.03**	**0.04**	**0.04**	**0.06**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.02**	**0.01**	**0.02**	**0.02**	**0.01**
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**2.28**	**1.91**	**4.34**	**4.36**	**1.68**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Site 14	Site 9	Site 3b	3b-D	Site 6
				Client sampling date / time	14-Feb-2017 14:00	15-Feb-2017 08:45	15-Feb-2017 12:00	15-Feb-2017 12:00	16-Feb-2017 09:00
Compound	CAS Number	LOR	Unit		EB1703554-001	EB1703554-002	EB1703554-003	EB1703554-004	EB1703554-005
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Total Cations	----	0.01	meq/L		2.10	1.83	4.35	4.26	1.57
Ionic Balance	----	0.01	%		----	----	0.08	1.09	----
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		5	3	6	4	4
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		3	2	5	5	4
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	----	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	----	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	----	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	----	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	----	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	----	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	----	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Site 14	Site 9	Site 3b	3b-D	Site 6
				Client sampling date / time	14-Feb-2017 14:00	15-Feb-2017 08:45	15-Feb-2017 12:00	15-Feb-2017 12:00	16-Feb-2017 09:00
Compound	CAS Number	LOR	Unit		EB1703554-001	EB1703554-002	EB1703554-003	EB1703554-004	EB1703554-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	----	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	----	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	----	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	----	<100	<100	<100
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	----	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**30.9**	----	**32.5**	**32.8**	**29.0**
2-Chlorophenol-D4	93951-73-6	1	%		**74.8**	----	**75.6**	**74.9**	**69.9**
2.4.6-Tribromophenol	118-79-6	1	%		**101**	----	**98.2**	**96.6**	**89.6**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**79.1**	----	**78.8**	**79.0**	**75.0**
Anthracene-d10	1719-06-8	1	%		**75.5**	----	**77.6**	**77.3**	**72.1**
4-Terphenyl-d14	1718-51-0	1	%		**73.1**	----	**74.4**	**73.7**	**68.1**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**84.7**	**79.5**	**88.6**	**85.8**	**91.3**
Toluene-D8	2037-26-5	2	%		**110**	**106**	**102**	**100**	**106**
4-Bromofluorobenzene	460-00-4	2	%		**107**	**96.2**	**97.7**	**98.3**	**97.4**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Site 4	Site 5	Site 2	Site 10	10-D
				Client sampling date / time	16-Feb-2017 13:30	17-Feb-2017 07:30	18-Feb-2017 09:00	18-Feb-2017 14:00	18-Feb-2017 14:00
Compound	CAS Number	LOR	Unit		EB1703554-006	EB1703554-007	EB1703554-008	EB1703554-009	EB1703554-010
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		**10**	**31**	**6**	<1	<1
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**32**	**99**	**92**	**131**	**128**
Total Alkalinity as CaCO3	----	1	mg/L		**32**	**99**	**92**	**131**	**129**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**10**	**30**	**48**	**55**	**55**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		<1	**2**	**1**	**6**	**6**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**8**	**30**	**30**	**32**	**34**
Magnesium	7439-95-4	1	mg/L		**3**	**9**	**14**	**18**	**17**
Sodium	7440-23-5	1	mg/L		**1**	**8**	**5**	**24**	**23**
Potassium	7440-09-7	1	mg/L		<1	**1**	**2**	**2**	**2**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.02**	<0.01	<0.01	<0.01	<0.01
Arsenic	7440-38-2	0.001	mg/L		<0.001	**0.001**	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		**0.002**	**0.004**	**0.008**	**0.005**	**0.005**
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	**0.001**	**0.001**	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
Strontium	7440-24-6	0.001	mg/L		**0.053**	**0.174**	**0.197**	**0.234**	**0.222**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L		<0.05	**0.06**	**0.06**	**0.17**	**0.08**
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.42**	**0.34**	**0.10**	**0.02**	**0.02**
Arsenic	7440-38-2	0.001	mg/L		<0.001	**0.001**	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		**0.003**	**0.004**	**0.009**	**0.005**	**0.005**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Site 4	Site 5	Site 2	Site 10	10-D
				Client sampling date / time	16-Feb-2017 13:30	17-Feb-2017 07:30	18-Feb-2017 09:00	18-Feb-2017 14:00	18-Feb-2017 14:00
Compound	CAS Number	LOR	Unit		EB1703554-006	EB1703554-007	EB1703554-008	EB1703554-009	EB1703554-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	**0.0001**	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	**0.001**	<0.001	<0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	**0.001**	**0.001**	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.006**	<0.005	<0.005	<0.005
Strontium	7440-24-6	0.001	mg/L		**0.056**	**0.190**	**0.216**	**0.242**	**0.242**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L		**0.62**	**0.65**	**0.40**	<0.05	<0.05
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		<0.01	**0.02**	**0.02**	**0.03**	**0.03**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	**0.04**	**0.03**	**0.05**	**0.05**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	**0.04**	**0.03**	**0.05**	**0.05**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		<0.1	<0.1	<0.1	**0.1**	<0.1
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		<0.1	<0.1	<0.1	**0.2**	<0.1
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.04**	**0.05**	**0.05**	**0.06**	**0.05**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	**0.01**	**0.03**	**0.04**	**0.04**
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		**0.85**	**2.66**	**2.86**	**3.93**	**3.89**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Site 4	Site 5	Site 2	Site 10	10-D
				Client sampling date / time	16-Feb-2017 13:30	17-Feb-2017 07:30	18-Feb-2017 09:00	18-Feb-2017 14:00	18-Feb-2017 14:00
Compound	CAS Number	LOR	Unit		EB1703554-006	EB1703554-007	EB1703554-008	EB1703554-009	EB1703554-010
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Total Cations	----	0.01	meq/L		0.69	2.61	2.92	4.17	4.15
Ionic Balance	----	0.01	%		----	----	----	2.98	3.18
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		2	4	3	4	3
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		2	4	3	3	3
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Site 4	Site 5	Site 2	Site 10	10-D
				Client sampling date / time	16-Feb-2017 13:30	17-Feb-2017 07:30	18-Feb-2017 09:00	18-Feb-2017 14:00	18-Feb-2017 14:00
Compound	CAS Number	LOR	Unit		EB1703554-006	EB1703554-007	EB1703554-008	EB1703554-009	EB1703554-010
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	<100	<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	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**30.7**	**31.4**	**31.8**	**33.4**	**30.6**
2-Chlorophenol-D4	93951-73-6	1	%		**73.2**	**72.7**	**72.4**	**78.4**	**69.3**
2.4.6-Tribromophenol	118-79-6	1	%		**95.3**	**95.5**	**91.1**	**95.2**	**84.4**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**77.8**	**77.4**	**74.4**	**81.0**	**74.6**
Anthracene-d10	1719-06-8	1	%		**75.6**	**75.2**	**72.4**	**79.8**	**75.1**
4-Terphenyl-d14	1718-51-0	1	%		**70.6**	**71.3**	**70.1**	**77.4**	**71.4**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**88.0**	**90.2**	**96.5**	**95.6**	**102**
Toluene-D8	2037-26-5	2	%		**95.8**	**102**	**105**	**103**	**99.0**
4-Bromofluorobenzene	460-00-4	2	%		**95.2**	**99.6**	**101**	**98.7**	**98.2**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Rinsate	Site 13	Site 12	Site 15	Site 11
				Client sampling date / time	19-Feb-2017 07:00	19-Feb-2017 09:00	[19-Feb-2017]	19-Feb-2017 12:00	19-Feb-2017 08:30
Compound	CAS Number	LOR	Unit		EB1703554-011	EB1703554-012	EB1703554-013	EB1703554-014	EB1703554-015
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		----	50	94	71	428
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		----	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		----	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		----	38	38	41	66
Total Alkalinity as CaCO3	----	1	mg/L		----	38	38	41	66
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	27	12	4	3
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		----	2	1	1	<1
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		----	10	15	12	21
Magnesium	7439-95-4	1	mg/L		----	5	3	2	2
Sodium	7440-23-5	1	mg/L		----	6	<1	<1	<1
Potassium	7440-09-7	1	mg/L		----	1	<1	<1	<1
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	0.02	0.03	0.02	0.03
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	0.001	mg/L		<0.001	0.007	0.006	0.005	0.006
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	0.002	0.001	0.001	<0.001
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	0.006	<0.005
Strontium	7440-24-6	0.001	mg/L		<0.001	0.081	0.091	0.065	0.112
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Iron	7439-89-6	0.05	mg/L		<0.05	0.18	0.11	0.09	<0.05
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	2.12	4.22	3.68	11.8
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	0.001	0.002
Barium	7440-39-3	0.001	mg/L		<0.001	0.014	0.021	0.017	0.053

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Rinsate	Site 13	Site 12	Site 15	Site 11
				Client sampling date / time	19-Feb-2017 07:00	19-Feb-2017 09:00	[19-Feb-2017]	19-Feb-2017 12:00	19-Feb-2017 08:30
Compound	CAS Number	LOR	Unit		EB1703554-011	EB1703554-012	EB1703554-013	EB1703554-014	EB1703554-015
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	**0.005**	**0.007**	**0.006**	**0.016**
Copper	7440-50-8	0.001	mg/L		<0.001	**0.006**	**0.008**	**0.006**	**0.018**
Cobalt	7440-48-4	0.001	mg/L		<0.001	**0.002**	**0.003**	**0.002**	**0.008**
Nickel	7440-02-0	0.001	mg/L		<0.001	**0.005**	**0.006**	**0.006**	**0.015**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	**0.002**	**0.001**	**0.005**
Zinc	7440-66-6	0.005	mg/L		<0.005	**0.006**	**0.014**	**0.011**	**0.033**
Strontium	7440-24-6	0.001	mg/L		<0.001	**0.090**	**0.099**	**0.082**	**0.178**
Tin	7440-31-5	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	0.01	mg/L		<0.01	<0.01	**0.01**	**0.01**	**0.03**
Iron	7439-89-6	0.05	mg/L		<0.05	**3.98**	**6.50**	**5.85**	**17.4**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		<0.01	**0.03**	**0.01**	<0.01	**0.83**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	**0.04**	**0.04**	<0.01	**0.04**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	**0.04**	**0.04**	<0.01	**0.04**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		<0.1	**0.4**	**0.4**	**0.3**	**1.5**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		<0.1	**0.4**	**0.4**	**0.3**	**1.5**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.01**	**0.14**	**0.15**	**0.08**	**0.40**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		----	**0.01**	**0.01**	<0.01	**0.02**
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		----	**1.38**	**1.04**	**0.93**	**1.38**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Rinsate	Site 13	Site 12	Site 15	Site 11
				Client sampling date / time	19-Feb-2017 07:00	19-Feb-2017 09:00	[19-Feb-2017]	19-Feb-2017 12:00	19-Feb-2017 08:30
Compound	CAS Number	LOR	Unit		EB1703554-011	EB1703554-012	EB1703554-013	EB1703554-014	EB1703554-015
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
Total Cations	----	0.01	meq/L		**----**	**1.20**	**1.00**	**0.76**	**1.21**
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		**1**	**6**	**5**	**5**	**3**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		<1	**5**	**4**	**4**	**3**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Rinsate	Site 13	Site 12	Site 15	Site 11
				Client sampling date / time	19-Feb-2017 07:00	19-Feb-2017 09:00	[19-Feb-2017]	19-Feb-2017 12:00	19-Feb-2017 08:30
Compound	CAS Number	LOR	Unit		EB1703554-011	EB1703554-012	EB1703554-013	EB1703554-014	EB1703554-015
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	<100	<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	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		**30.4**	**28.9**	**31.3**	**29.5**	**29.7**
2-Chlorophenol-D4	93951-73-6	1	%		**73.8**	**71.9**	**72.6**	**72.6**	**70.3**
2.4.6-Tribromophenol	118-79-6	1	%		**98.7**	**94.8**	**96.3**	**97.9**	**93.7**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		**73.2**	**72.8**	**74.9**	**73.3**	**71.8**
Anthracene-d10	1719-06-8	1	%		**74.8**	**72.4**	**74.7**	**75.2**	**73.4**
4-Terphenyl-d14	1718-51-0	1	%		**73.1**	**69.6**	**71.7**	**72.8**	**70.5**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**98.7**	**98.7**	**93.6**	**95.2**	**98.7**
Toluene-D8	2037-26-5	2	%		**102**	**100**	**97.0**	**99.1**	**100**
4-Bromofluorobenzene	460-00-4	2	%		**96.5**	**94.7**	**90.1**	**93.4**	**99.2**

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	72
2-Chlorophenol-D4	93951-73-6	27	130
2.4.6-Tribromophenol	118-79-6	19	181
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	14	146
Anthracene-d10	1719-06-8	35	137
4-Terphenyl-d14	1718-51-0	36	154
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB1703554**	Page	: 1 of 10
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Contact	: Customer Services EB
Address	: PO BOX 203 SPRING HILL BRISBANE QLD 4004	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 3831 6744	Telephone	: +61-7-3243 7222
Project	: B21414 Elk FW1	Date Samples Received	: 23-Feb-2017
Order number	: ----	Date Analysis Commenced	: 24-Feb-2017
C-O-C number	: ----	Issue Date	: 02-Mar-2017
Sampler	: BRAD HILES, DANIEL MORAN		
Site	: ----		
Quote number	: BN/250/15 V5		
No. of samples received	: 15		
No. of samples analysed	: 15		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Amanda Conkie	Organic Chemist	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

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

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 (%)*
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 768344)									
EB1703554-001	Site 14	EA025: Suspended Solids (SS)	----	1	mg/L	21	21	0.00	0% - 20%
EB1703554-012	Site 13	EA025: Suspended Solids (SS)	----	1	mg/L	50	52	4.23	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 768815)									
EB1703497-021	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1040	1050	0.656	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1040	1050	0.656	0% - 20%
EB1703554-009	Site 10	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	131	128	1.86	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	131	128	1.86	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 768772)									
EB1703554-001	Site 14	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	25	25	0.00	0% - 20%
EB1703554-012	Site 13	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	27	28	0.00	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 768771)									
EB1703554-001	Site 14	ED045G: Chloride	16887-00-6	1	mg/L	2	2	0.00	No Limit
EB1703554-012	Site 13	ED045G: Chloride	16887-00-6	1	mg/L	2	2	0.00	No Limit
ED093F: Dissolved Major Cations (QC Lot: 769398)									
EB1703554-010	10-D	ED093F: Calcium	7440-70-2	1	mg/L	34	33	0.00	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	17	17	0.00	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	23	22	0.00	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.00	No Limit
EB1703554-001	Site 14	ED093F: Calcium	7440-70-2	1	mg/L	18	18	0.00	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	9	8	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 (%)*
ED093F: Dissolved Major Cations (QC Lot: 769398) - continued									
EB1703554-001	Site 14	ED093F: Sodium	7440-23-5	1	mg/L	10	10	0.00	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	1	1	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 769395)									
EB1703554-010	10-D	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.222	0.232	4.47	0% - 20%
EB1703554-001	Site 14	EG020B-F: Strontium	7440-24-6	0.001	mg/L	0.128	0.137	6.55	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 769396)									
EB1703554-010	10-D	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.08	0.07	23.0	No Limit
EB1703554-001	Site 14	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.13	0.05	85.2	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 769474)									
EB1703554-001	Site 14	EG020B-T: Strontium	7440-24-6	0.001	mg/L	0.147	0.146	0.00	0% - 20%
EB1703554-010	10-D	EG020B-T: Strontium	7440-24-6	0.001	mg/L	0.242	0.240	0.596	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 769475)									
EB1703554-001	Site 14	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.009	0.010	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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 769475) - continued									
EB1703554-001	Site 14	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.024	0.019	19.6	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.91	0.90	1.11	0% - 20%
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	1.29	1.24	3.98	0% - 20%
EB1703554-010	10-D	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Barium	7440-39-3	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.002	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.02	0.01	0.00	No Limit
		EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 769397)									
EB1703554-011	Rinsate	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EB1703554-001	Site 14	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 769479)									
EB1703554-001	Site 14	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EB1703554-011	Rinsate	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 768306)									
EB1703554-001	Site 14	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.06	<0.01	139	No Limit
EB1703554-011	Rinsate	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 768770)									
EB1703554-001	Site 14	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB1703554-012	Site 13	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 768305)									
EB1703554-001	Site 14	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EB1703554-011	Rinsate	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 769191)									

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 (%)*
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 769191) - continued									
EB1703554-001	Site 14	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EB1703554-011	Rinsate	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 769190)									
EB1703554-001	Site 14	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.05	0.00	No Limit
EB1703554-011	Rinsate	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.01	0.01	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 768769)									
EB1703554-001	Site 14	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.02	0.00	No Limit
EB1703554-012	Site 13	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.01	0.01	0.00	No Limit
EP002: Dissolved Organic Carbon (DOC) (QC Lot: 769487)									
EB1703554-001	Site 14	EP002: Dissolved Organic Carbon	----	1	mg/L	5	5	0.00	No Limit
EB1703554-010	10-D	EP002: Dissolved Organic Carbon	----	1	mg/L	3	4	0.00	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 769488)									
EB1703554-001	Site 14	EP005: Total Organic Carbon	----	1	mg/L	3	4	0.00	No Limit
EB1703554-010	10-D	EP005: Total Organic Carbon	----	1	mg/L	3	3	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 769485)									
EB1703554-001	Site 14	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EB1703554-011	Rinsate	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 769485)									
EB1703554-001	Site 14	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EB1703554-011	Rinsate	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 769485)									
EB1703554-001	Site 14	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EB1703554-011	Rinsate	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	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 Spike (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			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 768344)								
EA025: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	100	84	120
				<1	1000 mg/L	98.4	84	120
ED037P: Alkalinity by PC Titrator (QCLot: 768815)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	97.3	80	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 768772)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	111	85	118
				<1	100 mg/L	99.2	85	118
ED045G: Chloride by Discrete Analyser (QCLot: 768771)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	101	90	115
				<1	1000 mg/L	105	90	115
ED093F: Dissolved Major Cations (QCLot: 769398)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
ED093F: Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
ED093F: Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
ED093F: Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 769395)								
EG020B-F: Strontium	7440-24-6	0.001	mg/L	<0.001	0.5 mg/L	96.5	86	111
EG020F: Dissolved Metals by ICP-MS (QCLot: 769396)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.7	79	118
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	100	88	116
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.5 mg/L	92.9	70	130
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.7	88	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.6	87	113
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	98.1	86	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	101	88	114
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.7	89	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.0	89	113
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	101	86	112
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	106	88	114
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	90.9	87	113
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.5	82	114
EG020T: Total Metals by ICP-MS (QCLot: 769474)								
EG020B-T: Strontium	7440-24-6	0.001	mg/L	<0.001	0.5 mg/L	106	86	112

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 769475)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.5	80	114
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	102	88	112
EG020A-T: Barium	7440-39-3	0.001	mg/L	<0.001	0.5 mg/L	101	70	130
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.2	88	111
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	89	115
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	102	89	115
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	104	88	116
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	89	112
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	88	116
EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	103	86	116
EG020A-T: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	103	87	114
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	98.5	84	114
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	106	82	118
EG035F: Dissolved Mercury by FIMS (QCLot: 769397)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	91.2	84	118
EG035T: Total Recoverable Mercury by FIMS (QCLot: 769479)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	94.5	80	100
EK055G: Ammonia as N by Discrete Analyser (QCLot: 768306)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	94.1	86	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 768770)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	95.4	90	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 768305)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	97.5	89	115
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 769191)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	97.0	70	111
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 769190)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	100.0	77	109
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 768769)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	99.0	88	115
EP002: Dissolved Organic Carbon (DOC) (QCLot: 769487)								
EP002: Dissolved Organic Carbon	----	1	mg/L	<1	10 mg/L	111	80	112
				<1	100 mg/L	109	80	112
EP005: Total Organic Carbon (TOC) (QCLot: 769488)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	106	79	113
				<1	100 mg/L	109	79	113
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 768288)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	10 µg/L	81.0	47	101

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 768288) - continued								
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	10 µg/L	84.1	46	109
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	10 µg/L	92.5	50	104
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	10 µg/L	84.1	50	114
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	10 µg/L	95.6	49	114
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	10 µg/L	92.9	48	113
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	10 µg/L	96.2	48	120
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	10 µg/L	80.2	48	119
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	10 µg/L	78.3	48	125
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	10 µg/L	76.0	45	119
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	10 µg/L	82.9	43	130
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	10 µg/L	69.6	46	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	10 µg/L	75.4	49	125
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	10 µg/L	67.1	40	132
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	10 µg/L	61.4	42	140
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	10 µg/L	73.7	39	136
EP080/071: Total Petroleum Hydrocarbons (QCLot: 768289)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	1211 µg/L	94.6	38	114
EP071: C15 - C28 Fraction	----	100	µg/L	<100	2103 µg/L	102	50	132
EP071: C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 769485)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	160 µg/L	87.6	76	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 768289)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	1696 µg/L	96.6	43	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	1496 µg/L	103	49	134
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 769485)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	185 µg/L	85.2	75	123
EP080: C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
EP080: BTEXN (QCLot: 769485)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	90.6	77	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	96.7	78	122
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	88.1	78	119
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	20 µg/L	85.0	77	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	82.6	76	121
EP080: Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080: BTEXN (QCLot: 769485) - continued								
EP080: Sum of BTEX	----	1	µg/L	<1	----	----	----	----
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	90.3	75	120

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**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 768772)							
EB1703554-002	Site 9	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	119	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 768771)							
EB1703554-002	Site 9	ED045G: Chloride	16887-00-6	400 mg/L	103	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 769396)							
EB1703554-002	Site 9	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	91.9	70	130
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	99.5	70	130
		EG020A-F: Barium	7440-39-3	0.5 mg/L	96.0	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	102	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	97.6	70	130
		EG020A-F: Cobalt	7440-48-4	0.1 mg/L	97.8	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	101	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	92.9	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	95.2	70	130
		EG020A-F: Tin	7440-31-5	0.1 mg/L	92.1	70	130
		EG020A-F: Vanadium	7440-62-2	0.1 mg/L	99.3	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	90.2	70	130
EG020T: Total Metals by ICP-MS (QCLot: 769475)							
EB1703554-002	Site 9	EG020A-T: Arsenic	7440-38-2	1 mg/L	102	70	130
		EG020A-T: Barium	7440-39-3	1 mg/L	99.3	70	130
		EG020A-T: Cadmium	7440-43-9	0.5 mg/L	100	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	104	70	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	106	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	105	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	105	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	102	70	130
		EG020A-T: Vanadium	7440-62-2	1 mg/L	104	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	99.1	70	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
EG035F: Dissolved Mercury by FIMS (QCLot: 769397)							
EB1703554-002	Site 9	EG035F: Mercury	7439-97-6	0.01 mg/L	79.0	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 769479)							
EB1703554-002	Site 9	EG035T: Mercury	7439-97-6	0.01 mg/L	81.8	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 768306)							
EB1703554-002	Site 9	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	97.6	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 768770)							
EB1703554-002	Site 9	EK057G: Nitrite as N	14797-65-0	0.4 mg/L	98.5	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 768305)							
EB1703554-002	Site 9	EK059G: Nitrite + Nitrate as N	----	0.4 mg/L	96.0	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 769191)							
EB1703554-002	Site 9	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	91.7	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 769190)							
EB1703554-002	Site 9	EK067G: Total Phosphorus as P	----	1 mg/L	103	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 768769)							
EB1703554-002	Site 9	EK071G: Reactive Phosphorus as P	14265-44-2	0.4 mg/L	104	70	130
EP002: Dissolved Organic Carbon (DOC) (QCLot: 769487)							
EB1703554-002	Site 9	EP002: Dissolved Organic Carbon	----	100 mg/L	118	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 769488)							
EB1703554-002	Site 9	EP005: Total Organic Carbon	----	100 mg/L	110	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 769485)							
EB1703554-002	Site 9	EP080: C6 - C9 Fraction	----	40 µg/L	78.9	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 769485)							
EB1703554-002	Site 9	EP080: C6 - C10 Fraction	C6_C10	40 µg/L	80.5	70	130
EP080: BTEXN (QCLot: 769485)							
EB1703554-002	Site 9	EP080: Benzene	71-43-2	10 µg/L	81.3	70	130
		EP080: Toluene	108-88-3	10 µg/L	91.2	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB1703554**	Page	: 1 of 21
Client	: **BMT WBM GROUP LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR JEREMY VISSER	Telephone	: +61-7-3243 7222
Project	: B21414 Elk FW1	Date Samples Received	: 23-Feb-2017
Site	: ----	Issue Date	: 02-Mar-2017
Sampler	: BRAD HILES, DANIEL MORAN	No. of samples received	: 15
Order number	: ----	No. of samples analysed	: 15

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.**
- **NO Matrix Spike outliers occur.**
- **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 : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA025: Total Suspended Solids dried at 104 ± 2°C						
Clear Plastic Bottle - Natural						
Site 14	----	----	----	24-Feb-2017	21-Feb-2017	**3**
Clear Plastic Bottle - Natural						
Site 9, Site 3b, 3b-D	----	----	----	24-Feb-2017	22-Feb-2017	**2**
Clear Plastic Bottle - Natural						
Site 6, Site 4	----	----	----	24-Feb-2017	23-Feb-2017	**1**
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural						
Site 14	----	----	----	25-Feb-2017	16-Feb-2017	**9**
Clear Plastic Bottle - Natural						
Site 9, Site 3b, 3b-D	----	----	----	25-Feb-2017	17-Feb-2017	**8**
Clear Plastic Bottle - Natural						
Site 6, Site 4	----	----	----	25-Feb-2017	18-Feb-2017	**7**
Clear Plastic Bottle - Natural						
Site 5	----	----	----	25-Feb-2017	19-Feb-2017	**6**
Clear Plastic Bottle - Natural						
Site 2, Site 10, 10-D	----	----	----	25-Feb-2017	20-Feb-2017	**5**
Clear Plastic Bottle - Natural						
Site 13, Site 12, Site 15, Site 11	----	----	----	25-Feb-2017	21-Feb-2017	**4**
EK071G: Reactive Phosphorus as P by discrete analyser						
Clear Plastic Bottle - Natural						
Site 14	----	----	----	25-Feb-2017	16-Feb-2017	**9**
Clear Plastic Bottle - Natural						
Site 9, Site 3b, 3b-D	----	----	----	25-Feb-2017	17-Feb-2017	**8**
Clear Plastic Bottle - Natural						
Site 6, Site 4	----	----	----	25-Feb-2017	18-Feb-2017	**7**
Clear Plastic Bottle - Natural						
Site 5	----	----	----	25-Feb-2017	19-Feb-2017	**6**
Clear Plastic Bottle - Natural						
Site 2, Site 10, 10-D	----	----	----	25-Feb-2017	20-Feb-2017	**5**
Clear Plastic Bottle - Natural						
Site 13, Site 12, Site 15, Site 11	----	----	----	25-Feb-2017	21-Feb-2017	**4**

Matrix: **WATER**

Method / Container / Client Sample ID(s)		Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved							
Site 14		24-Feb-2017	21-Feb-2017	**3**	----	----	----
Amber Glass Bottle - Unpreserved							
Site 3b,	3b-D	24-Feb-2017	22-Feb-2017	**2**	----	----	----
Amber Glass Bottle - Unpreserved							
Site 6,	Site 4	24-Feb-2017	23-Feb-2017	**1**	----	----	----
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved							
Site 14		24-Feb-2017	21-Feb-2017	**3**	----	----	----
Amber Glass Bottle - Unpreserved							
Site 3b,	3b-D	24-Feb-2017	22-Feb-2017	**2**	----	----	----
Amber Glass Bottle - Unpreserved							
Site 6,	Site 4	24-Feb-2017	23-Feb-2017	**1**	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved							
Site 14		24-Feb-2017	21-Feb-2017	**3**	----	----	----
Amber Glass Bottle - Unpreserved							
Site 3b,	3b-D	24-Feb-2017	22-Feb-2017	**2**	----	----	----
Amber Glass Bottle - Unpreserved							
Site 6,	Site 4	24-Feb-2017	23-Feb-2017	**1**	----	----	----

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count: QC	Count: Regular	Rate (%): Actual	Rate (%): Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	14	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	15	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	14	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	15	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025) Site 14	**14-Feb-2017**	**----**	----	----	**24-Feb-2017**	21-Feb-2017	×
Clear Plastic Bottle - Natural (EA025) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**24-Feb-2017**	22-Feb-2017	×
Clear Plastic Bottle - Natural (EA025) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**24-Feb-2017**	23-Feb-2017	×
Clear Plastic Bottle - Natural (EA025) Site 5	**17-Feb-2017**	**----**	----	----	**24-Feb-2017**	24-Feb-2017	✓
Clear Plastic Bottle - Natural (EA025) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**24-Feb-2017**	25-Feb-2017	✓
Clear Plastic Bottle - Natural (EA025) Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**24-Feb-2017**	26-Feb-2017	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) Site 14	**14-Feb-2017**	**----**	----	----	**25-Feb-2017**	28-Feb-2017	✓
Clear Plastic Bottle - Natural (ED037-P) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**25-Feb-2017**	01-Mar-2017	✓
Clear Plastic Bottle - Natural (ED037-P) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**25-Feb-2017**	02-Mar-2017	✓
Clear Plastic Bottle - Natural (ED037-P) Site 5	**17-Feb-2017**	**----**	----	----	**25-Feb-2017**	03-Mar-2017	✓
Clear Plastic Bottle - Natural (ED037-P) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**25-Feb-2017**	04-Mar-2017	✓
Clear Plastic Bottle - Natural (ED037-P) Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**25-Feb-2017**	05-Mar-2017	✓

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) Site 14	**14-Feb-2017**	**----**	----	----	**25-Feb-2017**	14-Mar-2017	✓
Clear Plastic Bottle - Natural (ED041G) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**25-Feb-2017**	15-Mar-2017	✓
Clear Plastic Bottle - Natural (ED041G) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**25-Feb-2017**	16-Mar-2017	✓
Clear Plastic Bottle - Natural (ED041G) Site 5	**17-Feb-2017**	**----**	----	----	**25-Feb-2017**	17-Mar-2017	✓
Clear Plastic Bottle - Natural (ED041G) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**25-Feb-2017**	18-Mar-2017	✓
Clear Plastic Bottle - Natural (ED041G) Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**25-Feb-2017**	19-Mar-2017	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) Site 14	**14-Feb-2017**	**----**	----	----	**25-Feb-2017**	14-Mar-2017	✓
Clear Plastic Bottle - Natural (ED045G) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**25-Feb-2017**	15-Mar-2017	✓
Clear Plastic Bottle - Natural (ED045G) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**25-Feb-2017**	16-Mar-2017	✓
Clear Plastic Bottle - Natural (ED045G) Site 5	**17-Feb-2017**	**----**	----	----	**25-Feb-2017**	17-Mar-2017	✓
Clear Plastic Bottle - Natural (ED045G) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**25-Feb-2017**	18-Mar-2017	✓
Clear Plastic Bottle - Natural (ED045G) Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**25-Feb-2017**	19-Mar-2017	✓

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
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) Site 14	**14-Feb-2017**	**----**	----	----	**27-Feb-2017**	14-Mar-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**27-Feb-2017**	15-Mar-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**27-Feb-2017**	16-Mar-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) Site 5	**17-Feb-2017**	**----**	----	----	**27-Feb-2017**	17-Mar-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**27-Feb-2017**	18-Mar-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**27-Feb-2017**	19-Mar-2017	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) Site 14	**14-Feb-2017**	**----**	----	----	**27-Feb-2017**	13-Aug-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**27-Feb-2017**	14-Aug-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**27-Feb-2017**	15-Aug-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) Site 5	**17-Feb-2017**	**----**	----	----	**27-Feb-2017**	16-Aug-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**27-Feb-2017**	17-Aug-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020B-F) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**27-Feb-2017**	18-Aug-2017	✓

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
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) Site 14	**14-Feb-2017**	**27-Feb-2017**	13-Aug-2017	✓	**27-Feb-2017**	13-Aug-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**27-Feb-2017**	14-Aug-2017	✓	**27-Feb-2017**	14-Aug-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) Site 6, Site 4	**16-Feb-2017**	**27-Feb-2017**	15-Aug-2017	✓	**27-Feb-2017**	15-Aug-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) Site 5	**17-Feb-2017**	**27-Feb-2017**	16-Aug-2017	✓	**27-Feb-2017**	16-Aug-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) Site 2, Site 10, 10-D	**18-Feb-2017**	**27-Feb-2017**	17-Aug-2017	✓	**27-Feb-2017**	17-Aug-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020B-T) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**27-Feb-2017**	18-Aug-2017	✓	**27-Feb-2017**	18-Aug-2017	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) Site 14	**14-Feb-2017**	**----**	----	----	**28-Feb-2017**	14-Mar-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**28-Feb-2017**	15-Mar-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**28-Feb-2017**	16-Mar-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) Site 5	**17-Feb-2017**	**----**	----	----	**28-Feb-2017**	17-Mar-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**28-Feb-2017**	18-Mar-2017	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**28-Feb-2017**	19-Mar-2017	✓

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
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) Site 14	**14-Feb-2017**	**----**	----	----	**28-Feb-2017**	14-Mar-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**28-Feb-2017**	15-Mar-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**28-Feb-2017**	16-Mar-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) Site 5	**17-Feb-2017**	**----**	----	----	**28-Feb-2017**	17-Mar-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**28-Feb-2017**	18-Mar-2017	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**28-Feb-2017**	19-Mar-2017	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) Site 14	**14-Feb-2017**	**----**	----	----	**25-Feb-2017**	14-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**25-Feb-2017**	15-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**25-Feb-2017**	16-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) Site 5	**17-Feb-2017**	**----**	----	----	**25-Feb-2017**	17-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**25-Feb-2017**	18-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**25-Feb-2017**	19-Mar-2017	✓

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
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) Site 14	**14-Feb-2017**	**----**	----	----	**25-Feb-2017**	16-Feb-2017	×
Clear Plastic Bottle - Natural (EK057G) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**25-Feb-2017**	17-Feb-2017	×
Clear Plastic Bottle - Natural (EK057G) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**25-Feb-2017**	18-Feb-2017	×
Clear Plastic Bottle - Natural (EK057G) Site 5	**17-Feb-2017**	**----**	----	----	**25-Feb-2017**	19-Feb-2017	×
Clear Plastic Bottle - Natural (EK057G) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**25-Feb-2017**	20-Feb-2017	×
Clear Plastic Bottle - Natural (EK057G) Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**25-Feb-2017**	21-Feb-2017	×
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) Site 14	**14-Feb-2017**	**----**	----	----	**25-Feb-2017**	14-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**25-Feb-2017**	15-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**25-Feb-2017**	16-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) Site 5	**17-Feb-2017**	**----**	----	----	**25-Feb-2017**	17-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**25-Feb-2017**	18-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**25-Feb-2017**	19-Mar-2017	✓

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
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) Site 14	**14-Feb-2017**	**27-Feb-2017**	14-Mar-2017	✓	**27-Feb-2017**	14-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**27-Feb-2017**	15-Mar-2017	✓	**27-Feb-2017**	15-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) Site 6, Site 4	**16-Feb-2017**	**27-Feb-2017**	16-Mar-2017	✓	**27-Feb-2017**	16-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) Site 5	**17-Feb-2017**	**27-Feb-2017**	17-Mar-2017	✓	**27-Feb-2017**	17-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) Site 2, Site 10, 10-D	**18-Feb-2017**	**27-Feb-2017**	18-Mar-2017	✓	**27-Feb-2017**	18-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**27-Feb-2017**	19-Mar-2017	✓	**27-Feb-2017**	19-Mar-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) Site 14	**14-Feb-2017**	**27-Feb-2017**	14-Mar-2017	✓	**27-Feb-2017**	14-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**27-Feb-2017**	15-Mar-2017	✓	**27-Feb-2017**	15-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) Site 6, Site 4	**16-Feb-2017**	**27-Feb-2017**	16-Mar-2017	✓	**27-Feb-2017**	16-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) Site 5	**17-Feb-2017**	**27-Feb-2017**	17-Mar-2017	✓	**27-Feb-2017**	17-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) Site 2, Site 10, 10-D	**18-Feb-2017**	**27-Feb-2017**	18-Mar-2017	✓	**27-Feb-2017**	18-Mar-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**27-Feb-2017**	19-Mar-2017	✓	**27-Feb-2017**	19-Mar-2017	✓

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
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) Site 14	**14-Feb-2017**	**----**	----	----	**25-Feb-2017**	16-Feb-2017	×
Clear Plastic Bottle - Natural (EK071G) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**25-Feb-2017**	17-Feb-2017	×
Clear Plastic Bottle - Natural (EK071G) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**25-Feb-2017**	18-Feb-2017	×
Clear Plastic Bottle - Natural (EK071G) Site 5	**17-Feb-2017**	**----**	----	----	**25-Feb-2017**	19-Feb-2017	×
Clear Plastic Bottle - Natural (EK071G) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**25-Feb-2017**	20-Feb-2017	×
Clear Plastic Bottle - Natural (EK071G) Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**25-Feb-2017**	21-Feb-2017	×
EP002: Dissolved Organic Carbon (DOC)							
Amber DOC Filtered- Sulfuric Preserved (EP002) Site 14	**14-Feb-2017**	**----**	----	----	**27-Feb-2017**	14-Mar-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**27-Feb-2017**	15-Mar-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**27-Feb-2017**	16-Mar-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) Site 5	**17-Feb-2017**	**----**	----	----	**27-Feb-2017**	17-Mar-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**27-Feb-2017**	18-Mar-2017	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**27-Feb-2017**	19-Mar-2017	✓

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
EP005: Total Organic Carbon (TOC)							
Amber TOC Vial - Sulfuric Acid (EP005) Site 14	**14-Feb-2017**	**----**	----	----	**27-Feb-2017**	14-Mar-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**----**	----	----	**27-Feb-2017**	15-Mar-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) Site 6, Site 4	**16-Feb-2017**	**----**	----	----	**27-Feb-2017**	16-Mar-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) Site 5	**17-Feb-2017**	**----**	----	----	**27-Feb-2017**	17-Mar-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) Site 2, Site 10, 10-D	**18-Feb-2017**	**----**	----	----	**27-Feb-2017**	18-Mar-2017	✓
Amber TOC Vial - Sulfuric Acid (EP005) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**----**	----	----	**27-Feb-2017**	19-Mar-2017	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) Site 14	**14-Feb-2017**	**24-Feb-2017**	21-Feb-2017	×	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) Site 3b, 3b-D	**15-Feb-2017**	**24-Feb-2017**	22-Feb-2017	×	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) Site 6, Site 4	**16-Feb-2017**	**24-Feb-2017**	23-Feb-2017	×	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) Site 5	**17-Feb-2017**	**24-Feb-2017**	24-Feb-2017	✓	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) Site 2, Site 10, 10-D	**18-Feb-2017**	**24-Feb-2017**	25-Feb-2017	✓	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP075(SIM)) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**24-Feb-2017**	26-Feb-2017	✓	**28-Feb-2017**	05-Apr-2017	✓

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
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) Site 14	**14-Feb-2017**	**24-Feb-2017**	21-Feb-2017	×	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP071) Site 3b, 3b-D	**15-Feb-2017**	**24-Feb-2017**	22-Feb-2017	×	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP071) Site 6, Site 4	**16-Feb-2017**	**24-Feb-2017**	23-Feb-2017	×	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP071) Site 5	**17-Feb-2017**	**24-Feb-2017**	24-Feb-2017	✓	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP071) Site 2, Site 10, 10-D	**18-Feb-2017**	**24-Feb-2017**	25-Feb-2017	✓	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP071) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**24-Feb-2017**	26-Feb-2017	✓	**28-Feb-2017**	05-Apr-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 14	**14-Feb-2017**	**27-Feb-2017**	28-Feb-2017	✓	**27-Feb-2017**	28-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**27-Feb-2017**	01-Mar-2017	✓	**27-Feb-2017**	01-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 6, Site 4	**16-Feb-2017**	**27-Feb-2017**	02-Mar-2017	✓	**27-Feb-2017**	02-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 5	**17-Feb-2017**	**27-Feb-2017**	03-Mar-2017	✓	**27-Feb-2017**	03-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 2, Site 10, 10-D	**18-Feb-2017**	**27-Feb-2017**	04-Mar-2017	✓	**27-Feb-2017**	04-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**27-Feb-2017**	05-Mar-2017	✓	**27-Feb-2017**	05-Mar-2017	✓

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) Site 14	**14-Feb-2017**	**24-Feb-2017**	21-Feb-2017	×	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP071) Site 3b, 3b-D	**15-Feb-2017**	**24-Feb-2017**	22-Feb-2017	×	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP071) Site 6, Site 4	**16-Feb-2017**	**24-Feb-2017**	23-Feb-2017	×	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP071) Site 5	**17-Feb-2017**	**24-Feb-2017**	24-Feb-2017	✓	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP071) Site 2, Site 10, 10-D	**18-Feb-2017**	**24-Feb-2017**	25-Feb-2017	✓	**28-Feb-2017**	05-Apr-2017	✓
Amber Glass Bottle - Unpreserved (EP071) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**24-Feb-2017**	26-Feb-2017	✓	**28-Feb-2017**	05-Apr-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 14	**14-Feb-2017**	**27-Feb-2017**	28-Feb-2017	✓	**27-Feb-2017**	28-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**27-Feb-2017**	01-Mar-2017	✓	**27-Feb-2017**	01-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 6, Site 4	**16-Feb-2017**	**27-Feb-2017**	02-Mar-2017	✓	**27-Feb-2017**	02-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 5	**17-Feb-2017**	**27-Feb-2017**	03-Mar-2017	✓	**27-Feb-2017**	03-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 2, Site 10, 10-D	**18-Feb-2017**	**27-Feb-2017**	04-Mar-2017	✓	**27-Feb-2017**	04-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**27-Feb-2017**	05-Mar-2017	✓	**27-Feb-2017**	05-Mar-2017	✓

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
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) Site 14	**14-Feb-2017**	**27-Feb-2017**	28-Feb-2017	✓	**27-Feb-2017**	28-Feb-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 9, Site 3b, 3b-D	**15-Feb-2017**	**27-Feb-2017**	01-Mar-2017	✓	**27-Feb-2017**	01-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 6, Site 4	**16-Feb-2017**	**27-Feb-2017**	02-Mar-2017	✓	**27-Feb-2017**	02-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 5	**17-Feb-2017**	**27-Feb-2017**	03-Mar-2017	✓	**27-Feb-2017**	03-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Site 2, Site 10, 10-D	**18-Feb-2017**	**27-Feb-2017**	04-Mar-2017	✓	**27-Feb-2017**	04-Mar-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) Rinsate, Site 13, Site 12, Site 15, Site 11	**19-Feb-2017**	**27-Feb-2017**	05-Mar-2017	✓	**27-Feb-2017**	05-Mar-2017	✓

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)							
Alkalinity by PC Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	14	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	15	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

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 Control Samples (LCS) - Continued							
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids	EA025	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	14	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Matrix Spikes (MS) - Continued							
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	15	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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
Suspended Solids	EA025	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. 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 BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Total Metals by ICP-MS - Suite B	EG020B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- 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)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Organic Carbon	EP002	WATER	In house: Referenced to APHA 5310 B. This method is compliant with NEPM (2013) Schedule B(3) . Samples are combusted at high termperature in the presence of an oxidative catalyst. The evolved carbon dioxide is quantified using an IR detector.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to 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
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

Appendix C Hydrocarbon Data – Water

The data in the following tables was collected by BMT WBM during the dry season and wet season surveys, and summarizes results in raw laboratory reports provided in Appendix B.

Table C-1 PAH in water – dry season (June/July 2016)

Site	Polynuclear Aromatic Hydrocarbons																	
	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1.2.3.cd)pyrene	Dibenz(a.h)anthracene	Benzo(g.h.i)perylene	Sum of polycyclic aromatic hydrocarbons	Benzo(a)pyrene TEQ (zero)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
3B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
11	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
12	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
14	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
16	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
17	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
18	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
19	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
21	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
22B	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
23	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
24	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table C-2 PAH in water – wet season (Jan/Feb 2017)

Site	Polynuclear Aromatic Hydrocarbons																	
	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1.2.3.cd)pyrene	Dibenz(a.h)anthracene	Benzo(g.h.i)perylene	Sum of polycyclic aromatic hydrocarbons	Benzo(a)pyrene TEQ (zero)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1B																		
2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
3B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
11	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
12	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
14	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
16	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
17	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
18	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
19	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
20	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
21	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
22B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
23	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5
24	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5

Table C-3 TPH/TRH in water – dry season (June/July 2016)

Site	Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons						
	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)	C6 - C10 Fraction	C6 - C10 Fraction minus BTEX (F1)	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	>C10 - C16 Fraction minus Naphthalene (F2)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1B	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
2	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
3B	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
4	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
5	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
6	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
9	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
10	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
11	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
12	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
13	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
14	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
15	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
16	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
17	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
18	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
19	----	<50	<100	<50	<50	----	----	<100	<100	<100	<100	----
20	<20	----	----	----	----	<20	<20	----	----	----	----	----
21	<20	----	----	----	----	<20	<20	----	----	----	----	----
22B	----	----	----	----	----	----	----	----	----	----	----	----
23	----	----	----	----	----	----	----	----	----	----	----	----
24	<20	----	----	----	----	<20	<20	----	----	----	----	----

Table C-4 TPH/TRH in water – wet season (Jan/Feb 2017)

Site	Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons						
	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)	C6 - C10 Fraction	C6 - C10 Fraction minus BTEX (F1)	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	>C10 - C16 Fraction minus Naphthalene (F2)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1B												
2	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
3B	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
4	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
5	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
6	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
9	<20	----	----	----	----	<20	<20	----	----	----	----	----
10	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
11	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
12	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
13	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
14	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
15	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
16	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
17	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
18	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
19	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
20	<20	----	----	----	----	<20	<20	----	----	----	----	----
21	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
22B	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
23	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
24	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100

Table C-5 BTEXN in water – dry season (June/July 2016)

Site	BTEXN							
	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Sum of BTEX	Naphthalene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1B	<1	<2	<2	<2	<2	<2	<1	<5
2	<1	<2	<2	<2	<2	<2	<1	<5
3B	<1	<2	<2	<2	<2	<2	<1	<5
4	<1	<2	<2	<2	<2	<2	<1	<5
5	<1	<2	<2	<2	<2	<2	<1	<5
6	<1	<2	<2	<2	<2	<2	<1	<5
9	<1	<2	<2	<2	<2	<2	<1	<5
10	<1	<2	<2	<2	<2	<2	<1	<5
11	<1	<2	<2	<2	<2	<2	<1	<5
12	<1	<2	<2	<2	<2	<2	<1	<5
13	<1	<2	<2	<2	<2	<2	<1	<5
14	<1	<2	<2	<2	<2	<2	<1	<5
15	<1	<2	<2	<2	<2	<2	<1	<5
16	<1	<2	<2	<2	<2	<2	<1	<5
17	<1	<2	<2	<2	<2	<2	<1	<5
18	<1	<2	<2	<2	<2	<2	<1	<5
19	----	----	----	----	----	----	----	----
20	<1	<2	<2	<2	<2	<2	<1	<5
21	<1	<2	<2	<2	<2	<2	<1	<5
22B	----	----	----	----	----	----	----	----
23	----	----	----	----	----	----	----	----
24	<1	<2	<2	<2	<2	<2	<1	<5

Table C-6 BTEXN in water – wet season (Jan/Feb 2017)

Site	BTEXN							
	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Sum of BTEX	Naphthalene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
1B								
2	<1	<2	<2	<2	<2	<2	<1	<5
3B	<1	<2	<2	<2	<2	<2	<1	<5
4	<1	<2	<2	<2	<2	<2	<1	<5
5	<1	<2	<2	<2	<2	<2	<1	<5
6	<1	<2	<2	<2	<2	<2	<1	<5
9	<1	<2	<2	<2	<2	<2	<1	<5
10	<1	<2	<2	<2	<2	<2	<1	<5
11	<1	<2	<2	<2	<2	<2	<1	<5
12	<1	<2	<2	<2	<2	<2	<1	<5
13	<1	<2	<2	<2	<2	<2	<1	<5
14	<1	<2	<2	<2	<2	<2	<1	<5
15	<1	<2	<2	<2	<2	<2	<1	<5
16	<1	<2	<2	<2	<2	<2	<1	<5
17	<1	<2	<2	<2	<2	<2	<1	<5
18	<1	<2	<2	<2	<2	<2	<1	<5
19	<1	<2	<2	<2	<2	<2	<1	<5
20	<1	<2	<2	<2	<2	<2	<1	<5
21	<1	<2	<2	<2	<2	<2	<1	<5
22B	<1	<2	<2	<2	<2	<2	<1	<5
23	<1	<2	<2	<2	<2	<2	<1	<5
24	<1	<2	<2	<2	<2	<2	<1	<5

Appendix D Hydrocarbon Data – Sediment

The data in the following tables was collected by BMT WBM during the dry season survey, and summarizes results in raw laboratory reports provided in Appendix B.

Table D-1 PAH in sediment – dry season (June/July 2016)

Site	Polynuclear Aromatic Hydrocarbons																			
	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1.2.3.cd)pyrene	Dibenz(a.h)anthracene	Benzo(g.h.i)perylene	Sum of polycyclic aromatic hydrocarbons	Benzo(a)pyrene TEQ (zero)	Benzo(a)pyrene TEQ (half LOR)	Benzo(a)pyrene TEQ (LOR)
	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
1B	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
3B	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
13	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
15	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
16	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
18	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
19	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
21	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
22B	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
23	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
24	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2

Table D-2 TPH/TRH in water – dry season (June/July 2016)

Site	Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons						
	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)	C6 - C10 Fraction	C6 - C10 Fraction minus BTEX (F1)	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	>C10 - C16 Fraction minus Naphthalene (F2)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1B	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
2	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
3B	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
4	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
5	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
6	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
9	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
10	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
11	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
12	<10	<50	<100	<100	<50	<10	<10	<50	**110**	<100	**110**	<50
13	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
14	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
15	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
16	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
17	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
18	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
19	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
20	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
21	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
22B	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
23	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50
24	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50

Table D-3 BTEXN in sediment – dry season (June/July 2016)

Site	BTEXN							
	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Sum of BTEX	Naphthalene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1B	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
3B	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
4	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
6	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
9	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
10	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
11	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
12	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
13	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
14	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
15	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
16	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
17	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
18	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
19	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
20	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
21	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
22B	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
23	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1
24	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<1



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